



GROWING GREEN MINDS: ECOLOGICAL AWARENESS ACROSS DISCIPLINES IN TURKEY'S MIDDLE SCHOOL CURRICULUM (GRADES 6–8)

Meltem İPEK ÖNER, Yelkin DIKER COSKUN, İlkey BÜLBÜL

Abstract: This study investigates the extent to which ecological awareness is integrated into the middle school curricula (Grades 6–8) in Turkey. Utilizing a qualitative research approach, content analysis was conducted on 13 compulsory courses from the 2022–2023 academic year. The analysis involved thematic coding and frequency distribution of 171 ecological keywords categorized into nine themes, such as energy, climate, and agriculture. The findings reveal that while concepts related to ecological awareness are present in courses like Environmental Education and Climate Change and Natural Sciences, their integration across the curriculum is inconsistent with several courses lacking any reference to ecological themes. The study highlights a critical need to expand ecological knowledge and foster interdisciplinary connections to strengthen the curriculum's ability to cultivate ecological awareness. These findings have broader implications for curriculum design, emphasizing the importance of aligning educational frameworks with global sustainability goals to prepare future generations for environmental challenges.

Keywords: Ecological awareness, ecological literacy, curriculum evaluation, sustainability, middle school education.

1. Introduction

“The Earth does not belong to us: we belong to the Earth.” This profound statement by Chief Seattle resonates deeply in today's world, where global environmental challenges are escalating at an alarming rate. These issues are no longer confined to ecological degradation but threaten the survival of all living beings and the possibility of a sustainable future. Addressing these challenges requires more than passive acknowledgment; it demands active participation and awareness from individuals. Nature alone cannot solve these crises—it depends on human action (Ingaldi, 2009; Marpa, 2020). Among the foundational concepts for tackling such challenges is ecological awareness, which encompasses understanding the interconnectedness of all life on Earth and embracing our responsibility as stewards of the planet for future generations (Arudanti et al., 2020; Kokkinen, 2013; Riley, 2000).

To explore ecological awareness, one must first understand the foundational concepts of ecology and environment. Ernst Haeckel, a German zoologist, introduced the term ecology, derived from the Greek word *oikos* (home), to describe the interaction between organisms and their organic and inorganic surroundings. Ecology thus focuses on the relationships between organisms and their environment, encompassing interactions within and between populations (Smith & Pimm, 2024). While environment refers broadly to living and non-living elements in an ecosystem, ecology is a more comprehensive concept that examines dynamic interactions in greater depth. Accordingly, ecological awareness extends beyond environmental awareness, reflecting a deeper understanding of biospheric components and their interrelations.

Ecological awareness represents a broad social consciousness shaped by individuals' thoughts, experiences, and living standards (Kociszewska, 2014; Kokkinen, 2013). It includes shared knowledge, perspectives, and beliefs about the environment's role in human life, environmental risks, and conservation efforts, alongside familiarity with environmental management tools and processes (Jaska,

Received April 2024.

Cite as: İpek-Oner, M., Diker-Coskun, Y., Bülbül, İ. (2024). Growing Green Minds: Ecological Awareness Across Disciplines in Turkey's Middle School Curriculum (Grades 6 to 8). *Acta Didactica Napocensia*, 17(2), 137-152, <https://doi.org/10.24193/adn.17.2.11>

2009; Kollmus & Agyeman, 2022). Key indicators of ecological awareness include attentiveness to environmental issues, proactive information-seeking behaviors, eco-friendly consumption habits, and knowledge of sustainable products (Bronfman et al., 2015). Cultivating these attributes requires the integration of ecological awareness into education systems, beginning in early childhood and continuing throughout a student's academic journey. This approach equips individuals with the values, skills, and knowledge needed to address pressing environmental challenges (UNESCO, 1977).

Ecological awareness can be identified through several key indicators, including attentiveness to environmental issues and a proactive approach to seeking information on these matters, concern for eco-friendly purchasing habits, and awareness of environmentally sustainable products (Bronfman et al., 2015). These indicators emphasize that fostering ecological awareness requires a thorough integration of environmental issues and problem-solving strategies across all levels of education. Embedding ecological awareness within the formal education system, beginning in early education and continuing throughout a student's academic journey, provides individuals with essential knowledge, values, and skills necessary for addressing pressing environmental challenges effectively (UNESCO, 1977). Given that individuals' attitudes and awareness are significantly shaped from a young age, providing early environmental education is crucial for building strong ecological attitudes and fostering long-lasting awareness (Baldu & Ömeroğlu, 2017; Evans et al., 2018; Marques & Xavier, 2020). Preschool education plays a foundational role, as early childhood experiences profoundly shape future learning and greatly influence how individuals perceive ecological issues later in life (Helldén & Helldén, 2008). As students progress into secondary education, curricula should focus on equipping them with the knowledge and practical skills needed to understand and sustain ecological systems, aligning high school learning in subjects like Physics, Chemistry, and Biology with a broader ecological perspective. Such alignment reinforces students' understanding of ecosystem dynamics and promotes practical environmental applications (Arudenti et al., 2020). Additionally, adopting a spiral curriculum model enhances ecological awareness across educational stages. This pedagogical approach, developed by Bruner (1960), involves the gradual revisiting of subjects, progressing from foundational concepts to increasingly complex ones. By reinforcing ecological knowledge and skills over time, the spiral model fosters a deeper, more resilient understanding of ecological principles, ultimately supporting individuals in developing a lifelong commitment to environmental stewardship.

Ecological Literacy and Curriculum

Ecological literacy, identified as a fundamental necessity for building a sustainable society in the 21st century (Capra & Stone, 2010, as cited in Pitman et al., 2016) incorporates an individual's ecological knowledge and their capacity and willingness to apply this knowledge towards sustainable living (Monaghan & Curthoys, 2008). This multidimensional literacy involves not only understanding ecological principles but also translating this understanding into actions that promote environmental protection (Angelovska et al., 2012; Arudenti et al., 2020). Ecologically literate individuals are cognizant of nature's limits and act in ways that conserve and preserve the environment. Acquiring the requisite knowledge marks the initial step toward ecological literacy, necessitating well-planned educational interventions (Roth, 1992; Barnett, 2011). Such interventions should not only impart knowledge but also facilitate the translation of knowledge into behavior, thereby fostering ecologically literate individuals and contributing to a sustainable future (Demir, 2022). In the context of curriculum terminology, ecological literacy encompasses the content, skills, and processes that learners should understand and possess to demonstrate 'literacy' in this domain (Cutter-Mackenzie & Smith, 2003). Despite the common interchangeability of ecological literacy and environmental literacy in literature, they represent distinct concepts. Environmental literacy, as commonly defined, encompasses understanding the environment, an active interest in environmental issues, and a commitment to addressing present and future environmental challenges (NAAEE, 2004, as cited in McBride et al., 2013).

The term climate crisis encapsulates the challenges stemming from global warming and climate change, necessitating a foundational understanding of these phenomena and their associated environmental impacts. Climate change refers to sustained alterations in temperatures and weather patterns, driven by natural phenomena like volcanic eruptions as well as human-induced activities (United Nations, n.d.). Human actions such as burning fossil fuels and deforestation contribute to the accumulation of greenhouse gases in the atmosphere, leading to regional and global warming (IPCC, 1996). Since the

mid-19th century, alongside natural climate variability, human activities have significantly influenced global climate dynamics, characterizing contemporary climate change as predominantly driven by human-induced greenhouse gas emissions (SPO, 2000). This shift poses a substantial threat to ecosystems and biodiversity, manifesting in adverse outcomes such as increased forest fires and glacier melting. Conversely, global warming specifically denotes the rise in temperatures near the Earth's surface (Anderson, 2012).

An integral factor contributing to environmental challenges, increasingly recognized as critical today, is the lack of essential knowledge and skills among individuals regarding the significance of the environment, the root causes of environmental issues, and potential solutions (Siraj-Blatchford et al., 2010). While education traditionally commences within the family unit, formal education channels must also actively engage individuals in environmental education from early stages (Chawla & Derr, 2012; Marques & Xavier, 2020). Environmental education endeavors to cultivate environmentally literate individuals capable of navigating a global economy, making informed decisions, and fulfilling societal responsibilities (Akçay & Pekel, 2017; NAAEE, 2001; Wang, 2014). This educational approach not only supports efforts to address existing environmental problems but also empowers individuals to devise preventative measures for potential challenges. Curriculum design plays a crucial role in this endeavor, requiring educational programs that instill concepts essential for building sustainable communities and ensuring ecological continuity, such as principles of ecology, sustainability, and community (Capra, 2007; Tibble, 2009).

With regards to Turkish context, The Ministry of National Education's (MoNE) 2024-2028 Strategic Plan emphasizes the value of environmental sensitivity and the right to life for all living beings, aligning with the goal of equipping students with universal values, knowledge, skills, attitudes, and behaviors relevant to contemporary demands (MoNE, 2024). Given that environmental protection and heightened ecological consciousness contribute to safeguarding common human values and ensuring life's sustainability, integrating ecology and environment concepts more prominently in the curriculum becomes crucial, offering learners vital life skills in these domains. As also outlined in the 2024-2028 Strategic Plan of the Turkish Ministry of Environment, Urbanization, and Climate Change (MEUCC), a key objective is to safeguard the environment and natural resources, promote sustainable environmental management, address climate change challenges, and enhance the country's adaptation capabilities (MEUCC, 2024).

Middle school education, encompassing grades 6–8, represents a pivotal stage in students' cognitive and moral development, making it an ideal period for cultivating ecological awareness. At this age, students begin to develop higher-order thinking skills, such as critical analysis, ethical reasoning, and the ability to understand complex systems. These cognitive advancements enable them to grasp the interdependence of ecological systems and the societal impacts of environmental challenges. Research indicates that middle school students are particularly receptive to values-based education, including concepts of sustainability and stewardship, which can shape their attitudes and behaviors into adulthood (Evans et al., 2018; Marques & Xavier, 2020). Furthermore, the middle school curriculum is uniquely positioned to introduce interdisciplinary connections. Subjects like Natural Sciences, Social Sciences, and even Mathematics and Technology offer opportunities to embed ecological concepts in meaningful ways. For instance, students can explore the science of ecosystems in biology, discuss environmental policies in social studies, and analyze data on energy consumption in mathematics. These integrative approaches align with Bruner's (1960) spiral curriculum model, which emphasizes revisiting and building on foundational knowledge at progressively higher levels of complexity.

The environmental challenges we face today make ecological awareness more important than ever. Educating students to be environmentally conscious and responsible should be a key priority in our schools. In Turkey, grades 6–8 coincide with a crucial phase in the national education system where students transition from foundational learning to more specialized subjects. The Ministry of National Education's curriculum reforms emphasize preparing students for the challenges of a globalized world, including environmental sustainability. Given the country's unique ecological and cultural context—marked by challenges such as water scarcity, deforestation, and urbanization—focusing on this educational stage ensures that students are equipped with the knowledge, skills, and values needed to

address these issues effectively. By targeting grades 6–8, this study aims to evaluate whether the curriculum adequately supports the development of ecological awareness during this formative period.

Upon reviewing the relevant literature, it has been determined that there is a scarcity of studies conducted on this topic. The studies primarily concentrate on environmental literacy (e.g. Coyle 2005; Derman & Hacıeminoğlu, 2017; McBeth & Volk, 2009; Negev et al., 2008; Shephard et al., 2013; Teksoz et.al, 2011; Timur et. al, 2015; Aydın et.al, 2022) and environmental awareness (e.g. Altın et al., 2014; Larijani, 2010; Ogunbode & Arnold, 2012; Oğuz, et.al, 2011; Özden, 2008; Simsekli, 2015) ecological literacy (Demir, 2022; Dündar & Kızık, 2022; Öcal, 2020; Nugraha et. al, 2022; Yapraklı & Mutlu, 2021) and ecological awareness (Jaska, 2009; Kociszewska, 2014; Shobeiri, Rezaei & Ranjbari, 2020). Rather than filling a gap in existing research, the study highlights the essential role of ecological literacy in equipping students with the knowledge and skills necessary for sustainable living and fostering a culture of environmental responsibility. The research addresses several critical questions: To what extent is ecological awareness incorporated into the middle school curriculum? How do various subjects differ in their emphasis on ecological themes? Furthermore, it explores the specific ecological concepts included across grades 6-8, their distribution across different subjects, and the extent to which the curriculum's competencies and values align with ecological awareness. By evaluating both the presence and depth of ecological themes across key subjects, the study identifies strengths and areas for improvement in curriculum design. Its findings contribute to a deeper understanding of how educational systems can better support ecological literacy, ultimately aiding in the development of a more sustainable and environmentally conscious framework for future generations.

2. Methodology

2.1 Study Purpose and Scope

This study aims to evaluate the integration of ecological awareness within the middle school curricula for grades 6, 7, and 8 in Turkey. Content analysis was conducted on thirteen compulsory courses taught during the 2022-2023 academic year, as outlined by the Ministry of National Education. These courses include curricula revised as recently as 2018, such as Environmental Education and Climate Change (introduced in 2022) and Turkish Language (last updated in 2019) (see Table 1).

Table 1. *Curricula of compulsory courses at primary 6-8 grade levels*

Course Name-Code	Year of Revision	Grade
Turkish-TR	2019	6, 7, 8
Social Sciences-SS	2018	6, 7
Turkish History of Revolution-HTR	2018	8
Natural Sciences-NS	2018	6, 7, 8
Mathematics-M	2018	6, 7, 8
Physical Education and Sports-PE	2018	6, 7, 8
Environmental Education and Climate Change-EE	2022	6, 7, 8
Visual Arts-VA	2018	6, 7, 8
Information Technologies and Software-ITS	2018	6
Technology and Design-TD	2018	7, 8
Music-MU	2018	6, 7, 8
Religious Culture and Moral Knowledge-R	2018	6, 7, 8
English-EN	2018	6, 7, 8

2.2 Selection and Validation of Ecological Themes

The selection of the nine ecological themes—energy, agriculture, pollution, ecology, natural resources, climate, natural disasters, flora and fauna, and living (Figure 1)—was grounded in an extensive review of existing literature and international educational frameworks on ecological awareness (e.g., UNESCO, 1977; OECD, 2004). These themes reflect core components of ecological literacy and align with key global environmental challenges such as climate change, biodiversity loss, and sustainable resource management. To ensure validity, the themes were cross-referenced with the objectives and standards set

forth in Turkey's national curriculum guidelines, as well as the emerging priorities identified in policy documents like the Ministry of National Education's Strategic Plan 2024–2028 (MoNE, 2024). A panel of experts in environmental education and curriculum design reviewed the themes for relevance and comprehensiveness. Their feedback confirmed the appropriateness of these categories in capturing the breadth of ecological awareness.

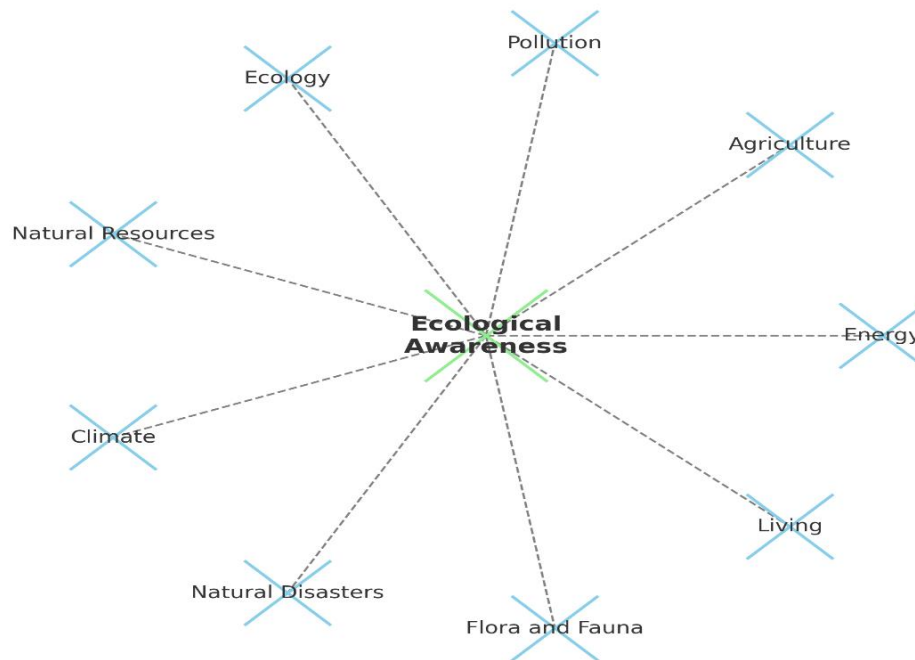


Figure 1. *Thematic Framework for Ecological Awareness*

2.3 Content Analysis Process

The content analysis method was applied to examine the representation of ecological awareness in the curricula for grades 6–8. This process involved several key steps, which are illustrated in Figure 2.

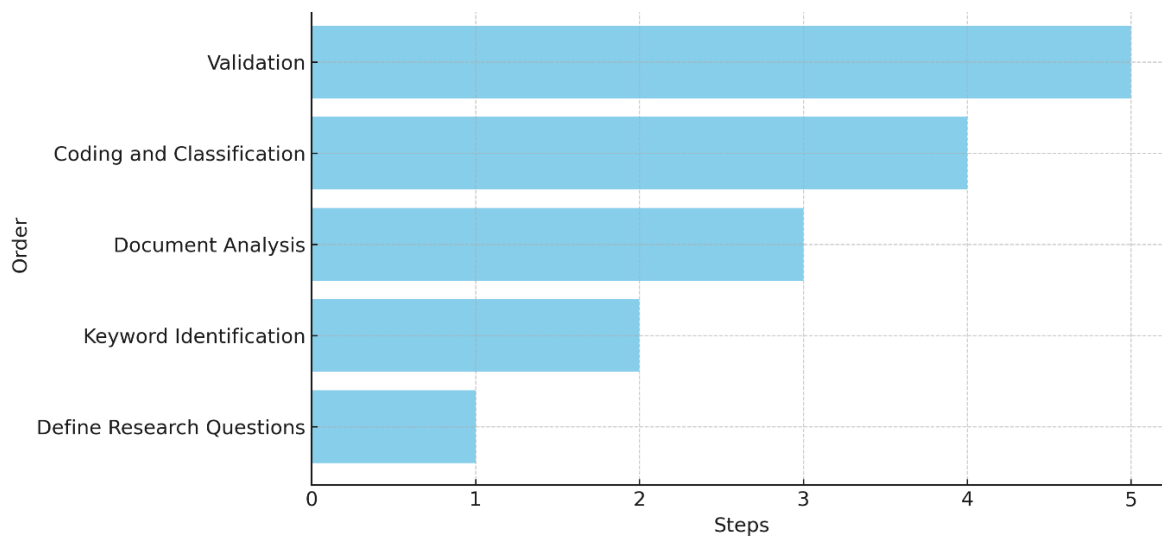


Figure 2. *Key Steps in the Content Analysis Process*

2.3.1 Definition of Research Questions

The analysis was guided by following specific research questions:

1. To what extent is ecological awareness incorporated into the middle school curriculum?
2. How do various subjects differ in their emphasis on ecological themes?
3. Which ecological concepts are included, and how are they distributed across grades and subjects?

2.3.2 Keyword Identification and Categorization

Building on the nine validated themes (Figure 1), a list of 171 relevant keywords (e.g., *recycling*, *renewable energy*, *sustainability*) was systematically developed. These keywords were carefully derived from the themes to ensure alignment with the study's objectives and the ecological literacy indicators identified in the literature.

2.3.3 Document Analysis

Each course curriculum was analyzed systematically to count the occurrences of these keywords in sections such as general objectives, values, competencies, and student learning outcomes (SLOs). The frequency and distribution of keywords were recorded in an Excel spreadsheet for quantitative analysis.

2.3.4 Coding and Classification

Keywords were coded as either "strongly related" or "related" to ecological awareness based on their contextual usage in the curriculum. This classification provided insights into the depth of ecological integration across subjects.

2.3.5 Validation of the Analysis

To ensure reliability, the coding process was independently conducted by multiple raters. Discrepancies were resolved through discussion, guided by a coding manual outlining inclusion criteria for each theme.

Validity

Internal validity was strengthened by aligning the coding process closely with the study's goals. Keywords and themes were selected to directly reflect ecological awareness. For example, terms like "recycling," "renewable energy," and "sustainable development" were included as they explicitly relate to ecological awareness. In contrast, broader terms like "environment" were scrutinized and only counted when they referred to natural settings relevant to ecology. This selective approach ensured that the focus remained precise and eliminated irrelevant data. The analysis followed a clearly defined process to minimize subjective interpretations, ensuring the findings accurately reflected how ecological topics are addressed in the curriculum. Internal validity was strengthened by carefully analyzing the learning outcomes for their relevance to ecological awareness. Learning outcomes were reviewed for the presence of keywords either in the main body or the explanatory sections. To maintain a precise focus, outcomes containing off-context keywords were excluded from the analysis. For instance, keywords such as "recycling" or "renewable energy" were retained when directly linked to ecological themes, while broader or ambiguous terms were assessed critically. This ensured that only relevant learning outcomes were considered, aligning the analysis closely with the study's objectives. Additionally, the remaining learning outcomes were rated on a two-point scale as "strongly related" or "related" to ecological awareness, reflecting the intensity of their focus. This process enhanced internal validity by ensuring that the findings accurately captured the presence and depth of ecological themes in the curriculum.

External validity, which relates to the generalizability of the findings, was supported by analyzing all core courses prescribed by the Ministry of National Education for grades 6, 7, and 8. This included a wide range of subjects, from Science and Social Studies to Mathematics, Physical Education, and the newly introduced Environmental Education and Climate Change course. By covering this diverse set of disciplines, the study captured a holistic picture of how ecological awareness is integrated across the curriculum. For example, the Environmental Education course provided targeted insights into ecological

themes, while subjects like Mathematics and Visual Arts illustrated how ecological concepts appear in less obvious contexts. This broad approach ensures the findings are relevant across the Turkish educational system and comparable to similar curriculum structures.

Reliability

To ensure internal reliability, multiple raters independently reviewed the coding of keywords and themes. Each rater assessed terms like “biodiversity” and “natural resources” to determine their relevance to ecological awareness. Any discrepancies were resolved collaboratively using a structured coding guide with clear criteria for inclusion. This process ensured consistency in the analysis and minimized potential biases. For instance, if one rater flagged “ecosystem” in a specific context as unrelated to ecological awareness, it was re-evaluated to maintain alignment with the study’s goals. The high level of inter-rater reliability achieved through this process ensured that the frequency counts and thematic categorizations accurately captured the ecological content in each subject. To ensure the results were consistent and dependable, multiple researchers independently rated the learning outcomes using a two-point scale: “strongly related” or “related” to ecological awareness. When there were differences in ratings, the team worked together to resolve them using clear and agreed-upon criteria. This process helped reduce bias and ensured that everyone was interpreting the outcomes in the same way.

External reliability, focusing on the study's replicability, was enhanced by thoroughly documenting the data analysis process. This included detailed records of coding categories, thematic keywords, and procedural steps, making it possible for future researchers to replicate the study in similar contexts. For example, the coding process for terms like “pollution” and “climate” was carefully outlined, providing a clear roadmap for applying the methodology to other curricula or grade levels. This transparency ensures that the findings can be reliably reproduced, supporting broader validation of the study.

These measures ensured that the study's findings were not only accurate and consistent but also applicable beyond the specific context examined. By providing a robust analysis of how ecological awareness is integrated into the Turkish middle school curricula, the study contributes meaningfully to the field of education.

3. Results

The analysis of 13 core courses across grades 6–8 reveals significant disparities in the representation of ecological awareness (Table 2).

Table 2. Frequency distributions of key words related to ecological awareness

Course Codes /Keywords	Ecology	Energy	Natural Resources	Climate	Pollution	Natural Disasters	Flora and Fauna	Living	Agriculture	TOTAL
EE	92	30	70	53	36	24	7	18	8	338
NS	23	111	31	22	19	7	11	3	4	231
EN	15	7	21	6	10	24	17	0	1	101
TD	14	17	30	1	13	1	0	1	1	78
SS	24	10	16	9	0	2	2	4	1	68
VA	6	4	1	1	1	2	0	1	0	16
TR	5	0	0	1	0	3	3	1	0	13
PE	7	2	1	0	0	0	0	0	0	10
M	0	0	2	0	2	0	0	0	0	4
HIS	0	1	0	0	0	0	0	0	1	2
ITS	0	0	0	0	0	0	0	0	0	0
MU	0	0	0	0	0	0	0	0	0	0
R	0	0	0	0	0	0	0	0	0	0
Total	186	182	172	93	81	63	40	28	16	861

Courses with the highest frequency of related keywords are *Environmental Education and Climate Change* ($\Sigma=338$), *Natural Sciences* ($\Sigma=231$), *English* ($\Sigma=101$), *Technology and Design* ($\Sigma=78$), and *Social Sciences* ($\Sigma=68$) (Table 2). Conversely, three courses—*Information Technologies and Software*, *Music*, and *Religious Culture and Moral Knowledge*—contain no keywords related to ecological awareness (see Table 2). The most frequently occurring themes are *ecology* ($f=186$), *energy* ($f=182$), and *natural resources* ($f=172$). In contrast, *agriculture* ($f=16$) is the least represented theme. Across all curricula for grades 6–8, a total of 861 ecological awareness-related keywords were identified.

The curriculum documents of core courses in grades 6–8 have sections that explain the major philosophy, general objectives, key competencies, values education, testing and evaluation approach, and individual development of learners; these sections are common and identical for all 13 core courses. Besides these, there are sections that are course-specific and that may vary across different documents, such as the specific goals, structure of the curriculum, competencies, and value education specific to the subject area, important issues for the application of the curriculum, suggestions for practice, and student learning outcomes.

Document analysis reveals that keywords related to ecological awareness are absent in the common sections of the curriculum, including *general objectives*, *competencies*, and *values*. For example, in the general objectives, the term “awareness” appears only once, referring specifically to “aesthetic awareness” rather than ecological awareness. The curriculum lists key competencies, aligned with European Commission standards, including *communication in the mother tongue*, *communication in foreign languages*, *literacy*, *basic skills in math and science*, *learning to learn*, *social and civic responsibility*, *initiative and entrepreneurship*, and *cultural awareness and creativity* (European Commission, 2006). However, none of these explicitly reference ecological awareness. Similarly, the key values emphasized across the curriculum—such as *friendship*, *justice*, *honesty*, *self-control*, *patience*, *respect*, *love*, *responsibility*, *patriotism*, and *altruism*—do not include values directly connected to ecological awareness.

In examining course-specific sections, it was found that certain courses explicitly target ecological awareness through specific goals or competencies. For instance, the *Social Sciences* course has 3 specific goals with 9 occurrences of ecological awareness keywords ($\Sigma=3$, $f=9$), while *Natural Sciences* includes 4 goals with 7 occurrences ($\Sigma=4$, $f=7$). The *Environmental Education and Climate Change* course incorporates 14 specific goals and 25 occurrences of ecological awareness keywords ($\Sigma=14$, $f=25$). Other courses with ecological awareness-focused goals include *Physical Education and Sports* ($\Sigma=1$, $f=1$), *Technology and Design* ($\Sigma=3$, $f=5$), and *English Language* ($\Sigma=1$, $f=2$). Ecological awareness keywords appear most frequently in the student learning outcomes (SLOs) of specific courses. In total, there are 201 SLOs related to ecological awareness across grades 6–8, distributed as follows: 49 in grade 6, 80 in grade 7, and 71 in grade 8 (see Table 3 and Figure 3).

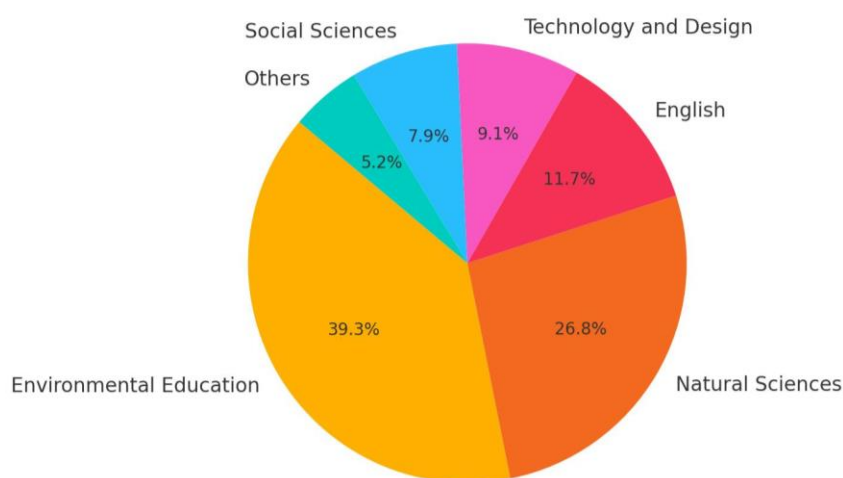
Highlights from Table 3 are summarized below:

- *Environmental Education and Climate Change* has the highest number of ecological awareness-related SLOs, with 34 strongly related outcomes consistently repeated across grades 6, 7, and 8.
- *Natural Sciences* follows, with a total of 34 SLOs, of which 29 are strongly related to ecological awareness.
- The *English Language* course includes 28 ecological awareness-related SLOs, with 20 being strongly related.
- *Technology and Design* has 19 relevant SLOs, 13 of which are strongly related, applicable across grades 7 and 8.
- *Social Sciences* includes 11 SLOs, with 7 of them strongly related, covering grades 6 and 7.

Table 3. Number of SLOs related to ecological awareness across grade levels and courses

Course Code	Grade 6		Grade 7		Grade 8		Course Total
	Strongly Related	Related	Strongly Related	Related	Strongly Related	Related	
EE*	34	0	34	0	34	0	102
NS	1	1	9	2	19	2	34
EN	6	1	7	7	7	0	28
TD	-	-	10	3	3	3	19
SS	4	1	3	3	-	-	11
PE	0	2	0	1	0	1	4
VA	0	0	1	0	0	2	3
TR	0	0	0	0	0	0	0
HIS	-	-	-	-	0	0	0
M	0	0	0	0	0	0	0
ITS	0	0	-	-	-	-	0
MU	0	0	0	0	0	0	0
R	0	0	0	0	0	0	0
Total	45	5	64	16	63	8	201

Note: The same 34 outcomes are repeated across grades in Environmental Education and Climate Change. Outcomes in other courses vary by grade.

**Figure 3.** Proportional Representation of Ecological Themes Across Subjects

Courses like Physical Education and Sports and Visual Arts have fewer SLOs related to ecological awareness. While Physical Education and Sports has 4 SLOs, none are classified as strongly related. Visual Arts includes minimal content, with one strongly related SLO in grade 7 and two moderately related SLOs in grade 8. Among the 13 core courses, six (Turkish Language, Turkish History of Revolution, Mathematics, Information Technologies and Software, Music, and Religious Culture and Moral Knowledge) do not contain any SLOs related to ecological awareness. While some of these courses, like Turkish ($\Sigma=13$), Mathematics ($\Sigma=4$), and Turkish History of Revolution ($\Sigma=2$), contain keywords related to ecological awareness in their documents, these references do not extend to their SLOs.

4. Discussion and Conclusion

The findings of this study reveal critical insights into how ecological awareness is embedded within the middle school curriculum in Turkey. The analysis highlights inconsistencies in the integration of ecological themes across subjects in grades 6 to 8, reflecting broader patterns in the literature. Studies emphasize that embedding ecological concepts across multiple disciplines fosters a more holistic understanding and increases the likelihood of nurturing environmentally responsible behaviors among students (Evans et al., 2018; Wals & Corcoran, 2012). For example, Evans, Otto, and Kaiser (2018) stress that early exposure to ecological themes can significantly shape lifelong environmental attitudes and behaviors. Similarly, interdisciplinary approaches to ecological education have proven effective in deepening students' understanding by linking concepts across subjects, ultimately enhancing ecological literacy (Gifford & Nilsson, 2014; Marques & Xavier, 2020). These findings underscore the importance of a cohesive and integrated approach to ecological education, ensuring students are not only aware of environmental issues but also equipped to address them meaningfully.

Although subjects such as Environmental Education, Natural Sciences, and Social Sciences incorporate ecological themes, others, including Information Technologies, Music, and Religious Culture and Moral Knowledge, lack significant references to ecological awareness. This absence represents a missed opportunity to foster environmental consciousness through diverse and innovative contexts. For instance, Music classes in Turkey, which often celebrate regional and cultural traditions, could integrate ecological themes by using folk songs or compositions that highlight environmental conservation and the beauty of Turkey's natural landscapes. Similarly, Religious Culture courses could incorporate Islamic teachings about stewardship (khalifa) and the moral responsibility to protect the environment, connecting these principles to sustainability in a way that resonates with students' cultural and spiritual identities.

Interdisciplinary education offers immense potential in bridging these gaps. In Turkey, where Mathematics and Information Technologies play a significant role in preparing students for STEM-related careers, integrating sustainability concepts into these subjects could encourage innovative problem-solving and critical thinking. For example, Mathematics could be used to teach students about the environmental costs of food waste or energy consumption, while Information Technologies could involve projects that design apps or tools for tracking and reducing ecological footprints. Stern et al. (2015) and Wals (2015) emphasize that embedding ecological principles into multiple domains enhances their real-world relevance, allowing students to better grasp the interconnected nature of environmental challenges.

While the curriculum's focus on ecology, energy, and natural resources aligns with recognized environmental priorities, the limited attention given to agriculture signals an incomplete approach to ecological education. Given Turkey's strong agricultural sector, this omission is particularly striking. The OECD's *Agriculture and the Environment* report stresses the vital role of public education in addressing agriculture's environmental impacts and promoting responsible consumption and sustainable practices (OECD, 2004). Expanding agricultural themes within the curriculum could also address national challenges, such as water management in drought-prone regions and sustainable farming practices in areas like the Southeastern Anatolia Project (GAP). By integrating agricultural themes into Social Studies or Natural Sciences, students could gain a deeper understanding of how farming practices intersect with broader ecological systems, including biodiversity and climate, while learning how Turkey's unique geographical and cultural context influences sustainable practices.

Global frameworks like UNESCO (2017) and OECD (2004) advocate for a strong focus on agricultural sustainability, yet this study reveals minimal emphasis on agriculture in Turkey's middle school curriculum. This gap may stem from a historical tendency to focus on urbanization and industrialization in education, sidelining agricultural and rural concerns. Addressing this issue through targeted curricular reforms could help Turkey align more closely with international standards while equipping students to tackle pressing challenges, such as ensuring food security and adapting to climate change.

The study's analysis of common curriculum sections, such as general objectives, competencies, and values, reveals a systemic gap in fostering ecological awareness explicitly. While key competencies informed by European Commission standards are included, none directly address ecological

responsibility. Moreover, values such as friendship, justice, and responsibility do not explicitly integrate sustainability or environmental ethics. This absence highlights the need for curricular revisions that embed ecological awareness into social and civic competencies, ensuring students develop a sense of sustainability as part of their civic identity (Gifford & Nilsson, 2014; European Commission, 2006).

One of the most striking findings is the omission of ecological responsibility as a core value, despite references to European Commission standards. This omission contrasts with the approaches of countries like Finland and Sweden, where sustainability is deeply embedded in national education goals and civic consciousness (Helldén & Helldén, 2008). In Turkey, ecological awareness appears to be treated as a secondary or optional component, reflecting broader societal trends where environmental issues have yet to become fully integrated into educational and cultural priorities. However, Turkey's cultural heritage, including a long-standing connection to nature reflected in its literature, art, and traditional practices, provides a unique opportunity to weave ecological themes into education. For instance, references to Turkish poets like Yahya Kemal Beyatlı, who celebrated the natural beauty of the Bosphorus, could inspire students to appreciate and protect their local environment.

Professional development for educators emerges as a key component for fostering meaningful ecological education. Teachers must be equipped with tools and strategies to integrate sustainability into their lessons effectively. Workshops focusing on interdisciplinary teaching methods, such as project-based learning or community engagement activities, could help educators connect ecological concepts to practical applications. For example, organizing a local tree-planting initiative tied to lessons in Science and Social Studies could reinforce theoretical knowledge with impactful, hands-on experiences.

The use of digital tools and innovative technologies also offers promising pathways for advancing ecological education. Turkey's rapidly expanding digital infrastructure could support the adoption of tools such as virtual field trips to conservation areas like Cappadocia or Mount Nemrut. These experiences could bring ecological concepts to life while fostering pride in Turkey's unique environmental heritage.

Active, experiential learning strategies remain critical for cultivating ecological literacy. Projects, field trips, and community-based initiatives allow students to directly engage in environmental issues, making ecological principles tangible and relevant to their daily lives (Coyle, 2005; Evans et al., 2018). Partnerships with NGOs or local stakeholders, such as the TEMA Foundation, officially known as the Turkish Foundation for Combating Soil Erosion, for Reforestation, and the Protection of Natural Habitats could further enrich these experiences, providing real-world perspectives on sustainability challenges and solutions (Marques & Xavier, 2020).

Developing assessment strategies aligned with ecological outcomes is another critical component. Formative and summative assessments, such as reflective journals, project-based evaluations, or portfolio work, can measure not only students' knowledge but also their attitudes and engagement with ecological issues (Teksöz et al., 2011; UNESCO, 2017). These assessments ensure a comprehensive approach to evaluating students' progress in environmental literacy.

Promoting environmental citizenship remains an essential goal. Encouraging students to see themselves as active participants in sustainability, rather than passive learners, fosters a sense of stewardship and responsibility. Embedding ecological citizenship within the curriculum aligns ecological literacy with civic responsibility, a synergy demonstrated by the educational systems of Finland and Sweden (Helldén & Helldén, 2008). By connecting sustainability with students' roles as global citizens, the curriculum can inspire proactive, lifelong engagement with ecological issues.

To meet the growing demands of ecological literacy and inspire the next generation of green minds, Turkey's curriculum can take bold steps toward creating meaningful change. This approach envisions a future where ecological awareness is not just a subject to study but a way of thinking embedded across all areas of learning. By reimagining competencies to emphasize creativity, innovation, and real-world problem-solving, students will be equipped to address environmental challenges with confidence and purpose. Experiential learning will play a vital role, connecting students to their environment through practical activities like renewable energy projects, urban greening initiatives, and biodiversity preservation. These hands-on experiences will deepen their understanding of sustainability and foster a

lifelong connection to the natural world. Meaningful assessments will celebrate students' contributions to their communities, focusing on the positive impact they create rather than simply measuring knowledge. Rooted in Turkey's cultural heritage, which values living in harmony with nature, this curriculum would draw inspiration from both local traditions and global best practices. This blend will help students develop a strong sense of identity while preparing them to contribute to a rapidly changing world. In this vision, Turkey's students will become changemakers with green minds, ready to lead the way toward a sustainable and inclusive future. They will graduate not just with knowledge, but with the compassion, creativity, and courage needed to inspire others and build a world where humanity and nature coexist in balance. This is a future worth striving for—a future where education is a catalyst for lasting, positive change.

References

- Akçay, S., & Pekel, F. O. (2017). Öğretmen adaylarının çevre bilinci ve çevresel duyarlılıklarının çeşitli değişkenler açısından incelenmesi [Investigation of prospective teachers' environmental awareness and sensitivity in terms of different variables]. *İlköğretim Online*, 16(3), 1174–1184. <https://doi.org/10.17051/ilkonline.2017.330249>
- Altın, A., Tecer, S., Tecer, L. H., Altın, S., & Kahraman, B. F. (2014). Environmental awareness level of secondary school students: A case study in Balıkesir (Türkiye). *Procedia - Social and Behavioral Sciences*, 141, 1208–1214. <https://doi.org/10.1016/j.sbspro.2014.05.207>
- Anderson, M. (2012). *Global warming* (1st ed.). Britannica Educational Publishing.
- Angelovska, J., Bilic, S., & Angelovska, N. (2012). The impact of environmental concern and awareness on consumer behavior. *Journal of International Environmental Application & Science*, 7(4), 406–416.
- Arudanti, R., Sutiono, H. T., & Suryono, I. A. (2020). Effect of ecological awareness, personal norms, and ecological attitude on conservation behavior. *Proceedings on Engineering Sciences*, 2(2), 187–196. <https://doi.org/10.24874/pes02.02.009>
- Aydın, S. Ö., Ekersoy, S., & Özkan, B. (2022). Türkiye’de eğitim ve öğretim programları, çevre okuryazarlığının gerçekleştirilmesini ne kadar desteklemektedir? *Yaşadıkça Eğitim*, 36(1), 66–89. <https://doi.org/10.33308/26674874.2022361354>
- Barnett, W. S. (2011). Effectiveness of early educational intervention. *Science*, 333(6045), 975–978. <https://doi.org/10.1126/science.1204534>
- Blatchford, J. S., Smith, K. C., & Pramling-Samuelsson, I. (2010). Education for sustainable development in the early years. *World Organization for Early Childhood Education*. Retrieved from <http://www.ecesustainability.org>
- Božak, S., Hegediš, P. J., & Hus, V. (2023). Ecological awareness among 3rd-grade students of primary school. *Creative Education*, 14(2), 367–376. <https://doi.org/10.4236/ce.2023.142024>
- Bronfman, N. C., Cisternas, P. C., López-Vázquez, E., De La Maza, C., & Oyanedel, J. C. (2015). Understanding attitudes and pro-environmental behaviors in a Chilean community. *Sustainability*, 7(10), 14133–14152. <https://doi.org/10.3390/su71014133>
- Bruner, J. S. (1960). *The process of education*. Harvard University Press.
- Capra, F. (2007). Sustainable living, ecological literacy, and the breath of life. *Canadian Journal of Environmental Education*, 12, 9–18.
- Capra, F., & Stone, M. K. (2010). Smart by nature: Schooling for sustainability. *The Journal of Sustainable Education*. Retrieved from <https://www.susted.com/wordpress/content/trial-author-change-2010-05/>
- Chawla, L., & Derr, V. (2012). The development of conservation behaviors in childhood and youth. In *Oxford University Press eBooks* (pp. 527–555). <https://doi.org/10.1093/oxfordhb/9780199733026.013.0028>

- Coyle, K. (2005). *Environmental literacy in America: What ten years of NEETF/Roper research and related studies say about environmental literacy in the US*. National Environmental Education & Training Foundation. Retrieved from <https://files.eric.ed.gov/fulltext/ED522820.pdf>
- Cutter-Mackenzie, A., & Smith, R. V. (2003). Ecological literacy: The 'missing paradigm' in environmental education (part one). *Environmental Education Research*, 9(4), 497–524. <https://doi.org/10.1080/1350462032000126131>
- Demir, F. B. (2022). Opinions and suggestions of social studies teachers on ecological literacy. *E-International Journal of Educational Research*, 13(4), 1–21. <https://doi.org/10.19160/e-ijer.1089887>
- Derman, A., & Hacıeminoğlu, E. (2017). In the context of education for sustainable development: Determining the environmental literacy level of in-service classroom teachers. *Ondokuz Mayıs University Journal of Education Faculty*, 36(2), 81–103. <https://doi.org/10.7822/omuefd.373029>
- Dündar, R., & Kızılk, M. M. (2022). Ekolojik okuryazarlık, çevre eğitimi ve sürdürülebilir gelişme odaklı eğitim anlayışı bağlamında çevre temasının hayat bilgisi dersi programındaki yerinin incelenmesi [Examination of the place of the environmental theme in the life sciences curriculum in the context of ecological literacy, environmental education, and sustainable development-oriented education approach]. *İnönü Üniversitesi Eğitim Fakültesi Dergisi*, 23(3), 1954–1974. <https://doi.org/10.17679/inuefd.1146730>
- European Commission. (2018). Council recommendation of 22 May 2018 on key competences for lifelong learning. *Official Journal of the European Union*, C 189, 1–13. Retrieved from [https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32018H0604\(01\)&from=EN](https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32018H0604(01)&from=EN)
- European Parliament and Council. (2006). *Recommendation of the European Parliament and of the Council of 18 December 2006 on key competences for lifelong learning*. Official Journal of the European Union, L394, 10–18
- Evans, G. W., Otto, S., & Kaiser, F. G. (2018). Childhood origins of young adult environmental behavior. *Psychological Science*, 29, 679–687. <https://doi.org/10.1177/0956797617741894>
- Gifford, R., & Nilsson, A. (2014). Personal and social factors that influence pro-environmental concern and behavior: A review. *International Journal of Psychology*, 49(3), 141–157. <https://doi.org/10.1002/ijop.12034>
- Helldén, G., & Helldén, S. (2008). Students' early experiences of biodiversity and education for a sustainable future. *Nordina: Nordic Studies in Science Education*, 4(2), 123–131.
- Ingaldi, M. (2019). Ecological education of children and young people in Poland. *Proceedings of the International Multidisciplinary Scientific GeoConference SGEM*, 19(1), 179–186. <https://ezproxy.iku.edu.tr:2444/10.5593/sgem2019/5.3>
- IPCC. (1996). *Climate change 1995, impacts, adaptations and mitigation of climate change: Scientific-technical analyses*. Contribution of Working Group II to the Second Assessment Report of the Intergovernmental Panel on Climate Change, Watson, R. T., et al. (Eds.), WMO/UNEP. Cambridge University Press. Retrieved from https://www.ipcc.ch/site/assets/uploads/2018/03/ipcc_sar_wg_II_full_report.pdf
- Jaska, E. (2009). Ecological awareness of the society and sustainable development. *Roczniki Naukowe Stowarzyszenia Ekonomistów Rolnictwa i Agrobiznesu*, 11(6).
- Kociszewska, M. (2014). Ecological awareness and education of the society in the light of sustainability idea – selected aspects. *Pedagogika Rodziny*, 4, 10.2478/fampe-2014-0004
- Kokkinen, E. (2013). *Measuring environmental awareness in the world* (Doctoral thesis). University of Oulu.

- Kollmuss, A., & Agyeman, J. (2002). Mind the gap: Why do people act environmentally and what are the barriers to pro-environmental behavior? *Environmental Education Research*, 8(3), 239–260. <https://doi.org/10.1080/13504620220145401>
- Larijani, M. (2010). Assessment of environmental awareness among higher primary school teachers. *Journal of Human Ecology*, 31, 121–124. <https://doi.org/10.1080/09709274.2010.11906302>
- Marques, R., & Xavier, C. R. (2020). The challenges and difficulties of teachers in the insertion and practice of environmental education in the school curriculum. *International Journal on Social and Education Sciences*, 2, 49–56.
- Marpa, E. P. (2020). Navigating environmental education practices to promote environmental awareness and education. *International Journal on Studies in Education*, 2(1), 45. Retrieved from <https://files.eric.ed.gov/fulltext/ED607231.pdf>
- McBeth, W., & Volk, T. L. (2009). The National Environmental Literacy Project: A baseline study of middle-grade students in the United States. *The Journal of Environmental Education*, 41(1), 55–67. <https://doi.org/10.1080/00958960903210031>
- Ministry of Environment, Urbanization, and Climate Change (MEUCC). (2024). *2024–2030 Climate Change Mitigation and Adaptation Strategy and Action Plans*. Republic of Turkey Ministry of Environment, Urbanization, and Climate Change. Retrieved from <https://iklim.gov.tr/en/the-2024-2030-climate-change-mitigation-and-adaptation-strategy-and-action-plans-are-published-news-4245>
- Ministry of National Education. (2024). *2024–2028 strategic plan*. Republic of Turkey Ministry of National Education. https://sgb.meb.gov.tr/meb_iys_dosyalar/2024_02/02172232_stratejik_plan_02022024.pdf
- Monaghan, K., & Curthoys, L. (2008). Addressing barriers to ecological literacy. *Pathways: The Ontario Journal of Outdoor Education*, 20(3), 12–16.
- Negev, M., Sagy, G., Garb, Y., Salzberg, A., & Tal, A. (2008). Evaluating the environmental literacy of Israeli elementary and high school students. *The Journal of Environmental Education*, 39(2), 3–20. <https://doi.org/10.3200/joe.39.2.3-20>
- North American Association for Environmental Education (NAAEE). (2001). *Using environment-based education to advance learning skills and character development: A report, annotated bibliography, and research*.
- Nugraha, R. G., Jalal, F., & Boeriswati, E. (2022). Improving students' ecoliteracy skills through the use of the eco-literacy module. *Indonesian Journal of Social Research (IJSR)*, 4(3), 178–186. <https://doi.org/10.30997/ijsr.v4i3.231>
- OECD. (2004). *Agriculture and the environment: Lessons learned from a decade of OECD work*. OECD.
- Ogunbode, C. A., & Arnold, K. (2012). A study of environmental awareness and attitudes in Ibadan, Nigeria. *Human and Ecological Risk Assessment: An International Journal*, 18(3), 669–684. <https://doi.org/10.1080/10807039.2012.672901>
- Oğuz, D., Çakıcı, I., & Kavas, S. (2011). Environmental awareness of students in higher education. *Turkish Journal of Forestry*, 12(1), 34–39. <https://doi.org/10.18182/tjf.65605>
- Öcal, S. (2020). Okul öncesi eğitime devam eden 60–66 ay çocuklarına yönelik geliştirilen STEM programının çocukların bilimsel süreç becerilerine etkisinin incelenmesi [Investigation of the effect of a STEM program developed for 60–66 month-old preschool children on their scientific process skills]. *International Journal of Languages' Education and Teaching*, 6(4), 333–345. <https://doi.org/10.18298/ijlet.2978>

- Özden, M. (2008). Environmental awareness and attitudes of student teachers: An empirical research. *International Research in Geographical and Environmental Education*, 17(1), 40–55. <https://doi.org/10.2167/irgee227.0>
- Pitman, S. D., Daniels, C. B., & Sutton, P. C. (2016). Ecological literacy and socio-demographics: Who are the most eco-literate in our community, and why? *International Journal of Sustainable Development and World Ecology*, 25(1), 9–22. <https://doi.org/10.1080/13504509.2016.1263689>
- Riley, E. K. (2000). *Awakenings on relational ways of knowing: An ecological perspective on curriculum* (Doctoral thesis). Louisiana State University.
- Roth, C. E. (1992). *Environmental literacy: Its roots, evolution, and directions in the 1990s*. Clearinghouse for Science Mathematics and Environmental Education.
- Schleicher, K. (1989). Beyond environmental education: The need for ecological awareness. *International Review of Education*, 35(3), 257–281. <https://doi.org/10.1007/bf00598942>
- Shephard, K., Harraway, J., Lovelock, B., Skeaff, S., Slooten, L., Strack, M., Furnari, M., & Jowett, T. (2013). Is the environmental literacy of university students measurable? *Environmental Education Research*, 20(4), 476–495. <https://doi.org/10.1080/13504622.2013.816268>
- Shobeiri, S. M., Rezaei, M., & Ranjbari, R. (2020). Evaluation of ecological awareness of sixth grade students of Tabriz elementary schools and the effective factors. *Iranian Journal of Educational Society*, 6(1), 156–168. <https://doi.org/10.22034/ijes.2021.242021>
- Siraj-Blatchford, J., Samuelsson, I. P., & Pramling, I. (2015). *Education for sustainable development in the early years*. Routledge.
- Smith, R. L., & Pimm, S. L. (24 C.E., February). Ecology. *Encyclopedia Britannica*. Retrieved March 9, 2024, from <https://www.britannica.com/science/ecology>
- State Planning Organization of Turkey (SPO). (2000). *Climate change special expertise commission report, eighth five-year development plan*. Ankara: State Planning Organization. Retrieved from <https://www.sbb.gov.tr/wp-content/uploads/2022/08/Iklim-Degisikligi-OIK-Raporu.pdf>
- Stern, M. J., Powell, R. B., & Hill, D. (2014). Environmental education program evaluation in the new millennium: What do we measure and what have we learned? *Environmental Education Research*, 20(5), 581–611. <https://doi.org/10.1080/13504622.2013.838749>
- Şimşekli, Y. (2015). An implementation to raise environmental awareness of elementary education students. *Procedia - Social and Behavioral Sciences*, 191, 222–226. <https://doi.org/10.1016/j.sbspro.2015.04.449>
- Teksöz, G., Şahin, E., & Tekkaya-Oztekin, C. (2011). Modeling environmental literacy of university students. *Journal of Science Education and Technology*, 21(1), 157–166. <https://doi.org/10.1007/s10956-011-9294-3>
- Tibble, C. (2009). *Cultivating an ecological consciousness: Appreciative inquiry for curriculum development in environmental education* (Master's thesis). Prescott College.
- Timur, B., Yılmaz, Ş., & Timur, S. (2015). Determining general trends in studies on environmental literacy published between 1992 and 2012. *Mehmet Akif Ersoy Üniversitesi Eğitim Bilimleri Enstitüsü Dergisi*, 3(5), 22–41. <https://dergipark.org.tr/en/pub/ebed/issue/22327/239287>
- UNESCO. (1977). *First Intergovernmental Conference Environmental Education, Tblisi, 14-26 October 1977, Final Report*. Retrieved from <http://www.gdrc.org/uem/ee/Tbilisi-Declaration.pdf>
- United Nations. (n.d.). *What is climate change?* Retrieved from <https://www.un.org/en/climatechange/what-is-climate-change>
- Wals, A. E. J. (2015). *Beyond unreasonable doubt: Education and learning for socio-ecological sustainability in the Anthropocene*. Wageningen University. <https://doi.org/10.18174/365312>

Wals, A. E. J., & Corcoran, P. B. (Eds.). (2012). *Learning for sustainability in times of accelerating change*. Wageningen Academic Publishers. <https://doi.org/10.3920/978-90-8686-757-8>

Wang, C. (2014). Curricula without boundaries: Developing an ecological connection for higher education curricula. *Educational Philosophy and Theory*, 46(13), 1402–1411. <https://doi.org/10.1080/00131857.2014.964162>

Yapraklı, T. Ş., & Mutlu, M. (2021). Ekolojik okuryazarlığın, çevreye yönelik tutumun ve sübjektif normların çevre dostu tüketim davranışına etkisi [The effect of ecological literacy, environmental attitude, and subjective norms on environmentally friendly consumption behavior]. *Verimlilik Dergisi*, 2021(1), 61–81. <https://dergipark.org.tr/en/pub/verimlilik/issue/60108/649082>

Authors

Meltem İPEK ÖNER, Assistant Professor of Curriculum and Instruction. Educational Sciences Department, Faculty of Education, Yeditepe University, İstanbul (Turkey). E-mail: meltem.oner@yeditepe.edu.tr

Yelkin DIKER-COSKUN, Professor of Curriculum and Instruction. Educational Sciences Department, Faculty of Education, Yeditepe University, İstanbul (Turkey). E-mail: ydiker@yeditepe.edu.tr

İlkay BÜLBÜL, PhD student, Department of Curriculum and Instruction, Educational Sciences Institute, Yeditepe University, İstanbul (Turkey). E-mail: ilkay.bulbul@sabanciuniv.edu.tr