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A Review of Postgraduate Theses on Integrating the Environmental Dimension of Sustainable Development into Curricula

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ABSTRACT The aim of this study is to examine the master's and doctoral theses published between 2015 and 2024 on the inclusion of the environmental dimension of sustainable development in curricula. Document analysis method was used in the study, and 104 theses prepared between 2015 and 2024 on the environmental dimension of sustainability were included in the sample. In the descriptive analysis, the findings were presented as percentages and frequencies. The findings revealed that master's theses primarily addressed the environmental dimension of sustainability; these studies were conducted in Science courses, the keyword "environmental education" was most commonly used, and most were published in 2019. At the same time, it was determined that the studies were primarily conducted at Gazi University, one of the largest public research universities in Ankara, the capital city of Turkiye, and were published by the University's Educational Sciences Institute. More studies were conducted by women using the quantitative research method, primarily using the survey model. Convenience sampling was frequently preferred, and secondary school students were primarily included. Sample sizes of 0-50 were generally preferred, and scales were primarily used as data-collection tools. Content analysis was mainly used as an analysis method.

Keywords: Document analysis, Curriculum, Environment, Environmental education, Sustainable development.

1. INTRODUCTION

Sustainability is a paradigm for thinking about a future in which environmental, social, and economic considerations are balanced for development and improved quality of life (UNESCO, 2012). This concept encompasses environmental, social, and economic dimensions, often referred to as the three pillars of sustainability (Moldan et al., 2012). The emergence of the concept of sustainable development was caused by the fact that human beings started to be negatively affected by the damage they caused to the earth, and as a result, the search for a balance between development and nature led to the emergence of the concept of sustainable development, and as a result, this concept has been on the agenda of nations since the second half of the twentieth century (Altunbaş, 2003; Kaypak, 2011). In 1987, the Brundtland Report, published by the United Nations World Commission on Environment and Development (WCED), defined sustainable development as "development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs" (United Nations, 1987, p. 16). Many studies have been conducted and meetings organized on this critical global issue. At the United Nations Summit in 2015, 17 main goals were set to address global problems and to achieve them by 2030. These goals are divided into the following categories: 'No poverty', 'Zero hunger', 'Good health' and Well-beeing, Quality education, Gender equality, Clean water and sanitation, Affordable and clean energy, Decent work and economic growth, Industry, innovation and infrastructure, Reducing inequalities, Sustainable cities and communities, Responsible production and consumption, Climate action, Life below water, Life on land, Peace, justice and strong institutions and Partnerships for the goals" (United Nations, 2016).

It can be said that the importance and interest in sustainable development stems from four main reasons (Ozili, 2022). Firstly, sustainable development is considered the ultimate objective of the United Nations' plan for the planet, which is why many countries are committed to achieving this goal. Secondly, it ensures a sustainable planet for future generations. Thirdly, it is considered an all-encompassing development goal. Finally,

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it is expected to have lasting socio-economic benefits for all people and the environment.

Education is a vital tool for achieving sustainability (Gelmez Burakgazi & Reiss, 2024), and education for sustainable development (ESD) equips individuals with the knowledge, skills, attitudes, and values to shape a sustainable future. This approach integrates key sustainable development issues such as climate change, reducing the risk of natural disasters, biodiversity, poverty reduction, and sustainable consumption into teaching and learning (Priyadarshi & Singh, 2024). According to UNESCO, education for sustainable development should be integrated into all formal institutional curricula. These curricula should not only develop the basic skills of all children and young people, but also transferable skills such as critical thinking, problem solving, advocacy, and conflict resolution, to help them become responsible global citizens (UNESCO, 2014; 2017).

Many studies across various disciplines have been conducted to improve our understanding of education for sustainable development, which aims to address global problems, particularly environmental issues. Studies have examined the inclusion of ecological and sustainability issues in general curricula, as well as participants' attitudes and opinions on this matter (Achuk Eba, 2020; Dambudzo, 2015; Gökmen, 2014; Kanapathy et al., 2019; Ozdemir, 2023; Özçelik & Arik, 2022; Uğraş & Zengin, 2019), in science and biology courses (Akgül, 2020; Ateş & Gül, 2018; Aydin, 2019; Aytar, 2016), chemistry (Kanapathy et al, 2019; Selim, 2019), social studies and geography (Azrak, 2022; Chiriac & Laţu, 2023; Göcen, 2023), and in English (Bilici, 2023); German (Ge et al., 2023), teacher preparation program curriculum (Bladow, 2023; Radha & Arumugam, 2023) and mechanical engineering (Tisdale, 2023). These studies measure students', pre-service teachers', and teachers' attitudes and awareness at different levels towards sustainable development, and examine how these goals are integrated into curricula in other subject areas.

At the same time, there are review studies on the environmental dimension of sustainability. Uygun and Karabulut (2023) examined 41 postgraduate theses on environmental literacy written between 2012 and 2022. As a result of the study, they found that the majority of the theses on environmental literacy conducted during this period were master's degrees, in the field of science, with more participants and quantitative research methods. Similarly, Yılmaz et al. (2015) examined theses on environmental education written between 1992 and 2011. The results showed that most of the studies were published at Gazi University, METU, and Marmara University. Higher and primary education students were mainly included in the sample, and the studies primarily focused on attitudes towards the environment, environmental awareness, and environmental knowledge. Additionally, the most popular study design was the survey and experimental design, with written and interview techniques as the most frequently used data collection methods. Parametric tests and descriptive statistics were used primarily in the analysis. Another study in the literature focused on the impact of environmental education in the pre-school period. In this study, research on environmental education in the pre-school period in Turkey between 2000 and 2014 was examined. It was concluded that theses and articles on environmental education for pre-school students in Turkey should be increased and expanded. In another study, Özbey and Şama (2017) examined 65 theses on environmental education published between 2012 and 2016. They concluded that these theses were mainly published at Gazi University and that primary and secondary school students were the primary study group. The most common topics were attitudes towards the environment and environmental problems. The most frequently preferred data collection technique was written data collection, and the most commonly used analysis techniques were parametric tests and descriptive/content analysis.

Similarly, Kahyaoğlu (2016) analyzed 25 studies on nature education published between 2010 and 2015 and found that the majority of these, including articles, theses, and dissertations, were designed to determine the effect of nature education on attitudes towards the environment. In another study by Arık (2019), within the framework of education for sustainable development, eight theses on sustainable environmental education were systematically examined. As a result, it was determined that all of these were written in Turkish and were master's theses; most were published between 2012 and 2013, and all were at Adnan Menderes University. The provinces with the most samples selected were İzmir and Aydın. At the same time, it was concluded that the sampling method was not specified in most of the theses, pre-service science teachers were primarily included as the study group, data collection tools developed by the researchers were mostly preferred in the studies, survey model, one of the quantitative research methods, was mainly used, and t-test and SPSS package program were primarily used in data analysis.

Karakoyun and Uzun (2022), who examined the theses on environmental education published between 2011 and 2022, concluded that the theses in this field mainly were published at Gazi University, primarily prepared in master's degree type, quantitative research method and survey model mostly were preferred in the studies, most of the studies were conducted by women, the titles of the advisors mostly were "Prof. Dr.", and the most frequent sample groups were primary school students and undergraduate students of the faculty of education. In addition, it was found that the number of studies on this subject increased in recent years, and that t-tests and ANOVA were the most commonly used data analysis techniques, with the most frequently used keywords being "environmental education"

and "environmental attitude". Focusing on sustainable development, Özerdinç et al. (2022) examined 11 articles and 34 postgraduate thesis studies prepared between 2010 and 2020. The analysis revealed that most of the studies were prepared at the master's level, with a peak in 2019. Qualitative research methods were widely used; the survey model was the most common research design; pre-service teachers were the most frequent study group; scales were the preferred data collection tool; content analysis was the dominant analysis method; and sustainable development awareness was a frequent research topic.

Studies using document analysis to investigate the reflection of sustainable development and environmental education in curricula have an important place not only in the national but also in the international context. In this regard, Permanasari et al. (2021) conducted a literature review of books, journals, and studies published between 2010 and 2021 on environmental and sustainable development education. Their findings emphasized the importance of investigating the implementation of environmental education in schools for achieving sustainable development. Their findings underscore the role of environmental education and related activities in changing individual behavior by enhancing students' awareness, knowledge, and skills. This also helps raise a generation capable of critical thinking to address environmental problems and make informed decisions. In another study, Hajj-Hassan et al. (2024) used the PRISMA method to analyze 21 articles (2013-2023) on the use of digital tools in environmental education to create sustainability awareness. In the article, 2021 was found to be the year in which the most articles were published in this field, the country with the most studies was the USA, the majority of digital tools were used to raise awareness on climate change, and virtual reality tools and climate change were found to be the most popular topics in this research area. In addition, the use of digital tools positively affects students' sustainability concerns.

Similarly, Bascope et al. (2019) concluded that, to ensure sustainable development, education systems should promote science-based citizenship education in practice. They believed that early education should foster global awareness of 21st-century environmental, social, and economic problems. Finally, Lima et al. (2022) conducted a systematic literature review of 111 articles and concluded that the development of the environmental, social, and governance theme has grown globally. The UK, USA, and Spain were the countries publishing the most on this topic, with research often focusing on management, governance, sustainability, higher education, sustainable campuses, environmental science, ecology, and science and technology. The journals most frequently publishing in this field were the International Journal of Sustainability in Higher Education, the Journal of Cleaner Production, and Sustainability. Leading institutions included Durham University, Florida State University, and Campinas State University in Brazil.

Utari (2024) analyzed six studies and emphasized that environmental literacy can be integrated into other academic disciplines such as natural sciences, language arts and social sciences by following a thematic approach; at the same time, he concluded that activities such as watching movies, reading books, drawing, conducting discussions and any activity that students do outside related to the environment are essential. In addition, it was determined that family participation is critical for developing behavioral change in students regarding environmental literacy, and that learning materials should be selected based on the student's age and be realistic and meaningful to the student while raising awareness of this issue.

The environmental dimension of sustainable development and the role of education in raising ecological awareness are among the urgent global priorities. Instilling this awareness from an early age requires effectively integrating environmental education into curricula. As the importance of this issue continues to grow, urgent action is needed. It should become a central concern of all disciplines, with efforts to develop standard solutions. This study provides a systematic, comprehensive, and holistic overview of the field by analysing all postgraduate theses that address the integration of environmental education into curricula. By highlighting interdisciplinary approaches and their connections with current educational policies and practices, the study provides a unique basis for national and international comparative research. It also aims to guide decision makers, curriculum developers, researchers, and teachers. In doing so, it identifies the focal points and gaps in this field. This study is expected to make a significant contribution to the literature by presenting the most up-to-date data and trends from a comprehensive sample, revealing developments and gaps in the field, and evaluating the findings in light of a large-scale international literature.

2. METHOD

This study aims to investigate the master's and doctoral theses published between 2015 and 2024 on the inclusion of the environmental dimension of sustainable development in curricula. For this purpose, the following research questions were addressed. The distribution of these questions is given in Table 1.

The document analysis method, a qualitative research method, was used in this study. Document analysis is a qualitative research method used to meticulously and systematically analyze the content of written documents (Wach, 2013). This method, like other qualitative research methods, requires in-depth examination and interpretation of data to make sense, gain understanding, and develop empirical knowledge. The documents used include texts and images recorded without the researcher's intervention

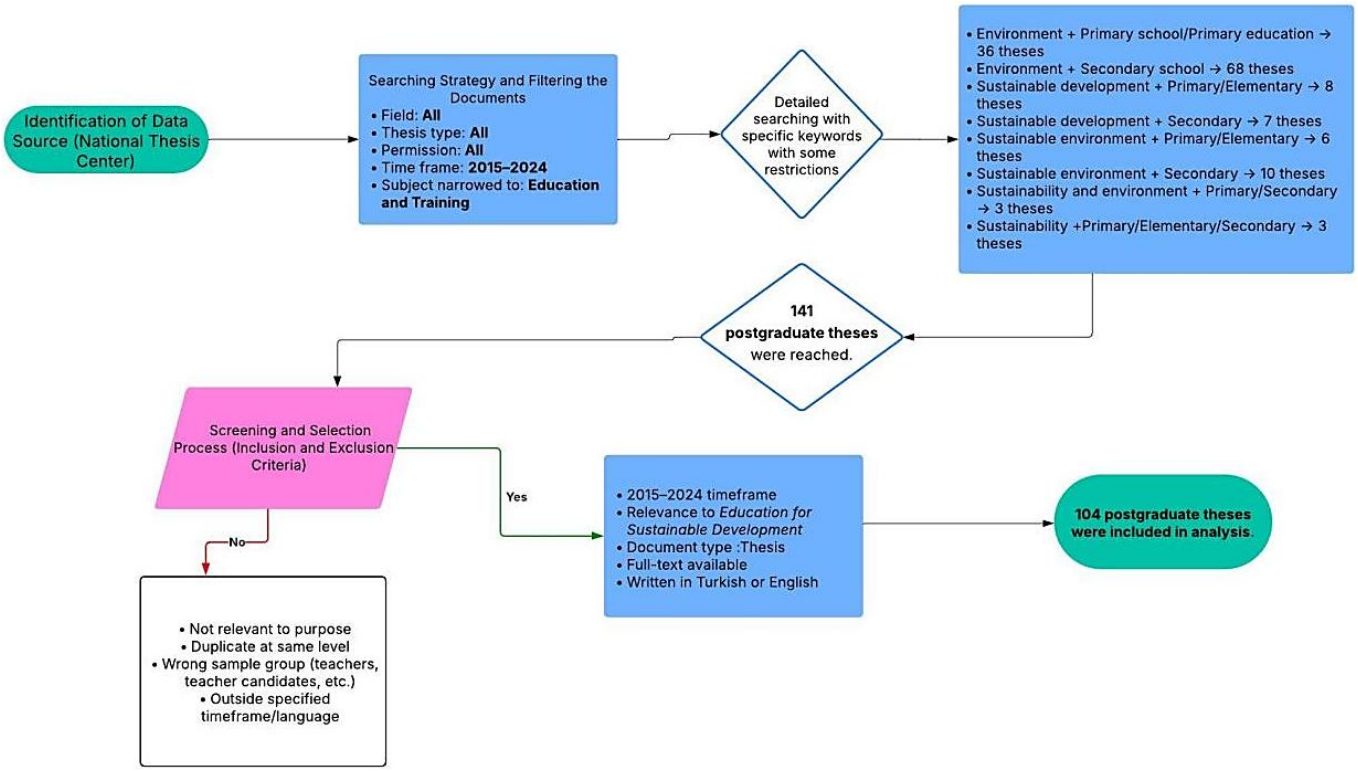

Figure 1 The process of document selection

(Bowen, 2009). The steps of the document selection process are presented in Figure 1.

As shown in Figure 1, to achieve the study's aim, keywords were entered into the thesis search section of the National Thesis Center on the Council of Higher Education's official website. The search parameters were set as "all" for field, permission status, and theses type. The publication date range was restricted to 2015-2024, and the subject area was narrowed to education and training. The keywords used were 'environment', 'sustainable development', 'sustainable environment', 'sustainability', and 'environment'. The theses were downloaded on 20 November 2024. Detailed searches were conducted with specific restrictions. For example:

Using the keywords "environment" and "primary school" OR "primary education," 36 theses were found.

With "environment" and "secondary school," 68 theses were found.

With "sustainable development" and either "primary school" or "elementary school," 8 theses were found.

With "sustainable development" and "secondary school," 7 theses were identified.

With "sustainable environment" + "primary school" OR "elementary school," 6 theses were found; with "secondary school," 10 were found.

With "sustainability" and "environment" + "primary school" OR "secondary school," 3 theses were found.

When "sustainability" is combined with "primary school," "elementary school," or "secondary school," 3 theses were found.

Table 1 The research questions

Number	The Reseach Questions
RQ1	How do the theses vary by type (master's-doctorate)?
RQ2	How are they distributed according to the subject area or course?
RQ3	How are they distributed according to the selected keywords?
RQ4	How do the theses vary by year of publication?
RQ5	How are they distributed according to the university where it was published?
RQ6	How are they distributed according to the institute where it was published?
RQ7	How are they distributed according to the author's gender?
RQ8	How are they distributed according to the research method?
RQ9	How are they distributed according to the research model/design?
RQ10	How are they distributed according to the sampling method?
RQ11	How are they distributed according to the level of education level of the sample?
RQ12	How are they distributed according to sample size?
RQ13	How are they distributed according to data collection tools?
RQ14	How are they distributed according to data analysis methods?

In total, 141 theses were identified in the National Thesis Center.

Each thesis was examined individually. The inclusion criteria were: (1) publication between 2015 and 2024, (2) relevance to education for sustainable development, (3) thesis as the document type, (4) full-text availability, and (5) written in Turkish or English. Exclusion criteria included being outside the research scope, duplication, targeting a different sample group (e.g., teachers or pre-service teachers rather than the intended population), or falling outside the specified time frame or language. After applying these criteria, 104 postgraduate theses were selected as the study sample.

To ensure credibility, a well-known research method familiar to the researcher was preferred; repeated queries were conducted to ensure accuracy; and expert opinion from a scholar in Curriculum and Instruction was consulted during the data analysis stage. To ensure transferability, each stage of the research was documented in detail. The research purpose, search dates, keywords, and selection criteria were explicitly presented, and the findings were displayed transparently in tables. A simple and understandable language was prioritized. Finally, to ensure reliability, the process for obtaining the findings was explained as clearly as possible, and results were presented in tables to maintain transparency throughout the research.

2.1 Data Collection Tools and Analysis

In the analysis phase, 104 theses written between 2015 and 2024 on the environmental dimension of sustainable development were compiled and examined individually according to the specified research questions. The descriptive analysis method was employed. Descriptive analysis follows a four-stage process: first, a framework for analysis is created based on the research questions and conceptual framework; second, the data are organized according to the established thematic framework; third, the findings are described; and finally, the findings are interpreted (Baltacı, 2019).

There are advanced programs such as NVivo and ATLAS. ti, MAXQDA, and N6 that go beyond simple coding in qualitative data organization and analysis, allowing researchers to manage, compare, explore, and recombine data in meaningful ways (Ose, 2016). However, when the data volume is large, Microsoft Excel can also be effectively used in qualitative data analysis due to its structural, processing, and visualization features (Meyer & Avery, 2009).

In this study, a coding and analysis form was first prepared in Microsoft Excel 2016 in line with the research questions. This form included the following headings: type of study, course in which the research was conducted, selected keywords, year of publication, university, institute, gender of the author, research method, research design, sampling method, educational level of the sample, sample size, data collection tools, and data analysis methods. The researcher extracted the necessary information from each thesis and entered it into this form. Subsequently, another Excel file was created in the same format, where the researcher coded the raw data, generated categories, and calculated frequencies and percentages. Finally, the findings were presented and interpreted in table form.

3. RESULTS AND DISCUSSION

The distribution of the studies by type is given in Table 2.

Table 2 Distribution of the studies by type

Study Types	f	%
Master's Degree	93	89.42
PhD Degree	11	10.58
Total	104	100

In this study, which examines theses on environment and sustainability between 2015 and 2024, the first analysis focused on thesis type. As shown in Table 2, 89.42% of the studies were master's theses, while 10.58% were doctoral dissertations.

The distribution of the studies by subject area or course of study is presented in Table 3.

Table 3 Distribution of studies by subject area or course of study

Subject-Lesson	f	%
Science	70	57.85
Life Studies	7	5.79
Social Studies	20	16.53
Classroom Teaching	10	8.26
Environmental Education	3	2.48
Turkish	2	1.65
Religious Culture and Ethics	2	1.65
Our city	2	1.65
Other (Physical Education and Sports, Environmental Education and Climate Change, Mathematics, Information Technologies, Science Applications)	5	4.13
Total	121	100

According to Table 3, which presents the distribution of studies by course or subject area, most were conducted in the field of Science (57.85%), followed by Social Studies (16.53%) and Classroom Teaching (8.26%).

The distribution of the studies according to the selected keywords is presented in Table 4. When the keywords used in the published studies were examined, the most frequently used were "environmental education" (12.17%), followed by "environment" (6.19%) and "environmental problems" (3.32%).

The distribution of the studies by year of publication is presented in Figure 2. According to Figure 2, showing the distribution of these by year, those in the field of environment and sustainability were most frequently published in 2019 (26.92%), followed by 2022 (15.38%)

Table 4 Distribution of the studies by selected keywords

Study Types	f	%
Environmental Education	55	12.17
Environment	28	6.19
Environmental Problems	15	3.32
Attitude towards the Environment	13	2.88
Environmental Literacy	12	2.65
Environmental Awareness	10	2.21
Secondary School Students	10	2.21
Environmental Behavior	9	1.99
Environmental Knowledge	9	1.99
Sustainable Development	7	1.55
Primary School Students	6	1.33
Science Education	6	1.33
Sustainability	6	1.33
Environmental Attitude	6	1.33
Social Studies-Social Studies Lesson	5	1.11
Ecological Footprint	4	0.88
Environmental Awareness	4	0.88
Environmental Attitude	4	0.88
Attitude	4	0.88
The keywords with one frequency (primary school students, primary school programs, attitude scale, validity, reliability, adaptation model, creative drama method, primary school science education, teacher effect, environment and human, primary school, natural resources, primary school 4.class, primary school fourth grade students, Bilsem, environmental anxiety, gifted individual, augmented reality, knowledge and attitude, nature conservation awareness, educational activities, primary school children, clean environment, skills teaching, creative drama, environmental emotion, environmental concern-anxiety, living space, water footprint, visually impaired students, environmental perspective, case study method, science course, environmentally responsible behavior, environmentally responsible citizen, behavior level, scientific cartoon, middle school 5th classroom, human and environment relationship, sensitivity, project-based teaching method, observation-explanation technique, prediction-observation-explanation supported, project-based environmental education, technology-supported environmental education, technology, life-based learning approach, environmental education with life-based learning approach, socio-scientific issues, scientific literacy, applied environmental education, knowledge, bird ringing, hatching ecology, environmental affect, environmental behavior, cognitive skills, argumentation approach, argumentation-based environmental education, environmental problems, ROSE questionnaire, opinion, belonging to nature, refugee students, local students, ecocentrism, anthropocentrism, behavior, environmental ethics, NEP, near environment education, science curricula, recycling, field trip-observation, plastic waste, personal hygiene, ecosystem, biodiversity, ecological footprint awareness, sensory disposition towards environment, environmental sensitivity, environmental citizenship, inquiry-based teaching, ASSURE instructional design model, environmental sensitivity, climate change, informal learning, science experiences, FeTeMM education, environmental awareness skills, quantitative research, outdoor recreation, recreation, edutainment, two-factor environmental values model (2FEM), environment-themed animated films, REACT strategy, concept learning, project-based approach, traditional teaching,science applications course, rural area, STEM approach, STEM perception, learning responsibility, Waste Collection Centers, design-based research, Finland, Turkey, curriculum, thematic learning approach, primary school curricula, primary schools, environmental management, environmental education in Turkey, environmental education in primary schools, curriculum review, environmental education approaches, environmental education methods, sustainable environmental education, primary school students' environmental drawings, primary school programs, sustainable development goals, STEM, Green STEM, computational thinking, sustainable environmental awareness, eco schools, secondary school science textbooks, textbook activities, 21st century skills, life skills, participation in environmental activities, children's literature, reading skills, reading books, computer assisted education, emotional intelligence, natural environment, artificial environment, environmental values, environmental tendencies, children's literature, reading skills, reading books, computer assisted education, natural environment, artificial environment, environmental values, environmental tendencies, century skills, life skills, participation in environmental activities, children's literature, reading skills, reading books, computer assisted instruction, emotional intelligence, natural environment, artificial environment, environmental values, environmental trends, ecological and social behavior, ecology-based education, environmental sustainability, problem-based learning, problem solving skills, self-regulation, teaching module, academic achievement, conceptual development, social studies teacher, justice, right, participation, ecological citizenship, responsibility, citizenship, perception, cartoon, biology, curricula, outcome, environmental education for sustainable development, primary and secondary school textbooks, primary and secondary school programs, flora literacy (botanical literacy), nature observation, educational card, students with visual impairment, conceptual understanding, multisensory material, zoos, scenario-based learning approach, curriculum)	175	38.72

Table 4 Distribution of the studies by selected keywords (*Continued*)

Study Types	f	%
The keywords with a frequency of two (primary education, relationship with nature, environmentally responsible behavior, sustainable environmental awareness, environmental pollution, life science, perspective, environmental achievement, environmental awareness, sustainable environment, out-of-school learning environments, environmental perception, middle school, student, middle school 8th grade student-students, mental model- mental models, sustainable environmental attitude, awareness, education, environmental knowledge)	40	8.85
The keywords with a frequency of three (environmental affect, critical thinking-critical thinking skills, action research, drawing-drawings-environmental drawings of primary school students, environmental anxiety, science, environmental perception, environmental anxiety)	24	5.31
Total	452	100

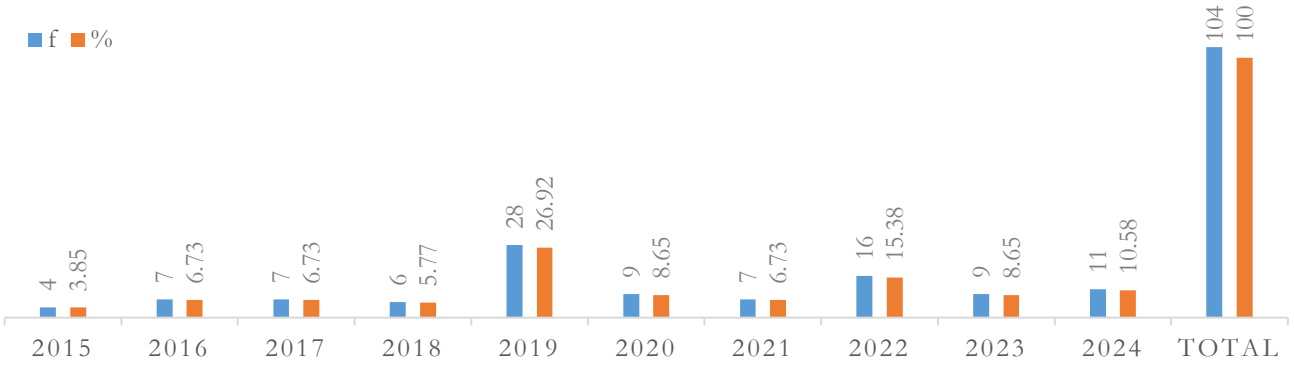

Figure 2 Distribution of studies by year of publication

Table 5 Distribution of the studies by university of publication

Published in University	f	%
Gazi University	13	12.50
Necmettin Erbakan University	3	2.88
Middle East Technical University	3	2.88
Tokat Gaziosmanpasa University	2	1.92
Trabzon University	2	1.92
Hacettepe University	2	1.92
Istanbul Aydin University	2	1.92
Süleyman Demirel University	2	1.92
Kastamonu University	5	4.81
Muğla Sıtkı Koçman University	6	5.77
Dokuz Eylul University	4	3.85
Sakarya University	4	3.85
Mersin University	4	3.85
Aksaray University	4	3.85
Aydin Adnan Menderes University	3	2.88
Kirikkale University	2	1.92
Nigde Omer Halisdemir University	2	1.92
Ondokuz May University	2	1.92
Burdur Mehmet Akif Ersoy University	3	2.88
Balıkesir University	3	2.88
Akdeniz University	3	2.88
Çanakkale Onsekiz Mart	2	1.92
Zonguldak Bülent Ecevit University	2	1.92
Ağrı Ibrahim Çeçen University	2	1.92
Other	24	23.08
Total	104	100

Note: The presentation in the table is ordered according to frequency.

and 2024 (10.58%).

The distribution of studies by university of publication is shown in Table 5. As seen in Table 5, the studies were primarily published in Gazi University (12.50%), Muğla Sıtkı Koçman University (5.77%), and Kastamonu University (4.81%). The universities included in the Other category (f=1) are as follows: Bursa Uludağ University, Erzincan Binali Yıldırım University, Sivas Cumhuriyet University, Pamukkale University, Erciyes University, Eskişehir Osmangazi University, Karadeniz Technical University, Marmara University, Amasya University, Eskişehir Anadolu University, Afyon Kocatepe University, Giresun University, Bartın University, Uşak University, Kırşehir Ahi Evran University, Fırat University, Recep Tayyip Erdoğan University, Çukurova University, Istanbul University, Hatay Mustafa Kemal University, Dicle University, Sinop University, Hacı Bayram Veli University, Kocaeli University.

Table 6 Distribution of studies by the institute

Types of Institutes	f	%
Education Sciences	62	59.62
Social Sciences	15	14.42
Science	14	13.46
Postgraduate Education	12	11.54
Health Sciences	1	0.96
Total	104	100

The distribution of studies by the institute is given in Table 6. According to Table 6, the studies published within the specified year range were mainly from the Educational

Table 7 Distribution of studies by author's gender

Gender of the Author	f	%
Woman	67	64.42
Male	37	35.58
Total	104	100

Table 8 Distribution of studies by research method

Research Methodology	f	%
Quantitative	50	48.08
Qualitative	19	18.27
Mixed	22	21.15
Design	1	0.96
Unspecified	12	11.54
Total	104	100

Table 9 Distribution of the studies by research model/design (as specified in the publication)

Research Model/Design	f	%
Screening Model	19	18.27
Descriptive Screening	9	8.65
Survey Screening	2	1.92
Relational Screening	4	3.85
Cross-Sectional Type	2	1.92
Experimental Design	11	10.58
Quasi-Experimental Design	15	14.42
Action Research	5	4.81
Document Analysis	6	5.77
Phenomenology	2	1.92
Exploratory Sequential Pattern	3	2.88
Explanatory Pattern	2	1.92
Converging Parallel Pattern	2	1.92
Nested Mixed Pattern	2	1.92
Other	9	8.65
Not specified	11	10.58
Total	104	100

Table 10 Distribution of the studies by sampling methods

Sampling Method	f	%
Probability Sampling Methods		
Simple Random/Coincidental Sampling/Inanimate Assignment/Random	15	14.42
Cluster Sampling	2	1.92
Random Stratified Sampling	2	1.92
Non-Probability Sampling Methods		
Convenience -Appropriate Sampling	21	20.19
Purposive Sampling	11	10.58
Maximum Diversity	5	4.81
Criterion Sampling	7	6.73
Stratified Purposive Sampling	1	0.96
Typical Case Sampling	1	0.96
Unspecified	39	37.50
Total	104	100

Table 11 Distribution of studies according to the educational level of the sample

Education Level	f	%
Primary School	20	19.23
Middle School	76	73.08
Unspecified	8	7.69
Total	104	100

Table 12 Distribution of the studies by sample size

Sample Size	f	%
0-50 participants	24	23.08
51-100 participants	17	16.35
101-200 participants	9	8.65
201-500 participants	22	21.15
501 and 1000 participants	17	16.35
1001 or more participants	7	6.73
Unspecified	8	7.69
Total	104	100

Sciences (59.62%), followed by Social Sciences (14.42%), Natural Sciences (13.46%), Graduate Education Institute (11.54%), and Health Sciences Institute (0.56%).

The distribution of studies by author gender is shown in Table 7. According to Table 7, 64.42% of the theses were prepared by women and 35.58% by men.

The distribution of studies by research method is presented in Table 8. As shown in Table 8, of the theses published between 2015 and 2024, 48.08% were conducted using the quantitative method, 21.15% using the mixed method, 18.27% using the qualitative method, and 0.96% using the design method. In 11.54% of the studies, the research method was not specified.

The distribution of studies by research model/design, as specified in the publications, is presented in Table 9. According to Table 9, which examines the research designs used in the studies, 18.27% employed the survey model, 14.42% used a quasi-experimental design, and 10.58% used an experimental design. The research design was not specified in 10.58% of the studies. The designs listed in the Other category, each with a frequency of one, are as follows: Causal Comparison, Exploratory Sequential Design, Sequential Transformational Design, Simultaneous Variation, Intervention Design, Embedded Design, Literature Review, Randomized Comparative Design, and Weak Experimental Design.

The distribution of studies by sampling method is presented in Table 10. As shown in Table 10, 20.19% of the studies employed convenience sampling, 14.42% used simple random sampling or random assignment, and 10.58% used purposive sampling. In 37.50% of the studies, the sampling method was not specified.

The distribution of studies by the educational level of the sample is presented in Table 11. Among the studies analyzed in the sample, 73.08% were conducted at the secondary school level and 19.23% at the primary school level. In 7.69% of the studies, the educational level was not specified.

The distribution of studies by sample size is presented in Table 12. According to Table 12, 23.08% of the studies were conducted with a sample group of 0-50, 21.15% with 201-500 participants, 21.15% with 201-500 participants-

Table 13 Distribution of studies by data collection tools

Data Collection Tools	f	%
Scale	72	31.72
Test	42	18.50
Survey	13	5.73
Rubric	3	1.32
Interview Form	26	11.45
Personal Information Form	22	9.69
Observation Form	8	3.52
Images	4	1.76
Mind Maps	2	0.88
Composition-Environment definition	3	1.32
Environment Booklet	3	1.32
Documents	4	1.76
Evaluation Form	4	1.76
Diaries	5	2.20
Events	4	1.76
Other (report-experiment-sound recording-mind map)	6	2.64
Worksheet	3	1.32
Unspecified	3	1.32
Total	227	100

16.35% with 51-100 participants and 16.35% with 501-1000 participants.

The distribution of studies by data collection tools is presented in Table 13. When the data collection tools used in the studies were examined (see Table 13), the most common were scales (31.72%), followed by tests (18.50%) and interview forms (11.45%).

The distribution of studies by data analysis methods is given in Table 14. When the methods used in the data analysis sections of the theses were examined, it was found that content analysis was applied in 10.08% of the studies, one-way ANOVA in 9.55%, and the independent samples t-test in 9.55%. The table also lists several analysis methods with a frequency of one (Exploratory Factor Analysis, Inferential Statistics, Kendall's Coefficient of Concordance, Multiple Comparisons Test, Tukey HSD, LSD, Document Analysis, Regression, Cohen's d, Covariance Analysis, and MANOVA). These are presented under the category "Other 1." The analysis methods reported with a frequency of two are grouped under "Other 2," and include Pearson product–moment correlation, Levene's Test, Miles and Huberman's approach, MANCOVA, mean score, and confirmatory factor analysis.

In this study, master's and doctoral theses published between 2015 and 2024 on the inclusion of the environmental dimension of sustainable development in curricula were examined. A total of 104 theses were analyzed with respect to study type, course, selected keywords, year of publication, university, institute, author gender, research method, research design, sampling method, educational level of the sample, sample size, data collection tools, and data analysis methods.

When classified by type, most theses were at the master's level (Arık, 2019; Karakoyun & Uzun; Özerdinç et

Table 14 Distribution of studies by data analysis methods

General Theme	Data Analysis Method	f	%
Descriptive Statistics	Percentage	22	5.84
	Frequency	22	5.84
	Descriptive Statistical Analysis	17	4.51
	Arithmetic Mean	15	3.98
	Standard Deviation	9	2.39
Parametric Tests	ANOVA (One-Way Analysis of Variance)	36	9.55
	Independent (Unrelated) Samples t-test	36	9.55
	t-test (paired-correlated)	22	5.84
	Dependent Groups t-test	12	3.18
	ANCOVA	4	1.06
Non-Parametric Tests	Wilcoxon Signed Ranks Test	11	2.92
	Mann Whitney U Test	29	7.69
	Kruskal-Wallis H Test	22	5.84
Correlation and Regression	Pearson Correlation	12	3.18
	Spearman Rank Difference Correlation	5	1.33
	Multiple Linear Regression	5	1.33
Normality Tests	Kolmogorov Smirnov Test	10	2.65
	Shapiro-Wilk Test	12	3.18
Validity and Reliability	Cronbach Alpha	5	1.33
Qualitative Analysis	Content Analysis	38	10.08
	Descriptive Analysis	11	2.92
Not specified	Other 1	10	2.65
	Other 2	12	3.18
Total		377	100

al., 2022; Uygun & Karabulut, 2023). This may be explained by the fact that completing a master's program is generally less demanding than completing a doctoral program. These findings align with Han (2022), who emphasized that doctoral studies typically involve longer, more comprehensive processes.

It was also concluded that the majority of the theses were conducted in the Science course, followed by Social Sciences and Classroom Teaching. The dominance of Science studies can be explained by the fact that subjects such as sustainability, nature, environment, and renewable energy are firmly embedded in this field, and that science education often incorporates environmental education in an interdisciplinary way (Schönfelder & Bogner, 2020).

Regarding keywords, "environmental education" was the most frequently used, followed by "environment" and "environmental problems." This contrasts with Rihhadatul'aysi (2022), who found "environmental literacy" to be the most common keyword. When keywords are evaluated by subject area, the findings are consistent with Karakoyun and Uzun (2022), Ogelman and Güngör (2015), Özbey and Şama (2017), and Yılmaz et al. (2015).

The year with the most publications was 2019, followed by 2022 and 2024. An upward trend in recent years was observed, consistent with other research (Ariyatun et al., 2024; Karakoyun & Uzun, 2022; Özerdinç et al., 2022).

This increase can be linked to growing societal and academic interest in sustainability and the integration of environmental education into curricula. As emphasized in the literature, education for sustainable development equips students with the knowledge, skills, attitudes, and behaviors necessary to act responsibly for environmental integrity, both now and in the future (Hu & Mou, 2025; Husamah et al., 2022; Motevalli et al., 2022; Permanasari et al., 2021; Utari, 2024).

In terms of universities, the majority of the theses originated from Gazi University, followed by Muğla Sıtkı Koçman and Kastamonu Universities. This may be due to Gazi University's long-standing institutional tradition. Similar findings were reported by Karakoyun and Uzun (2022), Özbey and Şama (2017), and Yılmaz et al. (2015), though they differ from those reported by Arık (2019) and Lima et al. (2022). Most theses were affiliated with Educational Sciences institutes, followed by Social Sciences and Natural Sciences institutes.

A gender-based distribution showed that most theses were authored by women, which may be linked to women's generally more positive environmental attitudes and more substantial interest in ecological issues. This finding is consistent with Karakoyun and Uzun (2022).

Methodologically, the quantitative method was most frequently preferred, possibly because its results are perceived as more generalizable. This aligns with Arık (2019), Hochbein and Smeaton (2018), Karakoyun and Uzun (2022), Uygun and Karabulut (2023), and Yılmaz et al. (2015), but contrasts with Özerdinç et al. (2022), who reported greater use of qualitative methods. Among research designs, the survey model was dominant, consistent with Arık (2019), Karakoyun and Uzun (2022), and Özerdinç et al. (2022), but different from Ardoin et al. (2018), who highlighted quasi-experimental designs.

The convenience sampling method was the most common, likely due to its cost- and time-effectiveness. However, many theses did not specify the sampling method, echoing Arık's (2019) findings.

Most participants were middle school students, probably because students in this age group can better comprehend sustainability topics through their coursework. This finding aligns with some studies that examined primary school groups (Karakoyun & Uzun, 2022; Özbey & Şama, 2017; Uygun & Karabulut, 2023; Yılmaz et al., 2015) but differs from those focusing on higher education or teacher candidates (Arık, 2019; Özerdinç et al., 2022).

Sample sizes of 0–50 participants were most common, with scales being the dominant data collection tool. This finding is consistent with Özerdinç et al. (2022) and is supported by Yılmaz et al. (2015) and Özbey and Şama (2017), who reported that scales are prevalent written data collection instruments.

Regarding analysis techniques, content analysis was most frequently used, followed closely by ANOVA and the t-test. These results align with prior research on the use of parametric tests in environmental education studies (Arık, 2019; Hochbein & Smeaton, 2018; Karakoyun & Uzun, 2022; Özbey & Şama, 2017; Yılmaz et al., 2015) and with Özerdinç et al. (2022) regarding the use of content analysis.

Overall, national and international document review studies consistently emphasize the importance of education for sustainable development and highlight the need to integrate it effectively into curricula. This field is recognized as crucial for equipping students with the knowledge, skills, and dispositions necessary to become environmentally responsible citizens (Ariyatun et al., 2024; Ardoin et al., 2018; Bascope et al., 2019; Figueiro & Raufflet, 2015; Hadjichambi et al., 2023; Hajj-Hassan et al., 2024; Hu & Mou, 2025; Husamah et al., 2022; Kahyaoğlu, 2016; Karakoyun & Uzun, 2022; Lima et al., 2022; Machado & Davim, 2022; Motevalli et al., 2022; Ogelman & Güngör, 2015; Özbey & Şama, 2017; Özerdinç et al., 2022; Permanasari et al., 2021; Rihhadatul'aysi, 2022; Schönfelder & Bogner, 2020; Utari, 2024; Uygun & Karabulut, 2023; Yılmaz et al., 2015).

4. CONCLUSION

This study examined 104 master's and doctoral theses published between 2015 and 2024 on the inclusion of the environmental dimension of sustainable development in curricula. The findings revealed that most were master's theses, concentrated in Science courses, frequently used "environmental education" as a keyword, and peaked in publication in 2019. Gazi University and the Educational Sciences institutes were the leading institutions, with most theses authored by women. Quantitative methods and survey designs were predominant; convenience sampling was commonly used; middle school students were the main participants; small sample sizes (0–50) were typical; scales were the most common data collection tool; and content analysis and parametric tests were the most frequent analysis methods.

Based on these findings, several suggestions can be made: More doctoral dissertations should be conducted to provide in-depth investigations of environmental and sustainability issues. A greater use of qualitative and mixed-methods research is recommended to capture the complexity of this global issue. Research should expand beyond Science courses to better reflect the interdisciplinary nature of sustainability, incorporating subjects such as Turkish, English, arts, and sports.

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