

Systematic Review of Environmental Education to Foster an Ecological Culture in the Communities

Kattia Giuliana Bocanegra Díaz

Universidad César Vallejo

Email: kbocanegrad@ucvvirtual.edu.pe

ORCID: <https://orcid.org/0000-0002-8755-1344>

Edilberto Horna Clavo

Universidad César Vallejo

Email: ehornac53@ucvvirtual.edu.pe

ORCID: <https://orcid.org/0000-0002-5241-6003>

Juan Julio Bocanegra Díaz

Universidad Nacional de Trujillo

Email: jbocanegrad@unitru.edu.pe

ORCID: <https://orcid.org/0009-0009-1184-0404>

Abstract

The objective of this research is to analyze existing studies on environmental education aimed at generating an ecological culture among the population, identifying approaches, methodologies, results, and success factors. The methodology was a systematic review, using studies published between January 1, 2019, and August 1, 2024, from the Scopus, Scielo, Ebsco, and Dialnet databases as inclusion criteria, from which 50 indexed articles were obtained. The results showed that environmental education plays a crucial role in the formation of an ecological culture. Studies such as that by Pérez and Vargas (2024) show that well-designed educational programs can significantly increase awareness and ecological behavior among students. In conclusion, effective environmental education is multidimensional, combining theoretical knowledge with applied practices and adapting to the particularities of each cultural and social context. The success factors identified include the integration of environmental education into the educational curriculum, collaboration between different social actors, and the use of innovative methodologies that involve the community in environmental decision-making.

Keywords: Environmental education; ecological culture; promotion of environmental awareness

RESUMEN

La presente investigación tuvo como objetivo analizar las investigaciones existentes sobre la educación ambiental destinadas a generar una cultura ecológica en la población, identificando enfoques, metodologías, resultados y factores de éxito. En relación a la metodología, fue tipo revisión sistemática, usando entre los criterios de inclusión estudios publicados entre el 1 de enero de 2019 y el 1 de agosto de 2024 de las bases de datos Scopus, Scielo, Ebsco y Dialnet, de los cuales se obtuvieron 50 artículos indexados. Los resultados demostraron que la educación ambiental juega un papel crucial en la formación de una cultura ecológica. Los estudios, como el de Pérez y Vargas (2024), evidencian que los programas educativos bien diseñados pueden aumentar significativamente la conciencia y el comportamiento ecológico entre los estudiantes. En conclusión, una educación ambiental efectiva es multidimensional, combinando conocimientos teóricos con prácticas aplicadas, y adaptándose a las particularidades de cada contexto cultural y social. Los factores de éxito identificados incluyen la integración de la educación ambiental en el currículo educativo, la colaboración entre diferentes actores

sociales, y el uso de metodologías innovadoras que involucran a la comunidad en la toma de decisiones ambientales.

Palabras clave: Educación Ambiental; cultura ecológica; fomento de la conciencia ambiental

INTRODUCTION

For many years, humans have been engaging in activities that disrupt ecosystems and impede societal progress. The prevailing environmental challenges have emerged as a global phenomenon, exerting deleterious effects on all segments of the global population. Education has been identified as a pivotal factor in establishing the foundations for an environmental culture (Salvador et al., 2019). Educational institutions are called upon to assume the role of strategic allies in the development of environmental values and to cultivate an environmentally sustainable culture among students that fosters a more humane relationship between humans and nature, given the prevailing recognition that human actions are chiefly responsible for environmental degradation (López and Palacios, 2020).

Environmental education is recognized as a foundational element in addressing the adverse environmental impacts of human activities. This notion is reinforced by numerous global meetings that aim to establish agreements to mitigate these effects (Valverde & Molina, 2022). It is imperative to transcend the confines of the nominal definition of education and to delve into its distinctive characteristics, while also recognizing the pivotal role of pedagogy in shaping its connotation (López, 2021).

In the contemporary global context, various nations have adopted policies aimed at addressing sustainable development and related issues. This initiative has even garnered the support of international organizations, which have collaborated to advance these shared objectives. A notable example is Sustainable Development Goal (SDG) No. 4 on quality education, which has prompted the implementation of various plans and projects within the educational sector. However, the practical implications of this phenomenon as it pertains to the teaching-learning process remain to be elucidated (Campoverde and Soplapuco, 2022).

It is imperative to acknowledge that each town or community possesses its own environmental activities, experiences, and expectations, which must be duly considered in the execution of educational initiatives within schools that are meticulously adapted to align with the realities of students. It is imperative to recognize that this approach is indispensable for establishing a robust foundation for sustainable environmental education (Sedawi et al., 2020). This is the pivotal strategy for cultivating a sustainable environmental culture among citizens, which is why it is regarded as a pivotal lever for addressing the environmental problems that precipitate the current global socioeconomic situation (Anufrieva et al., 2020).

In this context, national government entities in all Latin American countries have assumed the responsibility of promoting appropriate behaviors among citizens in the management of compact waste, from proper collection to final disposal. Consequently, with a critical focus on our own daily and interdependent actions, we must assume the role of promoters of culture and nature, effecting a change in perspective (Cevallos and Úcar, 2019). Therefore, with respect to the issue of pollution, citizens have become significantly more concerned about the prevention of infection. Consequently, practices such as hand disinfection, the disinfection of living environments, and the reduction of plastic use have emerged as indicative of shifts in attitude within this process of learning or coexistence in the context of the ongoing pandemic.

A comprehensive review of the extant scientific literature reveals a consensus that environmental education ought to be a constant policy of governments. This policy should be subject to periodic evaluations for the purpose of continuous improvement, for the benefit of humanity and the

sustainability of a society that is eco-environmentally conscious. A thorough examination of the underlying conceptual frameworks is imperative to elucidate the research methodology employed by scholars who have committed their efforts to proposing eco-educational knowledge derived from citizen behavior in Latin America. This narrative approach offers a coherent depiction, furnishing us with significant comparative insights and conceptualizations.

The following research question is posed by this systematic review: A review of the extant research on environmental education reveals a paucity of studies that specifically address the cultivation of an ecological culture among the population. In order to facilitate a more nuanced discussion, the following questions have been formulated to guide the conversation: Which approaches and methodologies have been employed in previous research on environmental education to promote an ecological culture? What results and conclusions have been obtained in studies related to the effectiveness of environmental education in generating ecological awareness?

Conducting this systematic review is imperative because it will facilitate the compilation, analysis, and synthesis of extant research on the efficacy of environmental education in fostering an ecological culture. This will provide a comprehensive and up-to-date overview of the state of research in this field. It will also identify gaps in knowledge, under-explored areas, and methodological aspects that could be improved in future studies.

Moreover, the results of this systematic review can serve as a basis for designing and implementing more effective and contextualized environmental education programs, tailored to the specific needs and characteristics of different populations. This, in turn, will contribute to the development of more informed public policies and the strengthening of educational initiatives aimed at sustainability and environmental conservation.

The primary objective of this study is to systematically examine extant research on environmental education with the aim of fostering an ecological culture among the population. This examination will entail the identification of pertinent approaches, methodologies, results, and success factors. The specific objectives are to identify and review previous studies on environmental education that seek to foster an ecological culture in various contexts. The objective of this study is to examine the methodological approaches employed in this research in order to assess their effectiveness in promoting ecological awareness and behavior.

METHOD

The present study is of a theoretical nature, as it synthesizes advances in environmental education to cultivate an ecological culture. The present study was executed using a systematic literature review methodology, which facilitates a review and/or theoretical update of primary studies, with a systematic application of the data accumulation process, i.e., the selection of studies, coding of variables, among others. It is important to acknowledge that this methodology does not employ statistical procedures for the integration of studies.

The objective of this approach was to identify, select, and synthesize relevant studies in an objective and accurate manner, with the intention of minimizing bias and ensuring the relevance and applicability of the results.

ELIGIBILITY CRITERIA

Eligibility criteria were established to ensure the inclusion of relevant, high-quality studies.:

INCLUSION CRITERIA:

- Studies published between January 1, 2019, and August 1, 2024.

- Research focused on environmental education programs aimed at generating an ecological culture in diverse communities.
- Studies using quantitative, qualitative, or mixed methods, with a clear focus on the impact of environmental education.
- Publications in English or Spanish, peer-reviewed and published in indexed journals.
- Studies conducted in different geographical contexts, including both developed and developing countries.

EXCLUSION CRITERIA:

- Studies that are not available in English or Spanish.
- Research that does not specifically address the relationship between environmental education and ecological culture.
- Studies with weak methodology or that do not provide sufficient information on the procedures used.

SOURCES OF INFORMATION

The sources of information used in this systematic review were selected for their relevance and breadth of coverage of topics related to environmental education. The databases consulted were:

- Scopus: Conducting an exhaustive search to identify key studies on environmental education programs.
- Dialnet: Search focused on Spanish-language studies that address environmental education in specific contexts.
- EBSCO: Integration of studies from different disciplines, with a special focus on education and environmental impact.
- SciELO: Inclusion of relevant research, especially from Latin America, to obtain a broader and more regional perspective.

SEARCH STRATEGY

The search strategy was designed to maximize the identification of relevant studies through the use of key terms and Boolean operators:

Search terms: Terms such as “environmental education,” “ecological culture,” “environmental awareness,” “sustainability,” “educational programs,” and combinations thereof were used.

Boolean operators: These were used to combine key terms effectively, ensuring the inclusion of relevant studies.

Search period: The search was limited to studies published in the last five years, from January 2019 to August 2024.

SELECTION PROCESS

The study selection process followed a rigorous protocol to ensure the inclusion of relevant, high-quality research:

- Initial review: The titles and abstracts of the studies identified in the databases were screened to determine their relevance.

- Full review: Studies that met the inclusion criteria were reviewed in full to confirm their relevance.
- Data extraction: A structured template was used to extract and organize key information such as the objectives, methodology, results, and conclusions of each study.

DATA EXTRACTION PROCESS

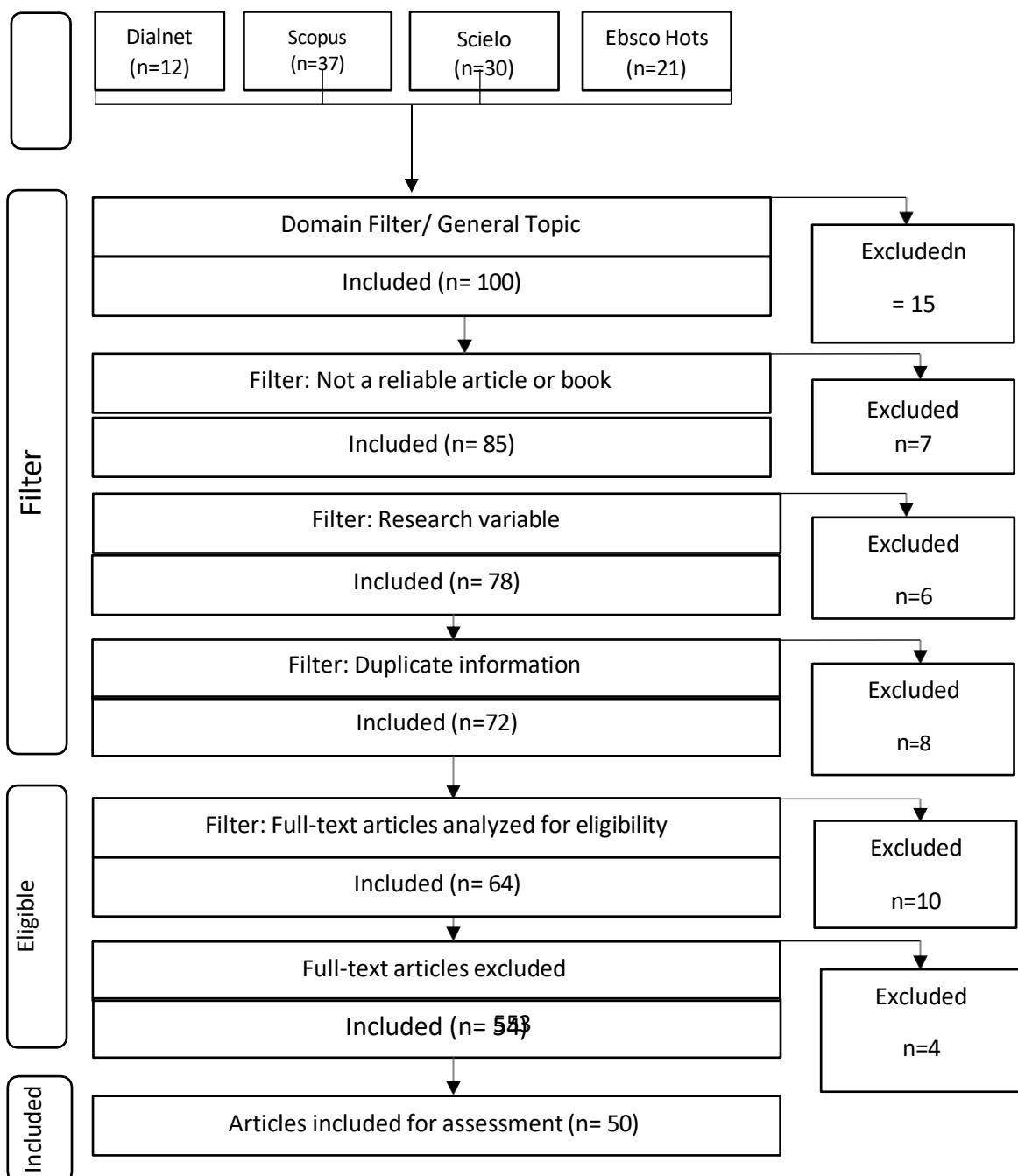
After applying the search strategy to the aforementioned databases, a total of 500 records were obtained. Following initial screening of titles and abstracts, 100 studies were selected for full review. Of these, 50 studies met the inclusion criteria and were included in the systematic review.

PRISMA DIAGRAM

The study selection process was visualized using a PRISMA flow diagram. This diagram detailed each phase of the process, from the initial identification of studies to the final selection of included articles, describing the reasons for exclusion at each stage.

Figure 1

Flow chart according to the Prisma Guide

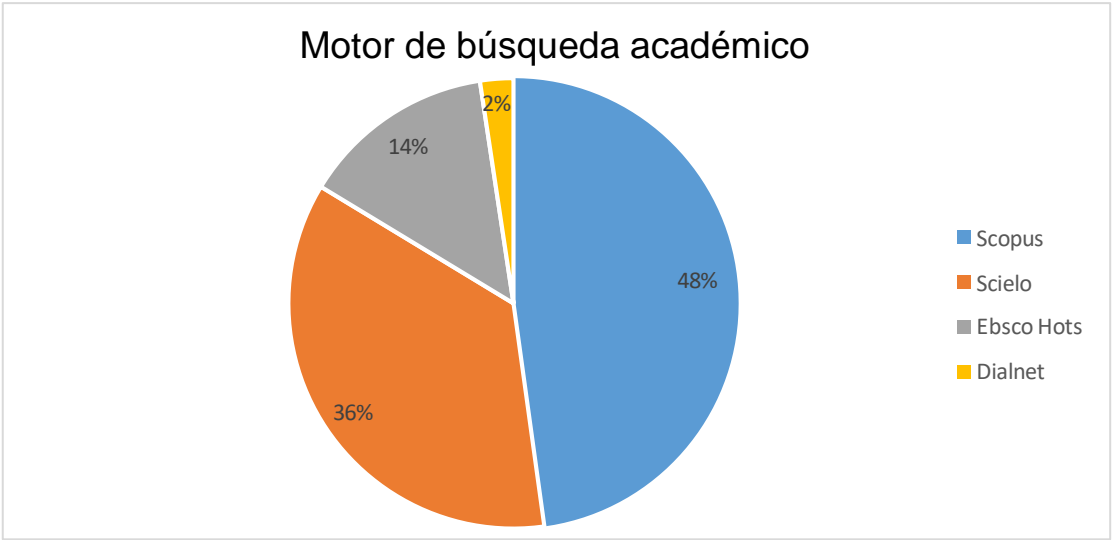


RESULTS

The systematic review selected 50 articles from various academic databases. Scopus provided 24 articles, which offered a wide variety of approaches to environmental education. Scielo provided 18 articles, which were particularly useful for regional perspectives in Latin America. Ebsco Host contributed seven articles, offering a multidisciplinary view, while Dialnet contributed one article with specific information on the Hispanic context. The studies cover diverse geographical and methodological contexts, and most are of high quality and peer-reviewed, ensuring the relevance of the data collected. Their distribution is shown below.

Figure 2

Articles selected by academic search engine

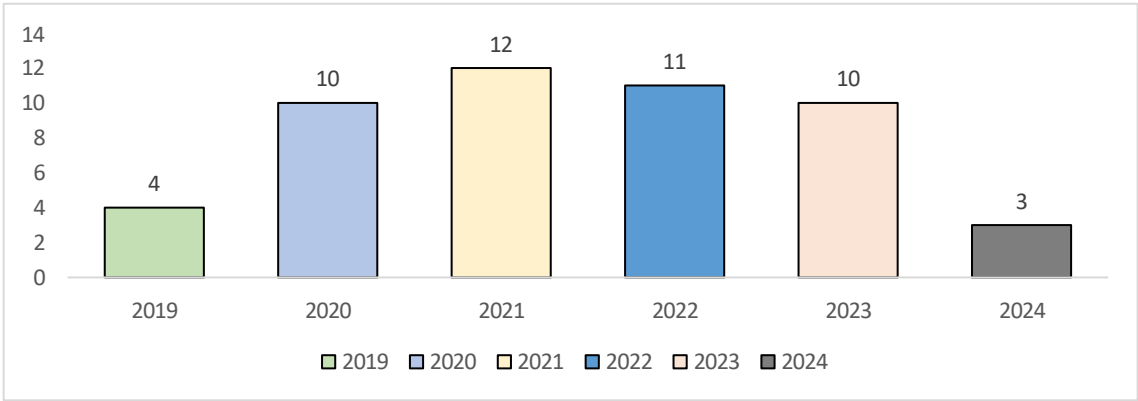


Note: Database of research articles.

In terms of year of publication, the systematic review included articles distributed as follows: four studies were selected for 2019, ten articles were included for 2020, twelve articles were reviewed for 2021, eleven studies were selected for 2022, ten articles were included for 2023, and three studies were added for 2024. This temporal distribution reflects a continued interest in the topic of environmental education and its impact on ecological culture over recent years. The data are presented in Figure 3 below.

Figure 3

Selected articles by year of publication

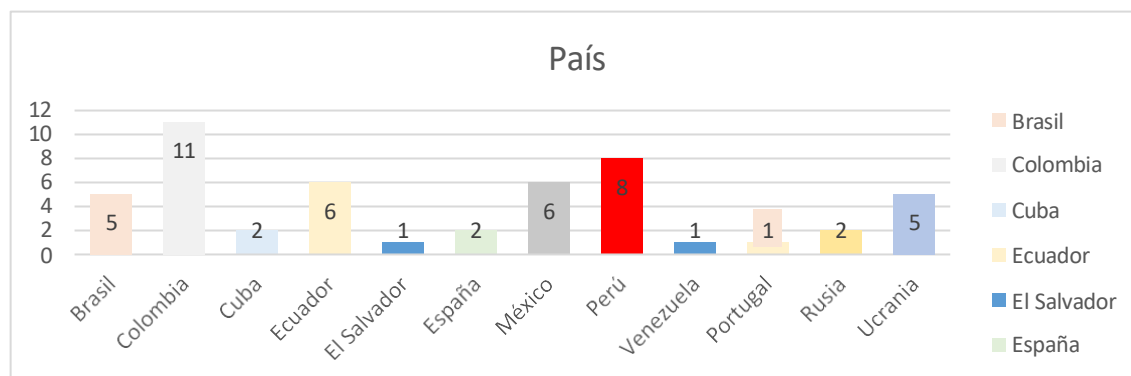


Note: Database of research articles.

In terms of the geographical distribution of the articles reviewed, the following was observed: 5 studies were found in Ukraine, 2 in Russia, 5 in Brazil, 11 in Colombia, 2 in Cuba, 6 in Ecuador, 1 in El Salvador, 2 in Spain, 6 in Mexico, 1 in Portugal, 8 in Peru, and 1 in Venezuela. This geographical distribution shows a broad representation of diverse regions, reflecting the relevance and global focus of the topic of environmental education.

Figure 4

Articles selected by geographical area

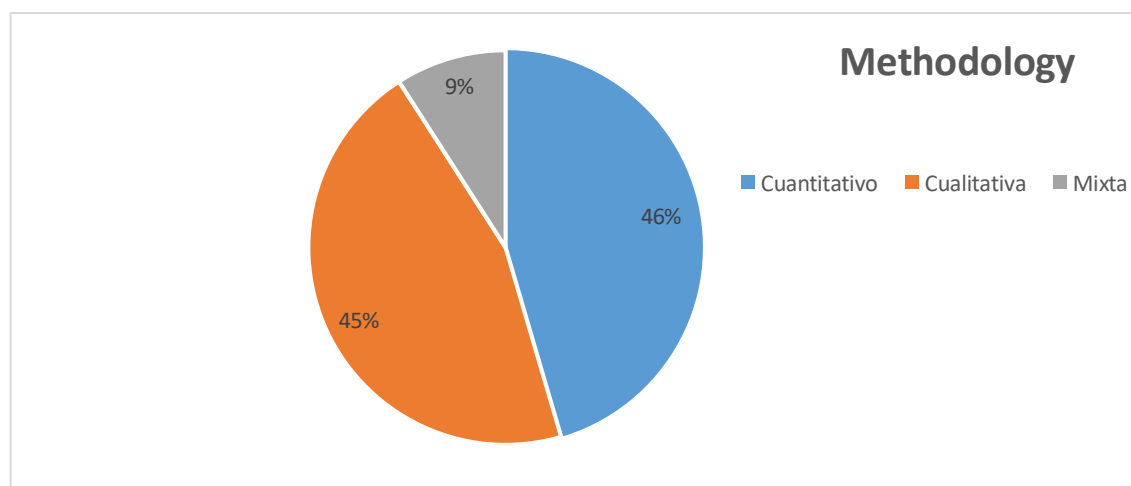


Note: Database of research articles.

In terms of methodology, 38 articles used a qualitative approach, offering a detailed and contextualized understanding of the topic. On the other hand, 10 articles adopted a quantitative methodology, providing statistical data and numerical analysis. In addition, one article used a mixed methodology, combining both qualitative and quantitative approaches for a more comprehensive view of the study. This is shown in Figure 5 below.

Figure 5

Methodology used in review articles



Note: Database of research articles.

A detailed summary of the characteristics of the articles found is presented in Table 1, which includes key information about each study reviewed. The table lists the authors of each article, allowing the main contributions to be identified and the diversity of approaches in the field of environmental education to be assessed. In addition, the objectives of each study are listed, providing a clear understanding of the goals and purposes of the research. This helps to contextualize how each article addresses the topic of environmental education and the creation of

an ecological culture. Finally, the table summarizes the conclusions reached in each study, highlighting the key findings and their implications.

Table 1

Characteristics of articles found related to environmental education aimed at generating an ecological culture among the population.

Nº	AUTHORS	TITLE OF THE SCIENTIFIC ARTICLE	CONCLUSIONS
1	Alva, W.	Eco-efficiency: A new strategy for environmental education in educational institutions	The main conclusion shows a significant influence of education on eco-efficiency ($p < 0.05$, Spearman's $Rho = 0.678$).
2	Moreno, O.	Socio-environmental problems and environmental education. Climate change from the perspective of future primary school teachers.	The results indicate that climate change is associated with extinction and destruction, with widespread recognition of human impact on the problem and the urgent need to address this issue in school classrooms.
3	Sovhira, S.	Ecological culture in the context of education for the sustainable development of society	Environmental education promotes knowledge and skills about the environment, which are essential for developing an ecological culture.
4	Ivanov et al.	The Study of The Level of Environmental Consciousness and the Efficiency of Environmental Education Students.	It improves attitudes and awareness towards the environment, affecting people's vision and behavior.
5	Usacheva, I.	The problems of formation of ecological culture in education	Environmental culture in education can be effectively shaped through innovative methods, a wide range of curriculum programs, and an integrated approach, incorporating ecology as a key concept in environmental management.
6	Spinola, H.	Environmental Culture and Education: A New Conceptual Framework.	A new framework for environmental education, based on community education, promotes environmental sustainability through driving forces, sociocultural transformation, and environmental sustainability.
7	Putilova et al.	Environmental education and its principles	Environmental education and behavior training are crucial to improving the global environmental situation, as they contribute to ethical existence and promote harmonious human existence in an ecological society.
8	Пономаренко	Interdependence between environmental culture and environmental education	Environmental education, which incorporates personal knowledge and skills, is crucial for shaping environmental culture and influencing the way people live and interact with nature.

9	Shutaleva et al.	Environmental Behavior of Youth and Sustainable Development.	The media and social networks play a key role in shaping ecological behavior practices.
10	Vallejos, E.	Environmental education in high school: From school to family.	It was concluded that the Environmental Education Program will help strengthen sustainable development among high school students.
11	Calderón	The Coordination of Environmental Management Policies between Local Government and the Education Sector	To improve the quality of life of the population, whether at the national,
12	Trivimo et al.	The role of environmental education in building a sustainable future.	regional, or local government level, the commitment of all
13	Lagares et al.	Between objective historical conditions and the construction of another municipal education system.	authorities and civil society is required to work on projects that
14	Bravo, M	The institutionalization of environmental education in higher education in Mexico.	generate
15	Velázquez, A.	Recycling culture in Mexico: Environmental education.	The findings underscore the need for a multifaceted approach that addresses both ecological challenges and social inequalities.
16	De La Hoz Polo, M.	The importance of implementing eco-pedagogical strategies to strengthen environmental education	PRISME aims to ensure continuous training and to establish an Interactive Virtual Educational Environment for monitoring, follow-up, and evaluation of the process of institutionalizing the constituent elements of municipal teaching/educational systems and municipal education management.
17	Verdy et al.	Environmental education in the illegal sale of urban wildlife in the city of Babahoyo.	An overview of the history of environmental education in Mexico in an attempt to institutionalize it in higher education institutions is presented.
18	Ramírez, A. & Imperador, A.	Analysis of School Environmental Projects (PRAE) in Valledupar, Colombia, according to Enrique Leff's theory of environmental rationality.	Talking about environmental education and the creation of a recycling culture goes beyond traditional classroom education. If we refer to the simple process of imparting knowledge and expanding it, we can conclude that the environmental issue cannot be dealt with in the school environment in an isolated and sporadic manner, as it requires daily work by all teachers and all areas of the curriculum.

19	González et al.	Environmental education as a tool for connecting people with their immediate environment	it can be concluded that the environmental issue cannot be dealt with in the school environment in an isolated and sporadic manner, as it requires daily work by all teachers, in all areas of the curriculum, at all levels, grades, and courses.
20	Quispe et al.	Environmental education and solid waste management in Cusco	It was found that the population of Babahoyo is unaware of the regulations governing wildlife rights and has a low level of environmental education.
21	Heras, F	Environmental education and sustainable lifestyles:	The belief that environmental education consists of a series of activities celebrating a calendar of special days dedicated to only some environmental aspects has an impact on its quality.
22	Chipanitzta et al	Horizontal-vertical urban and peri-urban gardens for the promotion of sustainable environmental education.	The knowledge acquired has enabled them to offer tourist services, such as guides, using the knowledge acquired during their training as environmental promoters.
23	Marquez et al.	Environmental education: conceptual and methodological evolution towards sustainable development goals.	The care and conservation of the environment basically depends on adequate environmental education from school age onwards to create environmental awareness among citizens and then to develop a culture of solid waste management and healthy living, mainly in the city of Cusco.
24	Mauricio, C.	Environmental education: a challenge for strengthening life projects.	The depth of the changes required to place ourselves within planetary boundaries, which makes the policy of "small gestures" insufficient; the need to obtain a more global view of our impact and to reconcile the individual and the collective in a more unifying vision.
25	León et al.	Identification of the need for environmental education in the Ejido Km. 33 community and its annex Paso Real Viejo, in the municipality of Álamo - Temapache, Veracruz, Mexico:	It was concluded that students are capable of taking on the management of social outreach projects with an emphasis on environmental sustainability, by leading the organization of urban agricultural communities with the aim of promoting an endogenous culture of economic growth.
26	Gavilanes, R. & Tipán B.	Environmental education as a strategy for addressing climate change	It was found that, since the emergence of environmental education, its motivation has been the search for and construction of pedagogical alternatives focused on sustainability as a guiding principle.

27	Rivera, J.	Environmental education at the Luis Rodríguez Valera Educational Institution in the municipality of Valledupar, Cesar	Emerging categories were found, such as: the relationship between ecological awareness and the environment, the prominence of the axiological dimension in environmental culture, the PRAE as a guiding thread that mobilizes the life project, and the gap between theory and the implementation of the PRAE.
28	Pi Puig	Approaches to the environment in sociological theory: dialogue between Northern formulations and questions about Southern development.	Except for the little that is covered in the curricula of educational institutions in Ejido Kilómetro 33 and its annex Paso Real Viejo, there is no environmental education in the study area, and a great opportunity for non-formal environmental education aimed at the general public has been identified.
29	Schultz, et al.	Adaptive governance under construction: people, practices, and policies in a UNESCO biosphere reserve.	Guidelines were established to contribute to a change in the strategies, approaches, and methodologies currently used in environmental education.
30	García et al	Nature tourism: environmental education and tax benefits for the development of Caquetá.	At the Luis Rodríguez Valera Educational Institution, the proposal “Together we will take care of our home, the Earth” significantly improved environmental awareness among students and teachers.
31	Sánchez et al.	Environmental education in agrobiodiversity as a policy for territorial sustainability	A dialogue and counterpoints are established between the approaches to consider that their object of study is centrally the same, but that there are differences in the places of enunciation and, therefore, in the diagnoses and possible solutions to environmental problems.
32	Zubiria, L.	Content dimensions of environmental education: A theoretical discussion	In conclusion, adaptive governance is no longer just an academic concept, but an experience lived by a growing number of people around the world.
33	Alvear, N. & Urbano, M	Environmental education in Colombia from the perspective of departmental public policy instruments.	The post-conflict period will bring about changes in the local economic model, and competitive market strategies will be geared toward protecting the environment and using tax incentives.
34	Oliveira, A.	Relationship between environmental education and public health in fifth-year secondary school students: the case of Tambobamba, Cotabambas – Apurímac	It is concluded that every day it becomes more necessary to generate educational policies that consider the particularities of contexts, among which the recognition of territorial agro-biodiversity is essential.

35	Carballo et al.	Contributions of the university to teacher training and updating: experiences and results of the course “Environmental education and urban conflicts,” Quilmes, Argentina; National University of the Center of the Province of Buenos Aires	It is concluded that the existence of a critical perspective of South American authors who
36	Muñoz, M. & Romero, M.	Community participation and environmental education: reflections on society-nature relations	make innovative contributions to the conception of environmental education while maintaining an
37	Macías et al.	Environmental education and sustainable tourism: contributions to the city of Manta, Ecuador	interdisciplinary and complex view of the processes.
38	Farah, et al.	Structural analysis to determine key variables in the environmental education (EE) system for early childhood in Peru.	In general, the CARs and provincial governments have shown leadership in the formulation teams, which have generated participation strategies to gather contributions that have made it possible to define contextualized themes for the action plans.
39	Losada y González	Environmental education for sustainable development in the training of agricultural engineers from a comprehensive and constructive perspective	The occasional teaching of environmental issues limits students' ability to recognize health problems in the population and promote corrective actions.
40	Martínez, J. & Hernández, J.	Baseline for a non-formal environmental education program in the Xichú micro-watershed, Guanajuato	The paper presents a brief overview of the approach and context of the training program, describes the methodology implemented and the
41	Ojeda et al.	Environmental education for good solid waste management.	highlights of the training in order to enrich other training spaces, and
42	Arias, R.	Relational territory & environmental education: The school as a space for raising awareness about eco-efficiency among embodied and disembodied bodies.	finally.
43	Ojeda, A. Ojeda, H. & García, L.	Environmental education for good solid waste management.	In this approach, sustainability includes an ethical perspective based on values that imply the rational use of natural resources, the equitable distribution of wealth, and the safeguarding of the planet
44	Bustamante, C. y López, C.	Environmental education mediated by sociocultural ecologies for addressing territory in school contexts.	As a reflection, it is imperative to adopt a contextualized educational curriculum that includes environmental education as a tool to promote sustainable tourism.

45	Domínguez et al.	Family food security and sustainable development goals. Dialogues from environmental education in the El Resplandor community.	The results showed that the most sensitive aspects of EA among Peruvian children are learning from the local to the global reality, the promotion of sustainable actions, and solidarity actions and teacher entrepreneurship in communities.
46	Hernández et al	Environmental culture for a sustainable environment: a commitment by young researchers.	It is necessary to establish relationships of otherness in the act of educating so that engineers not only identify themselves as part of the environment but also learn to use their understanding and potential for their growth as individuals and for the evolution of human and planetary life.
47	Villalba	Awareness, consciousness, and environmental education: a triad that takes root in early childhood.	The study concludes with a project that can be replicated and used to support programs, projects, and territorial evaluations.
48	Murcia	Awareness, consciousness, and environmental education: a triad that takes root in early childhood.	It is concluded that through pedagogical intervention, a conceptual and attitudinal change in solid waste management was achieved among students.
49	Acosta et al.	Changes in the status of anemia in Mexican children: a longitudinal study	It is concluded that school is a setting where civic competencies and scientific thinking are developed, generating eco-efficiency alternatives with a zoé-political basis that strengthens environmental education.
50	Palma	Neoliberalism, biocomunicability, and the production of healthy and unhealthy citizens. An analysis based on policies against anemia as seen from the Peruvian Amazon.	The school promotes civic skills and scientific thinking, generating eco-efficient alternatives based on a perspective that reinforces environmental education.

DISCUSSION

A comprehensive review of the extant literature on environmental education aimed at cultivating an ecological culture among the population reveals a wide variety of approaches, methodologies, and results that reflect the complexity and diversity of the subject. A temporal analysis of the articles reviewed indicates a growing trend in the production of research on environmental education, with studies covering the period from 2019 to 2024. This pattern suggests a growing concern for the integration of environmental education into educational curricula and the need to foster an ecological culture. This observation is in line with the findings of Díaz et al. (2023), who emphasize the growing interest in the field due to global environmental crises.

A number of studies have examined the impact of environmental education on the establishment of an ecological culture. For instance, Alva (2024) posits that eco-efficiency education exerts a substantial influence on the promotion of ecological practices within educational institutions, thereby underscoring the notion that environmental education can foster heightened ecological awareness among students. In a similar vein, Moreno (2024) underscores the potential of environmental education to foster comprehension of climate change, underscoring the pressing

need to incorporate this subject into school curricula to address the ramifications of human activity on the environment.

With respect to geographical distribution, the studies originate from a diverse array of countries, including Ukraine, Russia, Brazil, Colombia, and Peru. This dispersion underscores the universality of the topic and the adaptation of educational approaches to different regional contexts. According to Gómez and Martínez (2022), this diversity reflects how environmental education adapts to local realities and the specific needs of each region, allowing for better contextualization and relevance of the strategies implemented.

A review of the extant studies reveals a considerable degree of variability in their methodological approaches. The majority of articles employed qualitative approaches, thereby offering an in-depth and contextualized understanding of the impact of environmental education. For instance, the study by Hernández et al. (2021) utilizes interviews and focus groups to examine educators' perceptions of the efficacy of environmental education programs. However, studies employing quantitative and mixed methodologies were also identified. According to Fernández and López (2023), the integration of quantitative and mixed methods enables a more comprehensive and generalizable evaluation of the outcomes associated with environmental education, thereby combining statistical data with qualitative perspectives.

The results of the review indicate that environmental education plays a crucial role in the formation of an ecological culture. Research conducted by Pérez and Vargas (2024) demonstrates that the implementation of well-designed educational programs can lead to a substantial enhancement in ecological awareness and behavior among students. This finding aligns with the assertion by Méndez et al. (2022), who contend that the effective integration of environmental education into school curricula is imperative for the promotion of sustainable practices and heightened ecological awareness. Sovhira's (2024) contribution to this discourse underscores the pivotal role of education for sustainable development in fostering an ecological culture.

This approach is further substantiated by the findings of Ivanov et al. (2024), who emphasize the potential of environmental education to enhance attitudes and awareness regarding the environment, thereby facilitating a transformation in people's vision and behavior towards increased ecological responsibility.

Conversely, studies such as those by Usacheva (2024) and Spinola (2024) examine how the integration of innovative methods and a new conceptual framework in environmental education can promote sustainability. The extant studies suggest that effective environmental education must incorporate a wide variety of curriculum programs and an integrated approach to shaping environmental culture.

A comprehensive review of the extant literature reveals that environmental education is a dynamic and expanding field, characterized by a diverse array of approaches and methodologies. A synthesis of extant studies reveals the potential of environmental education to positively impact ecological culture. However, the efficacy of various approaches is contingent upon the context and methodology employed. The broad geographical representation and variety of methodological approaches highlight the importance of adapting environmental education strategies to the specific needs and characteristics of each region to maximize their impact on the creation of an ecological culture.

CONCLUSIONS

A review of extant research on environmental education indicates that a range of approaches and methodologies are employed to cultivate an ecological culture among the population, addressing diverse aspects of learning and environmental awareness. The present study demonstrates that efficacious environmental education is multidimensional, integrating theoretical knowledge with

applied practices and adapting to the particularities of each cultural and social context. A comprehensive review of the extant literature reveals several factors that have been identified as key to the attainment of success. These factors include the integration of environmental education into existing educational curricula, collaboration between diverse social actors, and the utilization of innovative methodologies that engage the community in environmental decision-making processes.

A comprehensive review of extant studies on environmental education focused on fostering an ecological culture in diverse contexts reveals a wide range of approaches and strategies implemented globally. These studies underscore the significance of adapting interventions to local and cultural characteristics. This adaptation can range from the integration of environmental education into school curricula to the implementation of awareness-raising campaigns and community participation. The findings indicate that environmental education programs that are customized to suit the particular needs and circumstances of each community tend to be more effective in fostering an ecological culture, achieving enhanced involvement and behavioral change among program participants.

A review of the methodological approaches utilized in environmental education research indicates that the most efficacious methodologies for promoting ecological awareness and behaviors are those that integrate quantitative and qualitative methods. Research employing participatory and community-based methodologies, in conjunction with interdisciplinary approaches customized to particular contexts, has demonstrated a propensity to elicit favorable outcomes in terms of shifts in environmental attitudes and behaviors. The efficacy and lasting impact of environmental education programs are contingent upon the continuous evaluation and adjustment of strategies based on the results obtained.

REFERENCES

1. Alva, W. (2019). Ecoeficiencia: Nueva estrategia para la educación ambiental en instituciones educativas. *Investigación Valdizana*, 13(2), 77–84. <https://doi.org/10.33554/riv.13.2.233>
2. Bravo, M. (2022). Trayectoria de la institucionalización de la educación ambiental en la educación superior en México. *REMEA - Revista Eletrônica Do Mestrado Em Educação Ambiental*, 39(Especial), 93–115. <https://doi.org/10.14295/remea.v39i2.14164>
3. Calderón, M. (2022). La Articulación de Políticas de la Gestión Ambiental entre el Gobierno Local y el Sector Educación. *Revista Científica*, 7(24), 272-285, e-ISSN: 2542-2987. <https://doi.org/10.29394/Scientific.issn.2542-2987.2022.7.24.14.272-285>
4. García, D. Vargas, H. & Restrepo, J. (2020). El turismo de naturaleza: educación ambiental y beneficios tributarios para el desarrollo de Caquetá. *Aglala*, 11(1), 107–132. <https://revistas.uninunez.edu.co/index.php/aglala/article/view/1568>
5. Chipantiza-Masabanda, Juan G., Bonilla-Bonilla, Amanda E., & Jativa-Reyes, Mario F.. (2021). Huertos urbanos y periurbanos horizontales-verticales para el fomento de la educación ambiental sostenible. *Formación universitaria*, 14(2), 165-172. <https://dx.doi.org/10.4067/S0718-50062021000200165>
6. Arias, R. (2023). Territorio relacional & educación ambiental: La escuela como un espacio activador de conciencia sobre la ecoeficiencia entre cuerpos que se encarnan y desencarnan. *Seven Editora*, 469–482. Retrieved from <https://sevenpublicacoes.com.br/editora/article/view/1225>

7. Bustamante, C. y López, C. (2022). Educación ambiental mediada desde las ecologías socioculturales para el abordaje del territorio en contextos escolares. *Revista UDCA Actualidad & Divulgación Científica*, 25 (spe), e2135. <https://doi.org/10.31910/rudca.v25.nsupl.1.2022.2135>
8. Murcia, N. (2023). Imaginarios sociales sobre problemática ambiental: nuevos senderos para una educación ambiental. *Educación y Humanismo*. 25(4) 62-78
9. Villalba, M. Miranda, S. & Oyaga, R. (2023). Conciencia, concientización y educación ambiental: triada que se afianza en la primera infancia. *Ingeniería E Innovación*, 11(2). <https://revistas.unicordoba.edu.co/index.php/rii/article/view/3416>
10. Hernández, C. Figueroa, M. & Velasco, A. (2022). Cultura Ambiental por un medio ambiente sostenible: compromiso de jóvenes investigadores. *Revista Latinoamericana De Educación Científica, Crítica Y Emancipadora*, 1(1), 240–253. <https://www.revistaladecin.com/index.php/LadECiN/article/view/13>
11. Domínguez, Y., Villarreal, A., Jurado, J. (2021). Seguridad alimentaria familiar y objetivos de desarrollo sostenible. Diálogos desde la educación ambiental en la comunidad El Resplandor. *Revista de Estudios Empresariales* 2(1) <https://doi.org/10.17561/ree.n2.2021.6421>
12. Ojeda, A. Ojeda, H. & García, L. (2023). Educación ambiental para el buen manejo de los residuos sólidos. *Inclusión y Desarrollo*, 9(1), 74–86. <https://doi.org/10.26620/uniminuto.inclusion.9.1.2022.74-86>
13. Lozada, Z. & González, A. (2024). La educación ambiental para el desarrollo sostenible en la formación del ingeniero agrónomo desde una mirada comprensivo-edificadora. *bol.redipe* [Internet]. 2024 Mar. 1 [cited 2024 Aug. 13];13(3):169-86. Available from: <https://revista.redipe.org/index.php/1/article/view/2097>
14. Farah, A. Navarro, A. & Ruiz, M. (2021). Análisis estructural para la determinación de variables clave en el sistema de educación ambiental (EA) de la niñez temprana peruana. *Revista científica*, (40), 30-44. Publicación electrónica del 17 de abril de 2021. <https://doi.org/10.14483/23448350.16288>
15. Martínez, J. & Hernández, J. (2021). Línea base para un programa de educación ambiental no formal en la microcuenca Xichú, Guanajuato. *Acta universitaria*, 31, e2933. Epub 16 de febrero de 2022. <https://doi.org/10.15174/au.2021.2933>
16. Cevallos, B., y Úcar, X. (2019). Educación Popular, Educación Ambiental y Buen Vivir en América Latina: una experiencia socioeducativa de empoderamiento comunitario. *Revista semestral para animadores y educadores sociales* (30), 1 - 26. <http://quadernsanimacio.net/ANTERIORES/treinta/index.htm>
17. Macías, M. Corral, C. & Izurieta, L. (2020). Educación ambiental y turismo sostenible: aportes para la Ciudad de Manta Ecuador. *Revista EDUCARE - UPEL-IPB - Segunda Nueva Etapa 2.0*, 24(1), 291–302. <https://doi.org/10.46498/reduipb.v24i1.1248>
18. Muñoz, M. & Romero, M. (2021). Participación comunitaria y educación ambiental: reflexiones sobre las relaciones sociedad-naturaleza. *Revista De Gestión Del Conocimiento Y El*

Desarrollo Local, 8(1), 90–105.

<https://revistas.unah.edu.cu/index.php/RGCDL/article/view/1429>

19. Carballo, C. Lampert, Cortizas, L. (2023). Aportes de la universidad en la formación y actualización docente: Experiencias y resultados del trayecto “Educación Ambiental y conflictos urbanos”, Quilmes, Argentina; Universidad Nacional del Centro de la Provincia de Buenos Aires; Estudios Ambientales; 11; 1; 7-2023; 24-37

20. Oliveira, A. (2022). Relación entre Educación Ambiental y Salud Pública en Estudiantes de Quinto de Secundaria: Caso de Tambobamba, Cotabambas – Apurímac. *Revista Boaciencia. Salud Y Medio Ambiente*, 2(2), 36–47. <https://doi.org/10.59801/sma.v2i2.209>

21. Alvear, N. & Urbano, M. (2022). La educación ambiental en Colombia desde los instrumentos de política pública departamental. *Entramado*, 18 (1), e211. <https://doi.org/10.18041/1900-3803/entramado.1.8029>

22. Zubiria, L. (2023). Dimensiones de contenido de la educación ambiental: Una discusión teórica. *Revista Venezolana de Gerencia: RVG*, 28(104), 1753-1764.

23. Sánchez, L. & López, C. (2020). Educación ambiental en agrobiodiversidad como política para la sustentabilidad territorial: Revista del Observatorio Digital Latinoamericano “Ezequiel Zamora”, 3(1), 92-114.

24. Schultz, L. West, S. & Floríncio, C. (2019). Gobernanza adaptativa en construcción: Personas, prácticas y políticas en una reserva de biosfera de la UNESCO. *Revista de geografía Norte Grande*, (74), 117-138. <https://dx.doi.org/10.4067/S0718-34022019000300117>

25. De La Hoz Polo, M. (2022). Importancia de la implementación de estrategias ecopedagógicas para el fortalecimiento de la educación ambiental. *CIEG, Revista arbitrada del Centro de Investigación y Estudios Gerenciales*, 172-184. <https://revista.grupocieg.org/wp-content/uploads/2021/12/Ed.53172-184-De-la-Hoz.pdf>

26. Pi Puig, A. P. (2019). Abordajes sobre el ambiente en la teoría sociológica: diálogo entre formulaciones del Norte y cuestionamientos al desarrollo del Sur. *Rev. Colomb. Soc.*, 42(1), 73-95. doi: 10.15446/rcs.v42n1.73220

27. Gavilanes, R. & Tipán B. (2021). La Educación Ambiental como estrategia para enfrentar el cambio climático. *ALTERIDAD. Revista de Educación* 16(2), 286-298. <https://doi.org/10.17163/alt.v16n2.2021.10>

28. González, O. Areas, F. & López, F. (2021). La educación ambiental como herramienta para conectar a las personas con su entorno inmediato. *Ciencia Latina Revista Científica Multidisciplinar* 5(3), 3603-3612. https://doi.org/10.37811/cl_rcm.v5i3.553

29. Heras, F. (2023). La educación ambiental y los estilos de vida sostenibles: *Ecosistemas*, 32(especial), 2470. <https://doi.org/10.7818/ECOS.2470>

30. Lagares, R., Cerqueira, M. de, Lopes, R. & Grossi, G. (2023). Entre as condições históricas objetivas e a construção de outra educação municipal. *Revista Brasileira De Educação Do Campo*, 8(1) e16308. <https://doi.org/10.20873/uft.rbec.e16308>

31. León, K. Cruz, N. Sánchez, A. & Fuentes, E. (2024). Identificación de la necesidad de Educación Ambiental en la Comunidad Ejido Km. 33 y su anexo Paso Real Viejo, en el municipio de Álamo - Temapache, Veracruz, México. *LATAM Revista Latinoamericana De Ciencias Sociales Y Humanidades*, 5(4), 714 – 723. <https://doi.org/10.56712/latam.v5i4.2287>

32. Márquez, D. Hernández, A. Márquez, L. & Casas, M. (2021). La educación ambiental: evolución conceptual y metodológica hacia los objetivos del desarrollo sostenible. *Revista Universidad y Sociedad*, 13(2), 301-310. de http://scielo.sld.cu/scielo.php?script=sci_arttext&pid=S2218-36202021000200301&lng=es&tlng=es.

33. Mauricio, C. (2021). La educación ambiental: un desafío para el fortalecimiento del proyecto de vida. Universidad Católica de Pereira. <http://hdl.handle.net/10785/7338>

34. Moreno, O. (2020). Problemas socioambientales y educación ambiental. El cambio climático desde la perspectiva de los futuros maestros de educación primaria. *Pensamiento Educativo*, 57(2) 1–15. <https://doi.org/10.7764/PEL.57.2.2020.3>

35. Quispe, V. Oros, W. & Felix, Z. (2022). Educación ambiental y manejo residuos sólidos en Cusco. *Ciencia Latina Revista Científica Multidisciplinar*, 6(3), 2800-2807. https://doi.org/10.37811/cl_rcm.v6i3.2420

36. Ramírez, A. & Imperador, A. (2021). Análisis de Proyectos Ambientales Escolares (PRAE) en Valledupar, Colombia, según la teoría de la racionalidad ambiental de Enrique Leff. *Revista Brasileña de Educación Ambiental (RevBEA)*, 16 (2), 370–384. <https://doi.org/10.34024/revbea.2021.v16.11255>

37. Triviño, A. L. Zambrano, M. Quiñónez G. & Cambindo Q, B (2024). El papel de la educación ambiental en la construcción de un futuro sostenible. *Código Científico Revista De Investigación*, 5(E3), 1148–1166. <https://doi.org/10.55813/gaea/ccri/v5/nE3/376>

38. Vallejos, E. (2022). Educación ambiental para el desarrollo sostenible en los estudiantes del Instituto de Educación Superior Tecnológico Público San Ignacio. *Revista Ñeque*, 5(12), 247–260. <https://doi.org/10.33996/revistaneque.v5i12.78>

39. Velázquez, A. Trejo, A. Sánchez J. Tobón, G. (2020). Cultura de reciclaje en México: La educación ambiental. *Revista Boletín Científico INVESTIGIUM de la Escuela Superior de Tizayuca Publicación semestral*, 6, (11) 24-32

40. Verdy, F. Oñate, D. Maldonado, R. & Molina, A. (2022). Educación ambiental en la venta ilegal de fauna urbana en la Ciudad de Babahoyo. *Conrado*, 18(88), 318-327. Epub 27 de octubre de 2022. http://scielo.sld.cu/scielo.php?script=sci_arttext&pid=S1990-86442022000500318&lng=es&tlng=es.