

Review

Understanding ecological citizenship through global literature: A bibliometric analysis

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Abstract: The urgency of ecological problems has become increasingly complex, so responses from diverse parties are needed, including in the context of ecological citizenship. The general hypothesis proposed in this research is that the problem of climate change has an influence on the high level of attention of the global community, including academics, to environmental issues related to the active role of citizens demanding environmental justice and sustainable development. This study aims to explore globally published documents to provide an in-depth discussion concerning ecological citizenship. Bibliometric analysis was employed from the Scopus database. The main findings confirm the significant contribution of ecological citizenship in shaping global understanding of the role of individuals in maintaining environmental sustainability. The research theme mapping shows the diversity of issues that have been explored, with particular emphasis on environmental education and social justice, providing a basis for recommendations for future research. In particular, environmental education has been recognized as a critical element in shaping society's understanding of environmental issues, while social justice underscores the importance of fair distribution and critical analysis of inequality in social and ecological contexts. Future research recommendations include the exploration of effective strategies in promoting the concept of ecological citizenship, developing a holistic environmental education curriculum, and more active research in the context of social justice in various regions, including Asia. This bibliometric analysis is expected to contribute substantially to formulating policies and practical actions that support the vision of inclusive ecological citizenship, which positively impacts overcoming global environmental challenges.

Keywords: ecological citizenship; environmental education; social justice; sustainable development

1. Introduction

Issues in ecological problems have become urgent as the global population increases, and human activities have led to environmental detriment (Chen et al., 2023; Wang et al., 2023). Climate change, biodiversity loss, and pollution are serious challenges that threaten sustainability today (Dhital and Rupakheti, 2019; Malik et al., 2023; Wheeler, 2001). The impact of exploitation of natural resources, and excessive use of fossil fuels not only results in global climate change, but also damages ecosystems, threatens wildlife habitats, and harms ecological balance (Lestaluhu et al., 2023; Umar et al., 2021). It is prevalent that such problems are not local, but are also global, which have largely impacted human welfare (Sippel et al., 2020; Sovacool et al., 2017). There is a need for collective action and sustainable policies to overcome

ecological problems and maintain the balance of nature for the sake of future generations (Malik et al., 2023; Wang et al., 2022).

Environmental degradation and climate change have negative impacts on food security, human health, and economic stability (Molotoks et al., 2021; Rietig and Dupont, 2021). The ecological crisis hence creates serious threats to marine and terrestrial ecosystems, causing the extinction of species, and destroying ecosystems that support life. In addition, the direct impact on communities, especially those in areas vulnerable to natural disasters, further strengthens the need for an effective global response to face this challenge (Boix-Fayos et al., 2023; Cole et al., 2023). Responses towards ecological problems are thus reflected in efforts to maintain the availability of limited natural resources, such as clean water and fertile land as the foundation of human life (Hawa et al., 2023; Mpandeli et al., 2018). In so doing, awareness of the urgency of ecological problems does not merely lay only the responsibility of governments and international institutions, but also changes in individual behavior and corporate policies to embrace more sustainable lifestyles, marking the need for collective awareness to achieve the ecological balance necessary for survival (Ahmad and Satrovic, 2024; Paphitis et al., 2023).

The importance of responding to ecological problems involves contributions from various parties, including individuals who hold the role of ecological citizenship. In the context of ecological citizenship, individuals should not be positioned as passive observers, but as agents of change who actively contribute to protecting the environment. Ecological citizenship can play a key role in supporting environmental policies, educating the public about sustainable practices, and leading by example in environmentally friendly lifestyles. Engaging in collective action such as environmental conservation campaigns, participation in recycling programs, and supporting green initiatives are real steps that ecological citizenship can take to help address global ecological challenges (Cruz et al., 2023; Misra, 2023; Simanjuntak et al., 2023). Therefore, individual involvement as ecological citizenship is necessary in supporting joint efforts towards better environmental sustainability.

Although the concept of ecological citizenship offers great potential for mobilizing individuals in environmental protection, several challenges must be addressed. First, environmental awareness is insufficient to encourage concrete action. Some individuals, in this case, have a good understanding of environmental issues, but struggle to translate that knowledge into sustainable behavior (Asilsoy and Oktay, 2018; Marzall, 2005). A lack of support or infrastructure for a sustainable lifestyle can be a barrier, such as a lack of accessibility to public transportation or the availability of environmentally friendly products (Bourban, 2022; Evans, 2011; Jagers et al., 2014). Second, there is inequality in the ability to take sustainable action. Some community groups face economic or social obstacles that make it difficult for them to adopt more environmentally friendly lifestyles (Dash, 2014). This creates inequalities in ecological participation and shows the need for an inclusive and fair approach to promoting ecological citizenship.

Another challenge is uncertainty about the concrete impact of individual actions on large-scale change. Some people feel that their efforts alone will not have a significant impact on solving complex environmental problems. Therefore, it is important to increase understanding that small changes in individual behavior can have

a positive impact when adopted collectively. In facing this challenge, a holistic approach involving environmental education, increasing the accessibility of sustainable solutions, and collaborative efforts between government, business, and civil society are key in encouraging the role of ecological citizenship in achieving environmental sustainability (Mattijssen, 2022; Middlemiss, 2010).

Overall, the urgency of ecological problems characterized by climate change, biodiversity loss, and pollution requires a profound collective response from across global society. In facing this challenge, ecological citizenship plays a crucial role by encouraging active individual participation in protecting the environment and supporting sustainability. While barriers such as insufficient awareness, inequities in sustainable access, and uncertainty of individual impact exist, collaborative efforts and holistic approaches can overcome these barriers. Collective awareness, support for sustainable infrastructure and broader environmental education will be the key to forming a more environmentally conscious society and maintaining the balance of nature for future generations.

Currently, studies investigating this topic simultaneously are still limited, especially in assessing the results from available published documents. To overcome this deficiency, a bibliometric analysis approach becomes a necessity. Bibliometric analysis allows researchers to systematically evaluate and measure the impact and trends of research in a particular field by analyzing the structure, citation patterns, and relationships between documents (Omogbe et al., 2020; Rao and Shukla, 2023). Therefore, this research aims to fill this knowledge gap by applying a bibliometric analysis approach. By carrying out bibliometric analysis, this research aims to provide in-depth insight into the development of literature, research collaborations, and the direction of development of this topic. Thus, it is hoped that this research will provide a solid foundation for further understanding of the topic and contribute to further research development in this area.

2. Materials and methods

This study employs bibliometric analysis using the Scopus database as the main source of data. This decision was based on Scopus' cross-disciplinary coverage and reputation as one of the leading sources of scientific information. The data collection process began by filtering based on the title of the article which focuses on the keyword (ecological citizenship). The use of these keywords aimed to narrow the scope of the topic and obtain more specific results from relevant literature. Filtering did not impose restrictions on parameters such as year of publication, subject area, author affiliation, and document type, thus enabling inclusive data retrieval. After the filtering process, a total of 109 relevant documents were identified and rechecked before being included in the analysis using the VOSviewer tool.

Data validation in this research was carried out through two critical stages. First, the keyword filtering process (ecological citizenship) in the article title in Scopus ensures that only documents that are truly relevant to the research topic are included. This step significantly reduces the potential for data collection that does not follow the research objectives. Second, the step of re-checking documents before being entered into the VOSviewer analysis tool serves to verify the accuracy and relevance of the

data that has been collected. Thus, this validation stage provides certainty regarding the quality and accuracy of the data used in the bibliometric analysis of this research. The results of the filtering and re-examination stages were then analyzed using the VOSviewer tool, which allows visualization of inter-topic linkage and density patterns in the literature, as well as identification of research trends and exploration of collaboration networks between researchers. With this approach, the research aims to provide a comprehensive overview of the development and contribution of research related to ecological citizenship in scientific literature indexed in Scopus.

3. Results and discussion

This section includes mapping global publication trends by focusing on the year of publication, subject area, and author affiliation related to ecological citizenship. The analysis shows the pattern and distribution of significant documents over time, identifies the disciplines most actively exploring this topic, and looks at the contributions of various author affiliations. Furthermore, mapping document contributions based on the number of citations provides an overview of the impact and relevance of ecological citizenship literature in the scientific community. By exploring research themes and research gaps, this research also provides recommendations for future research directions, creating a foundation for further knowledge development and filling open research gaps. This section provides in-depth insight into the development of global literature on ecological citizenship, guides researchers and practitioners in understanding the dynamics of current research and identifies research areas that still require further exploration.

3.1. Mapping global publication trends: Year of publication, subject area, author affiliation

Mapping global publication trends is a crucial aspect of this research, which focuses analysis on the year of publication, subject area, and author affiliation related to ecological citizenship. This information provides a comprehensive picture of the evolution of research and the geographic distribution and expertise of authors contributing to the ecological citizenship literature.

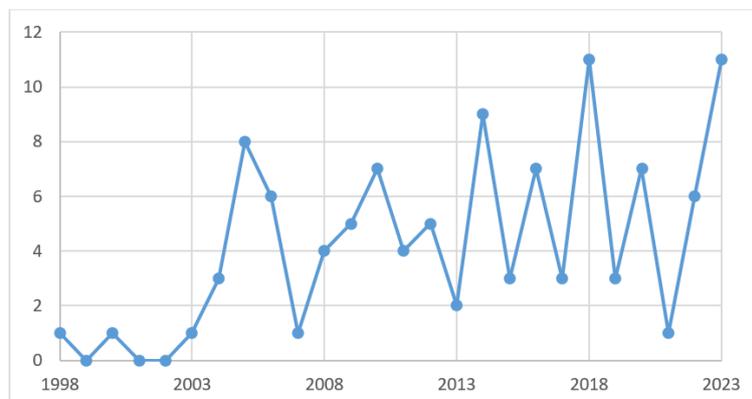


Figure 1. Total number of documents about ecological citizenship based on the publication year.

Source: Scopus database 2023.

Analysis of the number of documents about ecological citizenship based on the year of publication varies significantly. **Figure 1** shows that between 1998 and 2023, the number reflects gradual development, with a peak in research activity in 2014 with nine related documents. Interestingly, this research trend seems to have started in 1998 with the research title “The faith of democratic ecological citizenship” by J. Ronald Engel. In his study, Engel (1998) introduced sustainability and evolution as the concept of ecological citizenship to the literature. The increase in the number of documents in subsequent years may reflect growing awareness and attention to environmental issues and citizen participation in maintaining ecological sustainability. This analysis provides important temporal context for understanding the history of ecological citizenship research and reflects the growing interest in this field.

Research trends related to ecological citizenship continue to develop over time, reaching a peak in 2023 with 11 related documents. This development reflects the high interest and need to explore such a concept in the literature. The consistent increase in the number of publications since 1998 indicates that this topic has become increasingly relevant and has been receiving greater attention from researchers in various disciplines. The emergence of various perspectives and approaches in these publications reflects the complexity and multidimensionality of ecological citizenship as a research field that continues to develop. With activity peaking in 2023, it seems that literature related to ecological citizenship will continue to be at the center of academic attention, reflecting a commitment to responding to global environmental challenges through a deeper understanding of citizen participation in maintaining environmental sustainability.

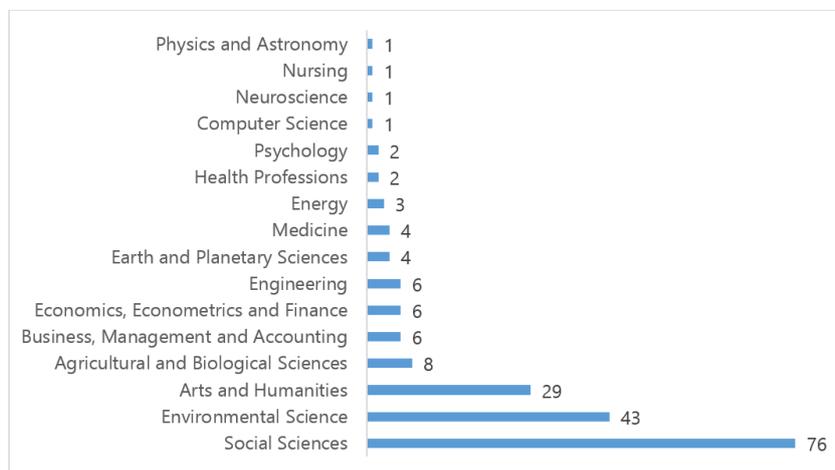


Figure 2. Total number of documents about ecological citizenship based on subject areas.

Source: Scopus database 2023.

Analysis of the number of documents based on subject areas shows significant dominance in Social Sciences with 76 documents, followed by Environmental Science (43), and Arts and Humanities (29) (**Figure 2**). A strong presence in the field of social sciences indicates that ecological citizenship is substantially related to social aspects, including values, policies, and societal dynamics. The significant increase in Environmental Science and Arts and Humanities also reflects a cross-disciplinary

approach to understanding the issue of ecological citizenship, apart from social factors, environmental and humanities aspects are the main focus of research.

Such distribution implies the importance of seeing ecological citizenship as a complex and multidimensional phenomenon, requiring a cross-disciplinary approach to properly understand its impact. The involvement of Social Sciences, Environmental Science, and Arts and Humanities shows the need for interdisciplinary collaboration to explore ecological citizenship issues holistically. This also creates opportunities to deepen understanding of how the values and principles of ecological citizenship can be integrated into policy and practical action in various sectors. With sufficient representation in various subject areas, ecological citizenship research has the potential to have a broad and sustainable impact in shaping global responses to environmental challenges.

Figure 3 shows the distribution of the number of documents based on the author's country affiliation. The top three contributors are the United Kingdom with 26 documents, the United States (21), and Canada (17). This distribution reflects the significant interest of researchers in these countries in the concept of ecological citizenship. In particular, Asian countries such as Turkey, Indonesia, and South Korea also make significant contributions, indicating geographic diversity in the understanding and exploration of ecological citizenship issues. This report implied the embrace of a global perspective and cross-country collaboration in responding to environmental challenges. By involving researchers from various countries, ecological citizenship studies are expected to cover broader issues while considering local contexts, which ultimately provide a more holistic framework.

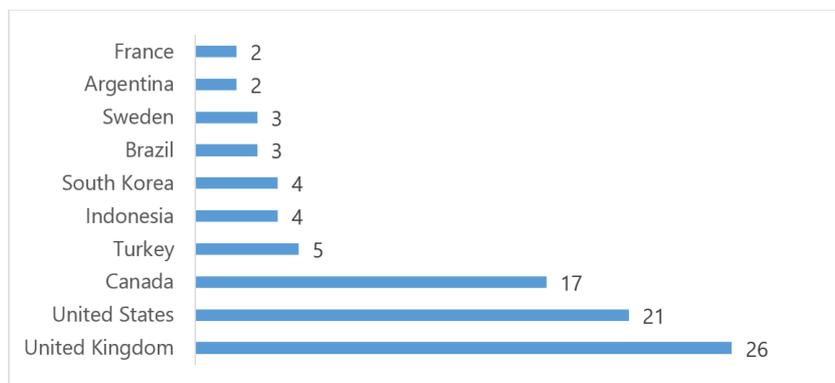


Figure 3. Total number of documents about ecological citizenship based on authors' country affiliation.

Source: Scopus database 2023.

It is noteworthy that this data depicts minimal contribution from writers from the Asian region. This is at odds with the central role of Asia in ecological citizenship considering the environmental challenges recorded in the region. In this case, Asian countries face serious problems of deforestation, environmental degradation, and climate change despite their rich natural diversity (Malik et al., 2023; Sharma et al., 2021; Zhao et al., 2006). Asian countries are expected to contribute more actively to ecological citizenship research to develop a deeper understanding of the role of citizens in maintaining environmental sustainability in regional contexts. It is important to respond to this lack of contribution by promoting cross-border

collaboration and encouraging more active research at the regional level, especially considering the complexity of environmental challenges that also affect the Asian region.

Efforts in mapping global publication trends regarding ecological citizenship are highly relevant to developing knowledge and responding to environmental challenges. First, the evidence that this research trend peaks in 2023 shows the urgency to understand the role of citizens in maintaining environmental sustainability. An increase in a particular topic indicates academic responses to the escalation of global environmental issues. Second, the dominant contributions from certain countries highlight their central role in shaping the global narrative regarding ecological citizenship. This implies the need to strengthen global dialogues and combine diverse perspectives to investigate environmental issues more holistically. Third, the lack of contributions from Asia calls for an increase in regional cooperation and more active research at the local level to respond to environmental problems specific to the region. Involving more contributors from the Asian region can open the door to understanding the rich and diverse regional context, which can provide more relevant and sustainable solutions.

Ecological citizenship: Document contribution based on the number of citations.

Analysis of the contribution of documents on ecological citizenship based on the number of citations provides an in-depth view of the impact and widespread acceptance of this concept in the literature. Paying attention to the extent to which a document is cited by other researchers also means measuring the extent to which the related topic has enriched and influenced academic discourse. The frequently cited documents related to ecological citizenship can be seen in **Table 1**.

Table 1. The most cited documents in ecological citizenship.

Title	Citations
Ecological citizenship and sustainable consumption: Examining local organic food networks	508
Shopping for sustainability: Can sustainable consumption promote ecological citizenship?	238
Only resist: Feminist ecological citizenship and the post-politics of climate change	96
Ecological citizenship and climate change: Perceptions and practice	92
Locating democratic politics in ecological citizenship	89

Source: Scopus database 2023.

Table 1 displays the titles of frequently cited documents related to ecological citizenship. One of the documents with the highest citation level was “Ecological citizenship and sustainable consumption: Examining local organic food networks” with 508 citations, followed by “Shopping for sustainability: Can sustainable consumption promote ecological citizenship?” with 238 citations. Other documents are “Only resist: Feminist ecological citizenship and the post-politics of climate change” with 96 citations, and “Ecological citizenship and climate change: Perceptions and practice” with 92 citations. Last, the document titled “Locating democratic politics in ecological citizenship” received 89 citations, showing significant attention in academic literature. The high number of citations of these

documents shows their substantial contribution to shaping discourse and understanding of ecological citizenship among researchers and academics.

The study titled “Ecological citizenship and sustainable consumption: Examining local organic food networks” reveals important findings regarding sustainable consumption and ecological citizenship through the study of local organic food networks. Comparing mainstream sustainable consumption policy models with alternative models from green economic theory, this study shows that local organic food networks play an important role in these alternative models. The empirical results confirm the hypothesis that ecological citizenship is the main driver for alternative sustainable consumption, especially through the purchase of local organic food. This initiative, both in terms of organizations and consumers, actively reflects the values of ecological citizenship in daily activities, making a real contribution to the growth of ecological citizenship, as well as overcoming the structural limitations of mainstream sustainable consumption practices (Seyfang, 2006). These findings highlight the great potential of ecological citizenship as a key driver of sustainable consumption behavior, providing an important basis for the formulation of policies and research that supports the transition to more environmentally friendly consumption patterns.

In the research “Shopping for sustainability: Can sustainable consumption promote ecological citizenship?” the author discusses the concept of ecological citizenship in the context of daily consumption choices. This research evaluates the sustainable consumption policy model in the UK as a tool to achieve ecological citizenship goals. By examining mainstream reform perspectives and radical alternatives regarding sustainable consumption, the research identifies failures in mainstream sustainable consumption policy models. As an alternative, they underscore several initiatives that can overcome the limitations of the mainstream model, enabling individual consumers to achieve good ecological citizenship (Seyfang, 2005). Such findings confirm that sustainable consumption practices can be an effective means of encouraging and practicing ecological citizenship, highlighting the importance of the link between everyday consumption choices and the environmental justice aspirations that underlie the concept.

In the document “Only resist: Feminist ecological citizenship and the post-politics of climate change” the author presents an analysis of post-political conditions related to the dominant climate change narrative. The focus is on the ecological feminist implications of the neoliberal-dominated narrative of climate change, which is seen as lacking a political subject, depicting nature as a threat to be endured, and replacing democratic public debate with expert administration and individual behavioral change. The author explores the potential contribution of ecological feminism to ecological citizenship by rejecting the hegemonic neoliberal narrative, while remaining committed to the feminist struggle to reclaim democratic debate about the socio-environmental future (Macgregor, 2014). These findings highlight the importance of resistance to dominant narratives in building critical and inclusive ecological citizenship.

Meanwhile, “Ecological citizenship and climate change: Perceptions and practice” presents a normative analysis of how citizens should live their lives by reducing environmental impacts. These findings explain that the practice of ecological citizenship motivates individual responses to climate change, with actions indicating

that behavioral change is the result of complex negotiations between living standards, knowledge about the causes of and contributions to climate change, and the perceived intensity of greenhouse gas emissions. The practice of ecological citizenship involves individual actions as voters and consumers, and concerns the power and justice implications of high-resource lifestyles in the Western world (Wolf et al., 2009). These findings provide insight into how the practice of ecological citizenship can be a driver for more sustainable behavioral changes in the face of climate change.

Finally, “Locating democratic politics in ecological citizenship” underlines that ecological citizenship has reached maturity, as can be seen in part from the special issue in April 2005 of a particular journal devoted to the topic. So far, ecological citizenship has been used more as a tool for normative theorizing about how to promote or regulate ‘greener’ forms of politics. This focus sometimes comes at the expense of appreciating how a shift toward citizenship can invigorate concerns about democratic politics in ecological thought. Although elements of democracy are certainly raised in the existing literature on environmental citizenship, there is a failure to address issues of recognition and inclusion, as well as identify subaltern voices that open the possibility of greater democratic participation through the politicization of the dominant socio-ecological order. This weakness can be partially overcome by establishing links between research in ecological citizenship and environmental justice (Latta, 2007). These findings suggest that ecological citizenship can potentially be a catalyst for refreshing democratic politics in ecological thinking, especially through an emphasis on recognition, inclusion, and subaltern voices.

It can be said that ecological citizenship research has provided deep insight into the complexity and diversity of interactions between sustainable consumption behavior, individual ecological responsibility, and ecological citizenship aspirations. Frequently cited documents, such as “Ecological citizenship and sustainable consumption: Examining local organic food networks” and “Shopping for sustainability: Can sustainable consumption promote ecological citizenship?”, provide significant contributions to shaping discourse and enriching understanding regarding ecological citizenship. These findings underscore the great potential of ecological citizenship as a major motor for changing consumption behavior towards sustainability, strengthening the foundation for policies and research that support the transition to more environmentally friendly consumption patterns. Overall, this research not only reflects the growing interest in the issue of ecological citizenship, but also points to future directions for research and action in this area by exploring the potential of ecological citizenship as a powerful conceptual framework for responding to global environmental challenges.

The high number of citations in the documents discussing ecological citizenship above also has several significant implications. First, this shows that the concept of ecological citizenship has become the main focus of attention in academic discourse, reflecting its relevance in the context of global environmental challenges. With so many citations, it can be assumed that this concept has had a big impact on shaping our understanding of the role of citizens in maintaining environmental sustainability. Second, the high number of citations reflects that the concept of ecological citizenship is not only a sectoral issue, but has permeated various scientific disciplines, showing a cross-disciplinary approach to understanding and overcoming environmental issues.

Third, another implication is that ecological citizenship research can provide a strong foundation for the development of sustainable policies and practical actions, supported by support and recognition from various parties in the scientific community.

3.2. Mapping research themes & identifying gaps: Recommendations for future research

Mapping research themes and identifying gaps is a critical step in summarizing research contributions and underscoring the need for further research. This study explores trends in dominant research themes, maps knowledge gaps, and offers recommendations for future research directions. This analysis provides in-depth insight into areas that have been substantially covered as well as raises the potential for additional contributions that future research could make.

Figure 4, which visualizes a mapping of research themes related to ecological citizenship, highlights the diversity of topics that have been researched in the scientific literature. Although many themes have received substantial attention, special attention needs to be paid to new themes that are emerging. In this context, two themes that stand out are environmental education and social justice. Although both have received prominence in the literature, there is still room for further development in both areas. Environmental education can be an important foundation in shaping society's understanding of ecological citizenship, while social justice highlights aspects of justice that are crucial in the context of sustainability. Further understanding of the relationship between ecological citizenship, environmental education, and social justice can make an important contribution to directing future research agendas and provide a more solid foundation for the practice of ecological citizenship.

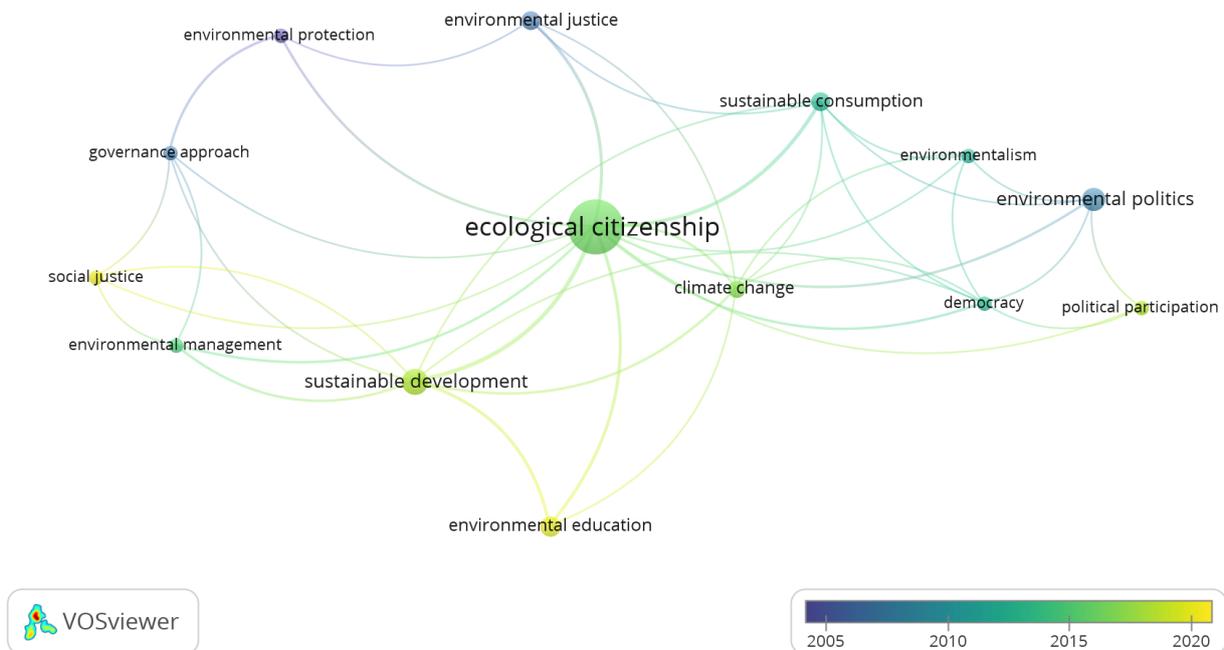


Figure 4. The map of research about ecological citizenship.

Source: Scopus database 2023.

The importance of environmental education is a critical element in the formation and maintenance of ecological citizenship, building a society that is committed to sustainability and environmental values (Rutti-Marín et al., 2022). Environmental education includes a series of activities and processes that aim to increase individual understanding of environmental issues, motivate behavior change, and encourage responsibility for sustainability. It involves lifelong learning and pays attention to the complex relationships between humans and the environment (Howles et al., 2018). Together, environmental education plays an important role in forming ecological citizenship by providing the knowledge, skills and attitudes needed to participate in sustainability efforts (Ardian Feriandi et al., 2023; Howles et al., 2018).

Social justice and ecological citizenship, despite their distinct dimensions, complement each other in facing the challenges of sustainability and equality. Social justice is not only limited to the fair distribution of resources and rights, but also includes critical analysis of structural inequality, oppression, and injustice in all its forms. The focus is not only on human well-being, but also on the recognition of vulnerable groups, as well as the ecological impact of social and economic practices (Binawan, 2023; Misra, 2023). By critically uniting social justice and ecological citizenship, education and advocacy can become a lever for broader social transformation. Understanding the relationship between ecology and human society by considering the interests of all groups and building an inclusive and just society is an important step towards substantial and impactful ecological citizenship.

The mapping of research themes related to ecological citizenship above provides an overview of the diversity of research focuses in scientific literature. Although several themes have received substantial attention, the emphasis on environmental education and social justice leads to opportunities for further research. This gap highlights that there are still many areas in these two aspects that have not been explored in depth, and a deeper understanding can provide a more solid foundation for the practice of ecological citizenship. Therefore, recommendations for future research should focus on developing environmental education methods that can stimulate awareness of ecological citizenship, especially by taking into account elements of social justice in the education curriculum.

Further research could explore environmental education strategies in two folds: the conveyance of information, and the encouragement of active participation and community empowerment in the context of social justice and sustainability. This recommendation is in line with the concept that environmental education is not just teaching, but is also a tool for creating citizens who are committed to sustainability and justice. By pursuing these studies, we can approach a more holistic understanding of how environmental education can be a catalyst for the formation of substantial and impactful ecological citizenship. Thus, through this approach, future research can fill the identified knowledge gaps, making an important contribution to the development of the concept of ecological citizenship and its implementation in educational and societal contexts.

4. Conclusion

The main findings confirm that this study succeeded in identifying ecological citizenship research trends, number of citations, mapping themes, and providing insight into research gaps. In this study, it appears that the concept of ecological citizenship has become the main focus in academic literature, showing its significant impact in shaping global understanding of the role of individuals in maintaining environmental sustainability. Research theme mapping shows the diversity of issues that have been explored, with particular emphasis on environmental education and social justice as research themes that are receiving increasing attention. Even though these two themes have received attention, there are still opportunities for further research, especially in exploring deeper connections between ecological citizenship, environmental education, and social justice.

Environmental education is an important effort in forming public understanding and awareness regarding environmental issues, while social justice highlights the importance of fair distribution of resources and rights, as well as critical analysis of inequality and oppression in social and ecological contexts. The relationship between the two is the focus of research to build an inclusive, sustainable, and just society as a whole. Future research recommendations include further exploration of effective strategies in promoting ecological citizenship, development of a holistic environmental education curriculum, and more active research in the context of social justice in various regions, including the Asian region which still requires further contributions. With this approach, future research can make a more substantial contribution to formulating policies and practical actions that support the vision of inclusive ecological citizenship and have a positive impact in overcoming global environmental challenges.

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