

A Systematic Review and Meta-Analysis of Ecological Aesthetics

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Abstract. In recent decades, a number of studies in culture and the fine arts have found that the decline in environmental quality has become a significant problem. Ecological aesthetics is one of the intriguing subtopics that has arisen from these discussions. This paper seeks to pinpoint recent research trends and patterns in the field of ecological aesthetics. To do so, a systematic literature review was conducted using the keyword ‘ecological aesthetics’. PRISMA (preferred reporting items for systematic reviews and meta-analyses) was used to filter and categorise scientific papers chosen from the Scopus, Science Direct, Proquest and Emerald platforms as study materials. A research roadmap of ecological aesthetics is the study's final output. This may facilitate the beginning of new research on the topic of ecological aesthetics.

Keywords: aesthetics, ecology, systematic review

1. Introduction

It is always interesting to talk about the aesthetics of the environment as they relate to human life. Nature’s beauty can impart a higher quality of life to humans. On the other hand, deteriorating ecological conditions will undoubtedly shorten human life. Everything in nature is interconnected, so everyone needs to be aware of deteriorating environmental conditions, even if these are related to the environment's aesthetics. However, there is still disagreement over the significance of aesthetics in terms of environmental management [1], despite numerous researchers having demonstrated the significance of aesthetics in environmental management. One of them is R.A. Smith, who coined the term ‘aesthosphere’ in 1970 to promote the beauty of the environment [2].

Numerous studies and discussions on ecological aesthetics have been conducted. Investigated direct perception models in extended eighteenth-century literature and philosophy[3]. Discussed the significance of art in the current ecological catastrophe [4]. Joan Iverson Nassauer discussed ecological aesthetics in her book *Integrating Ecology and Culture*[5]. Discussed ecology, politics and aesthetics in the context of the South American region [6]. In the context of biodiversity, N. Dunnet also conducted a study on how to combine aesthetics and ecology [7].

Although the advancement of ecological aesthetics research appears promising, little has been clarified in a thorough investigation. Therefore, this investigation was undertaken to highlight the importance of ecological aesthetics for present and future human life.

2 Aim

This paper aims to identify research trends and patterns in ecological aesthetics. While the aim is to identify the sub-topics of ecological aesthetics that can still be developed, it also opens up opportunities for the development of a research framework that is more in line with the research roadmap and the context of problems in Indonesia. In particular, this article aims to obtain data on what research has been carried out on this topic. We then review the research methodology used and how the researchers developed the discussion. Most importantly, we explore what has been produced from existing studies.

3. Methods

The Systematic Literature Review (SLR) is an exacting process that yields accurate, reliable and impartial results. A meta-analysis is a review carried out in accordance with predetermined processes and with quantitatively analysed results. To analyse the findings within the publications selected for the SLR, we paired the SLR approach with a meta-analysis[8]. The suggested reporting elements for systematic reviews and meta-analyses, or PRISMA, are compatible with this. The method used refers to the Joanna Briggs Institute, which applies the PRISMA protocol and guidelines for the order in which the review is carried out [9]. Articles were obtained from four scientific journal provider platforms, namely Science Direct, Scopus, Proquest and Emerald. The collected articles were reviewed sequentially, starting with the title, abstract and full text. Irrelevant articles were excluded, while relevant articles were explored with abstracts to the full text. The detailed review was carried out using the Cochran method in order to obtain clear and easy-to-read data [10].

The quality assessment of the articles used the PRISMA model as described in Figure 1. First, initial searches for keywords were conducted to find the available articles. 'Ecological aesthetics' was chosen as the keyword, which was then used to set up the scientific database. Second, all articles were collected from the database and the step-by-step instructions shown on the diagram were followed. All of the processes were backed up by Mendeley Reference Manager and Microsoft Excel.

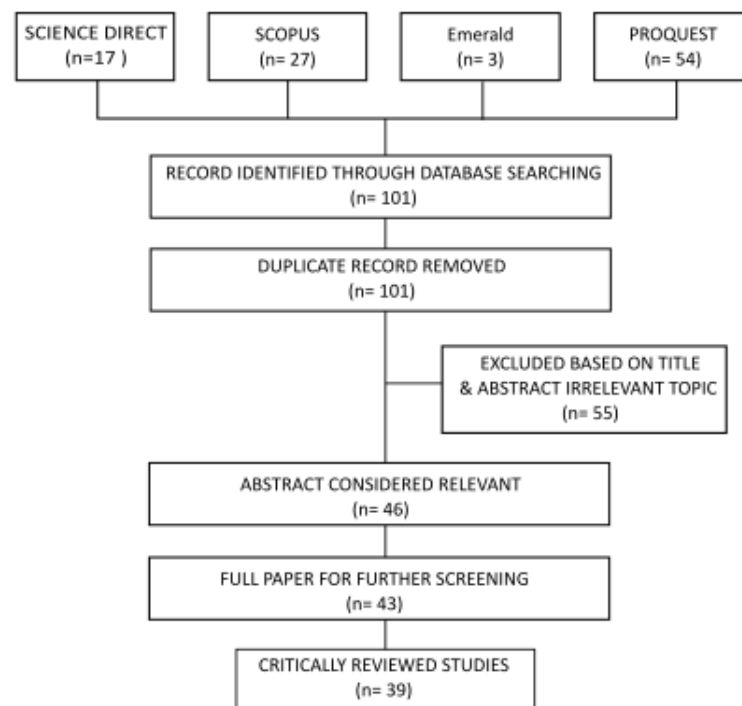


Fig. 1. Adaptation of PRISMA diagram for the article screening

For the metadata analysis, there are several models of data analysis from selected articles, and in this research, the articles were reviewed using the model reference from Cochrane, which is adapted to the fields of arts and humanities. The selected articles were extracted with the following data: authors, year of publication, study location, data source, aims of the study, overview of methods, and results.

3 Result

The number of studies on the subject of ecological aesthetics that were conducted during the past five years is shown in Figure 2. Only two research titles were published in 2018 [11], [12], compared to four in 2017 [13]–[16]. With four titles, the implementation of research grew once more in 2019 [17]–[19]. A further two studies were published in 2020. The number significantly increased in 2021 with the appearance of an additional four titles [20]–[25]. Twelve titles were added in 2022 [26]–[36], bringing the total to 28 titles. Overall, there has been a tremendous surge in ecological aesthetics studies during the past five years.

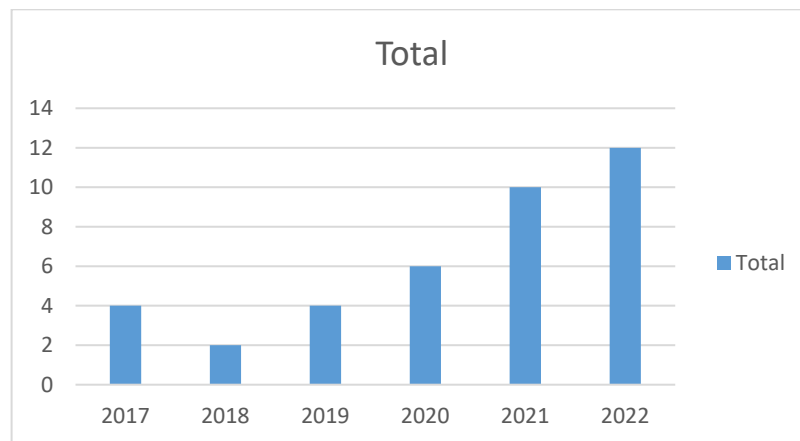


Fig. 2. The number of ecological aesthetics studies conducted in the last five years

The location of the ecological aesthetics studies conducted over the past five years can be seen in Figure 3. With 45% of the total, the majority of the research was conducted in China [15], [17], [19], [23], [25]–[27], [29]–[31], [33]–[39]. With 8% of the total, South Korean research [12], [40], [41] came in second after China. With 5% of the total each, France and India were ranked equal third [22], [42], [43]. Other studies were conducted on an equal basis in Australia, the United States, Brazil, Germany, Ghana, Italy, Latvia, Lithuania, Norway, Spain, Sweden and England, [1], [11], [13], [14], [18], [20], [21], [28], [32] in addition to the first four nations mentioned. Furthermore, numerous international studies have been carried out, specifically in China, Japan, the United States and various European locations.

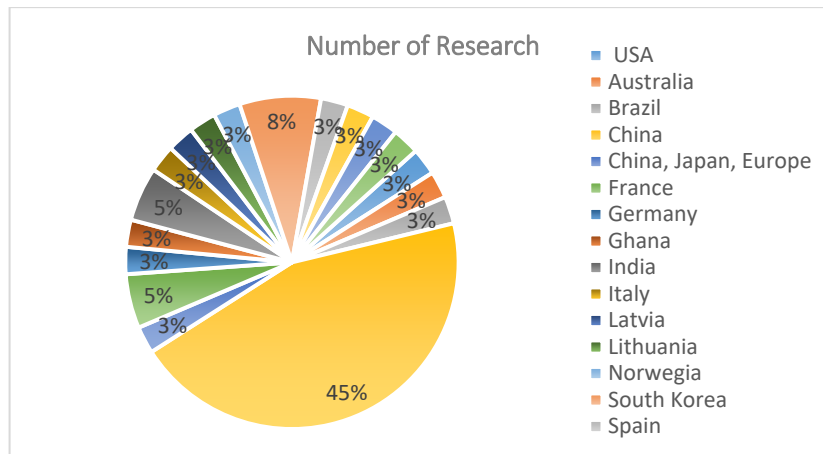


Fig. 3. The number of ecological aesthetics studies conducted in the last five years

As shown in Table 1, the research carried out used the data sources in various ways. There were 22 studies that used data sources as research objects. Then there were those that used the data sources involved in the research as subjects, namely the research conducted by Gobster et al. [1] and Zhang et al. [33]. Meanwhile, eight studies identified data sources as respondents. For those who positioned themselves as participants, this amounted to seven studies. There was no research that identified data sources as informants. Interestingly, nine studies did not clearly state the source of their research data.

Table 1. The type of data sources used in ecological aesthetics research

Object	Subject	Respondent	Participant	Informant	NA
22	2	8	7	0	9

Regarding the study objectives, all of the studies had their own specificity. For example, a study by Do et al. aimed to find the visual preferences of eco-tourism visitors [40]. Research by Fügler et al. [20] related to the development of the visual aesthetics of forest ecosystems. Gobster et al. investigated predictions of the landscape preferences of landowners [1]. Meanwhile, Haruna et al. aimed to develop a theory of ecological aesthetics in Ghana [11]. Hu et al. aimed to analyse public art in urban landscape construction [44].

From the above, a selection of sub-topics chosen by the researchers from the broader topic of ecological aesthetics can be glimpsed. Sub-topics related to visual appearance appeared in twelve studies. The sub-topic of aesthetic quality became the subject of ten research papers. Ecological aesthetics conceptually existed in seven studies. The rest of the research involved the subtopics of education, behaviour, application, material and perception.

The research method used in the ecological aesthetics research was divided into three groups. The largest group involved research that used quantitative methods, amounting to 47% of the total. Meanwhile, research using qualitative methods accounted for 45% of the total. Finally, the remaining 8% of the total was research using a mixed method or a combined method.

5 Discussion

The metadata obtained from the 38 selected studies yielded many discussion points. The trend of the studies—which are increasing in number—highlights the focus of researchers who are concerned with environmental problems and their aesthetics. However, the number of increases—an average of 2–4 research projects per year—can be considered to be low. The global situation and conditions do not seem to be affecting the increasing trend of this research. The encouragement of the initiation of research with ecological and aesthetic themes should be intensified, as environmental problems are increasing all over the world.

The location of the research can be discussed from various points of view. The number of studies taking place in China, with 45% of the ecological aesthetics research titles, indicates more interest in the topic when compared with other countries. This suggests that the ecological problems in China are larger than those of other countries. Data from the Statistical Review of World Energy 2021 (see Figure 4) states that China occupies the position of the most polluted country in the world in terms of air pollution, which is an indicator of environmental conditions. South Korean studies followed the Chinese studies, with 8% of the total studies investigated; this may be a result of the rapid growth of industry in this country. Other countries with minimal research may indicate priority scales and environmental visions that have not yet been considered as important problems.

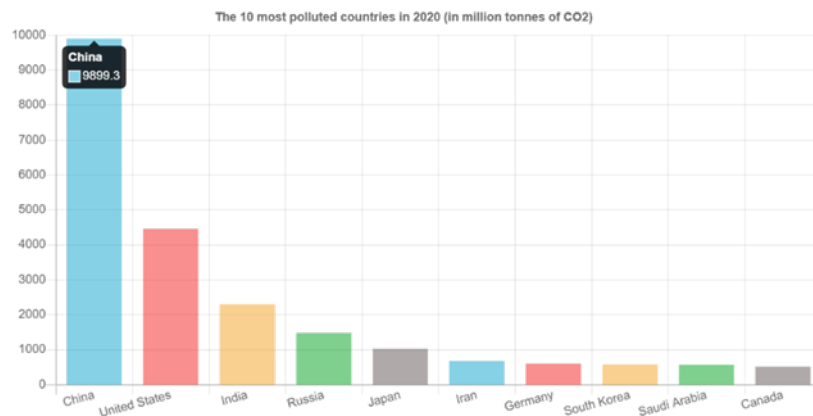


Fig. 4. Most polluted countries in 2020

Regarding data sources, our analysis showed that most of the research on ecological aesthetics is still focused on objects. Ontologically, it means that the real truth lies in the object being studied. Humans as actors (subjects), sources of truth in their perceptions (respondents), and actions (participants), have not yet occupied the expected position in accordance with the development of current research. This is especially the case when examined from the aspect of the philosophy of aesthetics, where the eye of the beholder [45][45] becomes an important point of view of the aesthetic process.

However, it is even more interesting that, of the 38 research titles on ecological aesthetics, there were nine research titles that did not clearly state the source of the data being studied. This can happen for several reasons; one of them could be because the research structure needs improvement. In addition, it can also be caused by qualitative research that is narrative in nature, where the research structure is made to flow without a standard scientific research structure [46][46].

The very varied distribution of the research objectives that had not been patterned shows that the fields related to ecological aesthetics are not yet well established. In addition, it can also occur because the body of knowledge, as a barrier to deepening knowledge, has not been well prepared. It could also be because the problems that form the basis of research needs in the field are still too diverse. It can also cause the research carried out to be more applicable, which is very typical with field conditions that are more normative in nature and not in a more positive direction in knowledge [47][47].

From the above discussion, the fact that 47% of the research was conducted with quantitative methods, 45% with qualitative methods and 8% with mixed or combined methods can indicate several things. Firstly, the paradigm of most researchers is in the area of formal aesthetics, where the problems studied are related to the form of aesthetic objects. In such a scenario, the nature of the problem is still on the surface without using research tactics that lead to deeper thoughts. As a result, it is very probable that many use statistics as a way of generalising findings that form the basis for logical scientific recognition. Secondly, eastern aesthetic research methods with flexible and interpretative characters have not been able to be placed side-by-side with quantitative methods. Thirdly, the pragmatic paradigm was represented by 8% of researchers who used mixed methods, which also shows efforts to improve research results as well as dialogue between the two epistemological domains of research.

6 Conclusions

From this literature review, several things can be concluded. Firstly, there are still opportunities for research on the ecological aesthetic in all regions of the world. Secondly, there is an interesting development in terms of methods with the application of qualitative methods, but it still needs development effort toward more established methods. Many studies were not conducted within a systematic framework, which made the review process difficult. And thirdly, systematic review as a method in humanities research still needs to develop its own tactics or techniques.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Conflict of interests No conflict of interest has been declared by the authors during the development and evaluation process involved in this review. No ethical issues have been noted.

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