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Exploration of Environmental Care Attitudes through Integrated Natural Science Learning with Local Potency

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Abstract. This research is article review research aimed at exploring integrated natural science learning research with the local potency to improve students' environmental care attitudes published in journal articles and proceedings for 2010-2021 and categorized based on research year, research location, research institution, and subject school level. This study uses a literature review with 63 articles. The results showed that a lot of research took place in 2020 with 10 articles, mostly conducted in Indonesia with 56 articles, researched mostly by College Institution institutions with as many as 27 authors, and mostly carried out at the junior high school level with 32 articles. This article's review shows that research on local potency to improve environmental care attitudes is still lacking and needs to be investigated further.

Keywords: environmental care attitude; integrated science; natural science learning; local potency

INTRODUCTION

The essence of science learning is not only to understand concepts, but students can also apply the concepts in their daily activities (Kalogiannakis et al., 2021; Usak et al., 2020). The essence of science learning includes four elements, namely (1) attitude which is curiosity about objects, natural phenomena, living things, and their relationships which cause new problems that can be solved through correct procedures, (2) processes, namely problem-solving procedures through methods scientific; the scientific method includes developing hypotheses, designing experiments or experiments, evaluating, measuring, and drawing conclusions, (3) products in the form of facts, principles, theories, and laws and (4) applications which are the application of the scientific method and scientific concepts in everyday life. days (Carlson et al., 2019; Ray & Srivastava, 2020).

The application of a scientific approach which includes five learning experiences (observing, asking, gathering information, reasoning/associating, and communicating) aims to enable students to obtain the essence of learning science (Oh, 2020; Siswanto et al., 2018). Thus, in the process of learning science at school, students can discover for themselves the concepts they learn thoroughly, meaningfully, authentically, and actively (Nida et al., 2020). The meaning of learning science at school can be obtained if students can care about the environment (Jannah et al., 2021; Simeon et al., 2020).

An attitude of caring for the environment is needed so that students not only understand a material but can apply it in everyday life (Restanti et al., 2013). An attitude of caring for the environment is an act or statement that shows partiality towards environmental sustainability (Narut & Nardi, 2019). The attitude of caring for the environment is very important for students because it relates to real life, where currently humans cannot be separated from technology and science in managing the environment (Devitasari et al., 2021; Mustika & Sahudra, 2018). An attitude of caring for the environment is the main goal of science education and is used as an indicator to see the quality of education and human resources in a country (Harsari & Indriayu, 2020).

Providing science materials in schools that are related to environmental, social, and technological issues is one of the efforts that can be made to increase the attitude toward caring for the environment (Ilhami et al., 2019). Science materials related to environmental issues can be learned through local potency-based learning which can help students to understand concepts correctly and contextually (Nurcahyani et al., 2021; Rahardini et al., 2017). Students who have a good environmental care attitude will be able to connect science, technology, and society. Students also have a sensitive attitude toward the environment (Hebel et al., 2014). Good literacy skills will also enable students to scientifically analyze various phenomena around them with scientific knowledge (Aristina & Isnaeni, 2022; Mtsi & Mabel-wendy, 2021).

Local potency can be interpreted as the potency

possessed by a particular area (Berger, 2020; Fauzan et al., 2021). Local potency can develop through the wisdom or cultural traditions of the community (Fitriyani et al., 2021; Sutrisno et al., 2020). Learning by utilizing local potency can attract students' interest so that learning is more useful (Budiarto & Joebagio, 2020; Sunarsih et al., 2020). This is what is then adopted into science learning in the K13 curriculum which is very relevant for integration with local content (Fuadati & Wilujeng, 2019; Hayati et al., 2019). Local potency in science learning can improve science learning outcomes in various aspects (Adinugraha et al., 2020; Ulya et al., 2022). One of the learning outcomes that is enhanced through science learning integrated with local potency is an attitude of caring for the environment, considering that local potency can be a source of direct, contextual learning (Sobiatin et al., 2020). Research on integrated science learning with local potency can be traced from various studies that have been conducted by researchers.

Research on local potency in increasing environmental care attitudes has become an interesting issue in the field of education in recent years (Hidaayatullaah et al., 2021). Research on local potency in science learning has been carried out with various variables. Until now, research on science learning integrated with local potency is still being carried out. To add references to science learning research that integrates local potency in improving environmental care attitudes, an in-depth literature review is needed as a source of new knowledge.

This article review aims to explore studies that reveal local potency integrated science learning that enhances students' environmental care attitudes grouped by year of research, research location, research institution, and subject school level. The benefits of this research are expected to contribute to science and become the basis for research related to local wisdom and environmental care attitudes.

METHODS

This research specializes in searching for publications in the form of scientific journal articles and proceedings articles. The journal articles and proceedings collected are those available in the Scopus and Google Scholar databases. Search for articles using the Publish or Perish application which is a special search engine for scientific publications. The keywords used to search for articles are a combination of the keyword's local potency, local wisdom, ethnoscience, indigenous knowledge, indigenous science, traditional science, environmental care attitude, environmental awareness, and green environment. The articles you are looking for are articles published from 2010 to 2021. The steps for selecting articles are explained in Figure 1.

In the identification stage, potential articles are located through comprehensive database searches using specific keywords. During screening, these articles are reviewed based on titles, abstracts, and sometimes full texts to exclude those that do not meet basic inclusion criteria, and duplicates are removed. The eligibility phase involves a detailed assessment of the remaining articles to confirm their relevance and quality, ensuring they meet all predetermined criteria. Finally, the inclusion step involves systematically analyzing and synthesizing the selected articles to address the research questions and objectives of the review.

The data analysis was conducted by categorizing the findings of the article into specific groups based on certain aspects that met the predetermined criteria. The determination of these categories was based on the information provided by the author in the results and discussion sections. Additionally, the collected data was presented in the form of tables or diagrams. At the identification stage, an article search is carried out with the specified keywords. Then at the screening stage monitoring of articles related to environmental care attitudes and local potency in science subjects is carried out. Articles that pass the screening process enter the eligibility stage, which is the stage of selecting articles that are by the research object in the form of journal articles and proceedings articles. Then the articles are selected again at the Included stage where only articles that meet the criteria are included in the research object. The search results are displayed in Table 1.

The data analysis was conducted by categorizing the findings of the article into specific groups based on certain aspects that met the predetermined criteria. The determination of these categories was based on the information provided by the author in the results and discussion sections. Additionally, the collected data was presented in the form of tables or diagrams.

RESULTS AND DISCUSSION

Research trends in increasing environmental care attitudes through learning local potency

Research on local potency to improve student

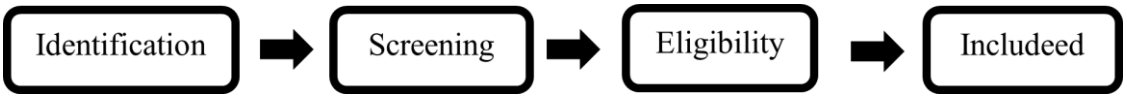

Figure 1 Article selection steps

Table 1 Distribution of research locations

No.	Selection Steps	Results	
		Scopus	Google Scholar
1	Identification	143	526
2	Screening	82	109
3	Eligibility	61	66
4	Included	24	39

learning outcomes has been carried out using various models, methods, and media. Science learning outcomes in the form of increasing students' environmental care attitudes through local potency are still rarely carried out. This is illustrated by research data from 2010 to 2021, there are only 63 journal articles and proceedings that specifically examine this matter which is published in the Scopus and Google Scholar databases. In that span of years, 2020 is the year with the most publications of articles about local potency related to environmental care, namely as many as 10 articles. This local potency trend is indeed a current issue (Deskarina & Atiqah, 2020; Toha, 2020).

From 2010 to 2018, the number of article publications showed a relatively stable trend without significant increases. However, from 2018 to 2019, there was a notable spike which continued through 2021. The years 2019 to 2021 marked periods with a notable increase in local potential articles aimed at enhancing students' environmental awareness. Research conducted between 2019 and 2021 has demonstrated a significant rise in the integration of local potential in education, particularly focusing on enhancing 21st-century skills through various educational models and methods. Studies have highlighted the importance of linking indigenous knowledge with scientific concepts to improve learning outcomes, critical thinking skills, problem-solving abilities, and environmental literacy (Kamila et al., 2024). The development of integrated local potential learning is closely aligned with targeted Sustainable Development Goals (SDGs). Local potential learning supports SDGs by integrating environmental conservation into science education and promoting sustainability (Margareth et al., 2024).

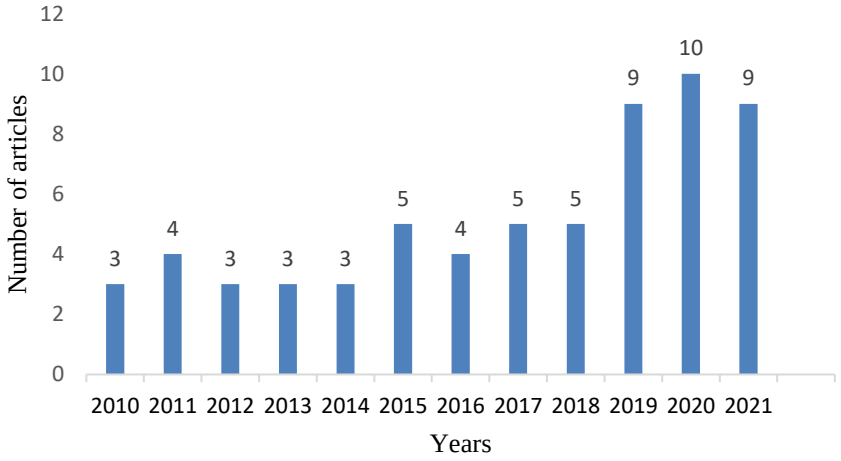

Figure 2 Graph of the increase in the number of articles from 2010-2021

Table 2 Distribution of research locations

No.	Countries	Number of articles
1	Indonesia	56
2	Tanzania	1
3	Kenya	1
4	Nigeria	1
5	China	1
6	Hungary	1
7	Poland	1
8	India	1

Research countries

Countries, where research on local potency learning is integrated with environmental care attitudes, are carried out in various countries. This research is dominated by research located in Indonesia, where 56 studies were conducted in Indonesia. The distribution of research locations can be seen in Table 2.

The data obtained shows that research that explores local potency integrated with environmental care is still lacking. This lack of research is an opportunity to conduct research that explores local potency in improving science learning outcomes (Khery et al., 2020; Sapitri et al., 2020).

Researcher Institutions

Researchers who are active in exploring local potency to improve environmental care attitudes

Table 3 Research institution of origin

No.	Institutions	Number of Researchers
1	Universitas Negeri Semarang	12
2	Universitas Negeri Yogyakarta	8
3	Universitas Negeri Surabaya	7
4	Universitas Lambung Mangkurat	5
5	Universitas Lampung	5
6	Universitas Jambi	4
7	Universitas Gadjah Mada	4
8	Universitas PGRI Madiun	4
9	Universitas Negeri Makassar	3
10	Universitas Diponegoro	2
11	IKIP Mataram	2
12	Universitas PGRI Yogyakarta	2
13	Universitas Negeri Jakarta	2
14	Universitas Sriwijaya	1
15	Universitas Riau	1
16	Institut Teknologi Bandung	1
17	Universitas Kristen Satya Wacana	1
18	Universitas Pendidikan Indonesia	1
19	Universitas Muhammadiyah Sukabumi	1
20	SMPN 2 Selomerto, Wonosobo	1
21	University of Calabar, Nigeria	1
22	Southeast University, Cina	1
23	Sekolah Dasar Kazinczy Ferenc, Hungaria	1
24	Universitas Babes-Bolyai, Hungaria	1
25	University of Warmia and Mazury, Polandia	1
26	University of Leeds, Inggris	1
27	University of the Western Cape, Afrika Selatan	1
28	Union Christian College, India	1
29	St. Augustine University of Tanzania, Tanzania	1

Table 4 Distribution of research at school level

School level	Number of articles
Elementary school	11
Junior high school	32
Senior High School	11
College	7

come from various institutions. These institutions are dominated by universities. The institutions can be seen in table 3.

Semarang State University is the institution that contributes the most researchers in this research field, namely as many as 12 researchers. Many researchers from Semarang State University are inseparable from the green campus conservation program which seeks to solve environmental problems (Prihanto, 2017; Rachmadi, 2019; Saddam, 2019). The amount of attention from researchers from tertiary institutions is inseparable from the role of the institution itself in paying attention to environmental and community issues (Buana et al., 2018; Mustika & Sahudra, 2018; Setiawan & Lenawati, 2020; Suryana, 2018).

Level of school research subjects

The attitude of caring for the environment is an ability that must be possessed by students at various levels of school. An attitude of caring for the environment can be trained and improved from learning science from elementary school to university. In this study, the junior high school level was the level most frequently found in research on local potency in increasing environmental care attitudes, namely 32 studies.

The junior high school level, which is the school level that has been widely researched regarding local potency and environmental care attitudes, is not without reason, this phenomenon is due to the high school level, students' abilities have developed in a more structured self-exploration. (Mendala & Suryadarma, 2019). Junior high school students are at an age where they are more receptive to exploring and understanding their immediate environment, making it an opportune time to introduce local examples and resources into their learning materials. Incorporating local potential into education not only enhances students' understanding of concepts but also fosters a sense of connection with their community and surroundings. Furthermore, secondary school is a critical period for building foundational knowledge and skills, thus it is important to integrate local contexts into the curriculum to create meaningful and engaging learning experiences that resonate with students' lives and experiences (Sari & Fauzan, 2024).

CONCLUSION

Between 2010 and 2021, 63 research articles on local potency learning related to environmental care attitudes have been published. 2020 was the year with the most article publications with 10 publications. These studies are spread across several countries, namely Indonesia with 56 publications, Tanzania, Kenya, Nigeria, China, Hungary, Poland, and India with 1 publication each. There are 29 affiliated institutions which are college institutions with 27 authors, Junior High Schools with 1 author, and Elementary schools with 1 author. The research subjects on this topic were conducted at the Elementary School level with 11 studies, Junior High School with 32 studies, Senior High School with 11 studies, and College Institution with 7 studies.

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