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Bibliometric Analysis of Maritime Education in Google Scholar Database (2018-2023)

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ABSTRACT

Maritime education is suitable for Indonesia because two-thirds of its territory is ocean. Science and technology in the maritime domain are developing at a quicker rate, and research in maritime education is facing increasing difficulties. Still, it is not yet known how extensive the research on marine education is. This study uses VOSViewer software to do bibliometric analysis on the Google Scholar database from 2018 to 2023. The research method used is bibliometric analysis using the VOSViewer application on the Google Scholar database. Based on the results of research with the keyword Maritime education, a total of 485 relevant articles were published in the 2018-2023 period. The mapping results show that there is still need for more research in the field of maritime education, and that this research may be connected to other factors. Further research with the theme of naval education still has several novelties with various pieces, including autonomous, marine environment management, climate change, and pollution phenomena, protection of marine ecosystems, the great potential of the sea as a renewable energy source, such as wave energy, tidal energy, and other energy.

1. Introduction.

Indonesia is one of the largest archipelagic countries that aspires to become the world's maritime axis (Anggoro & Amrullah, 2023; Hidayat & Anwar, 2022). The advantage of Indonesia being in the equatorial area is a strategic breakthrough to make island connections with one another (Marlina et al., 2022), to develop industries in the marine sector, ship transportation, and fisheries sector, and to focus on planning sea transportation and maritime world security.

To realize this desire, revitalization of development in the marine sector (Ren, 2021), strengthening and developing connections in sea transportation, rehabilitating the environment and conserving marine life, and increasing the quantity and quality of Human Resources.

The Ministry of Transportation is a maritime education provider that organizes educational programs for prospective seafarers. This educational program is given to the general public who want to become a sailor. Maritime education produces quality human resources to support the marine industry. The sustainability and progress of the naval sector depend mainly on the availability of a skilled and trained workforce.

Changes in global economic dynamics, technology, and regulatory demands in the maritime sector pose new challenges (Liu et al., 2023). In the face of these challenges, the success of the marine industry depends on the extent to which naval education can produce graduates who can adapt to these changes (Bogusławski et al., 2022).

There are concerns about the gap between the competencies required by the maritime industry and the skills possessed by maritime education graduates. This can hinder industry growth and reduce global competitiveness. Technological developments and the changing needs of the marine sector emphasize the need to develop a dynamic and relevant maritime education curriculum. Maritime education must be able to provide knowledge and skills that are in line with industry demands (Suharno et al., 2020).

Technological developments in the maritime industry, such

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as automation and digitalization, demand adjustments in the curriculum and teaching methodology of marine education (Mallam et al., 2019a). This research explores how maritime education institutions are adapting to these developments. The importance of government and institutional support in improving the quality of marine education can also be the focus of the research background. How policies and regulations support the development of quality maritime education needs to be analyzed.

The research also explores how maritime education prepares students for global maritime security challenges. This research is expected to make a real contribution to improving the quality of human resources needed to support the growth and sustainability of the marine sector.

Research related to maritime education has not been known in the period (2018-2023), and it's unclear if there's a continued need for educational research on maritime education. Maritime education is expected to have a positive influence on fostering an attitude of love for the homeland and restoring the glory of the ancestors of the Indonesian nation as sailors to students.

A quantitative research method used to examine the creation, distribution, and significance of scientific publications is called bibliometric analysis (Mallam et al., 2019a). In order to find trends and patterns in scientific communication, this analysis examines a number of bibliographic data elements, including publication output, citation patterns, and authorship networks (Aramo-Immonen et al., 2020; Hou et al., 2018). Bibliometric analysis is a useful tool for tracking the dissemination of knowledge across disciplines, identifying new research areas, and tracking research trends over time (Chawla & Goyal, 2022). Bibliometric analysis data in this study was obtained from an academic database, namely Google Scholar (Md Khudzari et al., 2018).

Bibliometric analysis is a tool used to look at research/publications, especially in maritime education, by providing insight into trends in existing literature (Ogunsakin et al., 2022). Bibliometric analysis is a software used to see the development of research/publications (Zakaria et al., 2021). This technique looks for trends and patterns in research related to a specific topic or field of study by examining the citations and content of articles published in journals and other papers (Tang et al., 2023). Bibliometric analysis is used by researchers to identify articles in the field of maritime education (Cao et al., 2023). This technique looks for trends and patterns in research related to a specific topic or field of study by examining the citations and content of articles published in journals and other papers (See et al., 2021). The data information presented is used to make decisions/policies related to maritime education. Using the VOSViewer programme, a bibliometric analysis of articles from the Google Scholar database for the years 2018–2022 was carried out in this study. The purpose of this study was to determine research themes primarily related to and serve as a resource for researchers and other researchers when conducting and interpreting research to "Maritime Education."

Maritime education is a type of education that focuses on preparing human resources to enter the marine industry (Riyanto & Haryanto, 2023). The main objective of maritime education is to provide the knowledge, skills, and understanding necessary for various occupations and professions related to the sea and waters. It covers multiple aspects, from navigation, ship management, and maritime engineering to maritime security (Nikitakos et al., 2017).

Maritime education programs can be found at various levels, from secondary education to colleges and training institutions. The curriculum is designed with themes of navigation, naval meteorology, law, ship management, maritime technology, and other practical skills needed to work on board (Sellberg et al., 2018).

Maritime education is the foundation of development in developing human resources in the marine sector. According (Mallam et al., 2019b), naval education is not just about providing technical skills but also forming a deep understanding of critical aspects of the maritime industry.

According to (Oke & Fernandes, 2020), maritime education faces global challenges such as climate change, economic uncertainty, and technological evolution. This challenge demands rapid adaptation from maritime education institutions to produce graduates who are relevant and ready to face these changes.

Research by (Renganayagalu et al., 2022), shows a gap between the skills taught in maritime education and the real needs of the marine industry. In this regard, curriculum adjustments become very important to address this gap.

According to (Grassini, 2023), technological developments, including automation and digitalization, have significantly transformed the maritime industry. Maritime education must respond by integrating cutting-edge training so that graduates can cope with these changes.

Government policies have a significant impact on the development of maritime education. Government support in the form of incentives, supportive regulations, and industry-education partnerships can improve the quality of marine education.

Research by (Di Vaio et al., 2023), highlights the importance of increasing women's participation in maritime education. Women's empowerment measures not only support gender equality but also contribute to diversity and innovation in the marine industry.

Based on some of this literature, research on maritime education can focus more on critical aspects that influence the development and effectiveness of educational programs in this area.

2. Methodology.

The research method to be used in researching maritime education is bibliometric analysis (Li et al., 2023). The database chosen is Google Scholar because, according to researchers, it has a complete indexation range (Halevi et al., 2017). This approach is used because it is considered capable of measuring and checking publications in the database to be studied. Research using bibliometric analysis allows for the exploration, note-taking, examination, and viewing of published papers related to the specified theme (Huang et al., 2023).

The way to retrieve indexation data is to use Publish or Perish application (Mahendra & Maftuh, 2023) with the keyword

"Maritime Education." The research stage was carried out first by collecting publication data using Publish or Perish application with a Google Scholar database, exporting RIS data, mapping using the VOSViewer application, and continuing analysis of mapping results. The VOSviewer application is used to imagine and assess trends using bibliometric maps in the form of visualization of networks, density, and overlays based on networks (Mahendra & Maftuh, 2023).

3. Result.

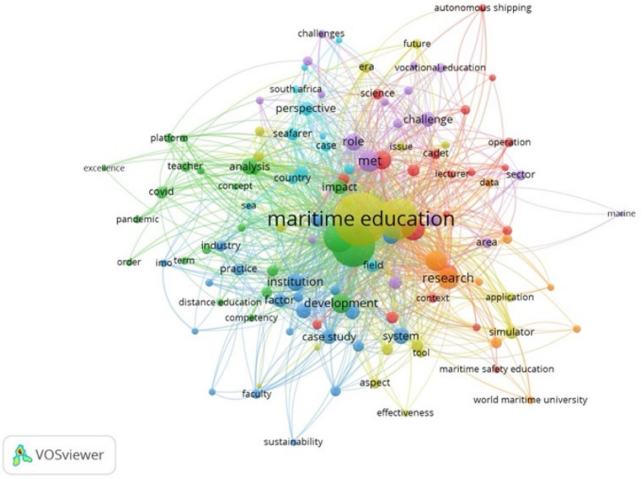
3.1. Search Results.

Based on output generated by Publish or Perish app, a database on Maritime Education from Google Scholar, 485 articles were identified as meeting predetermined criteria. The articles analyzed had a total citation of 1.162, with an average of 232.40 citations per year and an average of 2.40 per paper. The data shows that many other authors cite articles on maritime education, indicating that this topic is still relevant to research. Therefore, further research related to marine education is fundamental to develop.

3.2. Visualization of Maritime Education Topic Areas Using VOSViewer

They are using the VOS Viewer application results in the computational mapping of articles on maritime education. The resulting items become 4 clusters for a total of 26 items. Here's the cluster mapping. Cluster 1 consists of 9 things: country, COVID, experience, maritime higher education, maritime student, Philippines, quality, student, and university. Cluster 2 consists of 8 items: implication, naval education, marine sector, perspective, seafarer, sustainable development, training, and training institution. Cluster 3 consists of 7 things: field, higher education, implementation, industry, knowledge, maritime higher education, and need. Cluster 4 consists of 2 items: simulator, use.

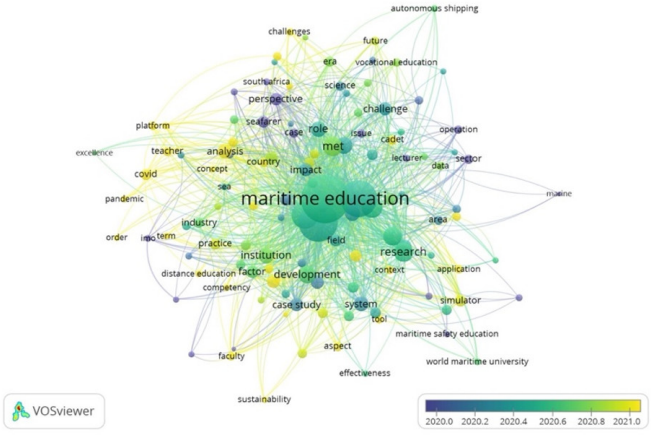
Figure 1: VOSviewer visualization related to maritime education.



Source: Authors.

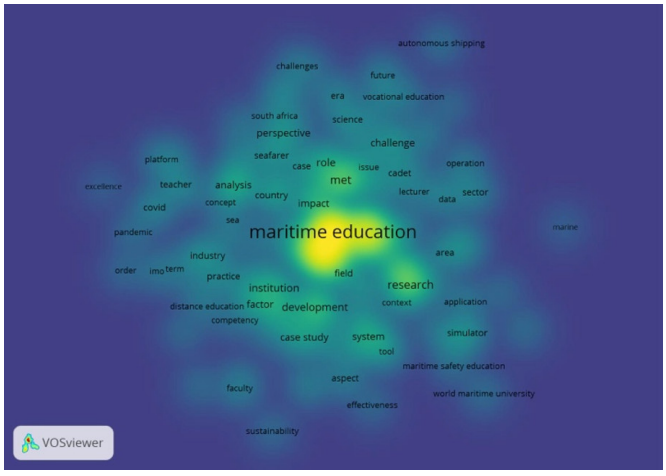
Based on the cluster data, there is a relationship of items with one another. Each item is given a colored mark and has a different size depending on the frequency of its appearance. The circle size shows a positive relationship with the frequency of its occurrence. Terms that appear frequently will be indicated by a larger circle. Network visualization, overlay visualization, and density visualization are addressed in the following figure:

Figure 2: VOSviewer Overlay Display related to maritime education.



Source: Authors.

Figure 3: Density VOSviewer related to maritime education.



Source: Authors.

4. Discussion.

Based on Figure 1 above, the overlay visualization of research related to maritime education shows related novelty about naval education. Research on marine education continues to be very popular. Even so, there are still plenty of opportunities for research on maritime education, so we can continue our study in this area.

Based on Figure 2 above, there is an opportunity for autonomous shipping, which has a high enough chance to be developed in future studies.

Figure 3 above shows the network of relationships between maritime education and country, COVID, experience, maritime higher education, marine student, Philippines, quality, student, university, implication, naval education, maritime sector, perspective, seafarer, sustainable development, training, training institution, field, higher education, implementation, industry, knowledge, maritime higher education, need, simulator, use. Research on maritime education is still ongoing and connected to other concepts. This implies that further studies in this field will probably have a big influence.

Research is in line with (Touwe, 2020), that Maritime research involving the management of marine resources. Fish, oil and natural gas, minerals, and other marine life that have economic and ecological value still have pretty exciting opportunities for further study.

Other research on marine environment management, climate change and pollution phenomena, marine ecosystem protection, and the great potential of the sea as a renewable energy source, such as wave energy, and marine thermal energy. Maritime research can help in optimizing the utilization of this energy source for sustainability.

Oceans play a crucial role in the defense and security of a country. Research on maritime helps in understanding and addressing naval security challenges such as piracy, illegal trade, and other maritime security issues.

The relevance of maritime research is also crucial for understanding the impact of climate change on oceans and coasts (Lincoln et al., 2022). These include rising ocean temperatures, sea level rise, and intensification of sea storms, all of which can have severe impacts on coastal communities.

Development of new technologies in ocean exploration, underwater surveying, ship development, and navigation systems (Bogusławski et al., 2022). It contributes significantly to the progress of the maritime industry. In a geopolitical context, maritime research can be the basis for naval diplomacy, where countries work together to address common issues such as the sustainability of the marine environment, security, and ocean trade.

Research on maritime can also be linked to the lives of coastal communities, their needs, and how to improve their well-being through sustainable management of marine resources.

Conclusions.

A bibliometric analysis of Maritime Education using Publish or Perish app and a Google Scholar database published from 2018 to 2023 found 485 relevant articles. The results of the mapping show that the field of maritime education is still open for new research by linking to other terms, such as autonomous, marine environment management, climate change and pollution phenomena, and marine ecosystem protection, to the great potential of the sea as a renewable energy source, such as wave energy, tidal energy, and other energy. In order to address current issues and trends in the field, it can be concluded that there is a need for more recent and up-to-date research in maritime education by connecting it with other related terms.

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