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Abstract. The country with the most variety of indigenous knowledge and local wisdom country in the world is Indonesia. Many academics today work to integrate aspects of the local culture into junior or senior high school curricula. The research examines a bibliometric analysis of local wisdom in physics education. The Scopus Database is being used for this bibliometric analysis. According to the findings, Indonesia dominated physics local wisdom research from 2013 to 2022. Even though there have not been many publications, most of the research has been published in conference proceedings. In addition, the Journal of Physics Conference Series is the journal that publishes the most publications related to physics local wisdom, followed by the AIP Conference Proceeding. Researchers need to explore deeply Physics Local Wisdom topics. Research and development need to be carried out in-depth related to the growing trend of physics local wisdom in the Scopus database.

1 Introduction

Indonesia is a country that has much local wisdom and diverse content. A country divided into various ethnic groups makes Indonesia rich in unique culture [1]. This cultural wealth becomes a clear identity for the ethnic group and shows that identity. The cultural wealth in Indonesia includes traditional houses, folk songs, dances, clothes, food, historical sites, customs, and games. This diverse wealth is known as local wisdom [2]. Apart from being part of popular culture, local wisdom is one of the wealth and pride of the Indonesian nation that must be preserved [3]. This local wisdom becomes a way of life practiced by the community because it is believed to be excellent and full of wisdom [4].

Local wisdom is a form of community understanding of nature and culture. Local wisdom also reflects the ethnohistory of belonging to a particular cultural community [5]. Local wisdom in several areas is closely related to the potential in that area. The local potential is the resource potential of a particular area and the potential for natural resources,
human resources, technology, culture, geography, culture, and history [6]. However, the era of globalization erodes the existence of local wisdom. The current era of globalization has unwittingly undermined local cultural values as the identity of local communities. Nowadays, many researchers and educators try to promote the local culture in the learning process in junior or senior high school. In reality, this change in cultural values causes local community cultural values to be neglected [7]. In order to preserve the local cultural values, the development of the younger generation's potential through learning is now starting to be driven [8-10].

Several researchers have studied local potential in their research, starting from the perspective of culture, philosophy, history, and technology, to integrate it into education [5, 11-13]. Some researchers have conducted research on education and learning based on local wisdom. In general, most researchers develop learning material using Local Wisdom as content. Husin et al. [14] developed teaching materials for physics learning, namely woven-based teaching materials on Newton's laws, and Fitriah et al. [15] also developed a book based on local wisdom on temperature and heat.

Another local wisdom research is related to physics learning media, namely physics learning based on the traditional boy ball game on momentum and impulse material [16], Nekeran game-based e-books on momentum and impulse material [17], comics based on crank games [18], E-module based on local wisdom [19], E-module based on local wisdom in Pontianak [20], and dol-based comics [21]. In addition, there is also another research related to physics content in local wisdom, namely the analysis of the concept of applying physics to the foundations of Jambi traditional houses [22], the integration of physics concepts in Javanese culture [23] and the analysis of physics parameters on aerophone musical instruments from Minangkabau [24]. However, few studies about Local Wisdom use Bibliometric Analysis, especially in Physics Local Wisdom.

One of the research about bibliometric studies in local wisdom has been carried out by Muhammad et al. [25]. He found that most research based on local wisdom focuses on developing teaching materials in learning science to educate the character of elementary school students. In the future, it can strengthen national identity and character. They analyze local wisdom education in general. Meanwhile, this study focuses on the linkages between learning physics and local wisdom. Therefore, this study aims to explore a bibliometric review of local wisdom in physics learning.

2 Method

The type of research in this study is library study which was analyzed using bibliometric analysis. The research data is sourced from the Scopus database taken from the Scopus website (www.scopus.com). Scopus was chosen because it is the largest academic database globally, with citations that provide abstracts from various scientific literature and research that has been reviewed [26]. The Scopus database effectively visualizes, tracks, and analyzes trends from a research theme.

Data collection was carried out on April 17, 2023, with the keywords: "((physics AND (local AND wisdom ) OR (indigenous AND (science OR knowledge ) ) OR ethnoscience OR ethnophysics ))" from "2013-2022". The procedure of the research can be seen in Figure 1. The data was obtained in the form of publication numbers each year, authors, and journals containing articles in the field of physics education related to local wisdom. The search results in the form of bibliometric data are downloaded in .ris and .csv format. Furthermore, the data was analyzed using VOSviewer software through three types of mapping: network visualization, overlay visualization, and density visualization.

The research data were also analyzed using Microsoft Excel, such as publication trends in Local Wisdom and document-type numbers processed. Using Microsoft Excel, the data
was visualized into a graph to make it easier for readers to understand this research. After the statistical results were obtained, the data mapping analysis was carried out using VOSviewer.

Fig. 1. The Research Stages of Bibliometric Analysis.

3 Result and Discussion

The publication trend of documents from year to year is shown in Figure 2 from 2013 to 2022. Figure 2 shows that there has been a development in publications in the 2014-2021 time period. Although the decline in publications occurred in 2014, which decreased by 5 from the previous year, there was an increase in publications after 2014. Then in the following year, there was an increase in publications every year. In 2021, there were 36 publications that had been published. However, in 2022, there are only 18 published manuscripts. This decreasing publication may be due to the Covid-19 Pandemic, in which researcher, especially in Physics Education, has limitation in doing field research in Physics Local Wisdom.

Fig. 2. Trend Publication in 2013-2022.
Table 1. Top Five Author with Publication in Physics Local Wisdom

<table>
<thead>
<tr>
<th>Rank</th>
<th>Top Author</th>
<th>Document Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Kuswanto, H.</td>
<td>8</td>
</tr>
<tr>
<td>2</td>
<td>Misbah, M.</td>
<td>6</td>
</tr>
<tr>
<td>3</td>
<td>Supahar</td>
<td>5</td>
</tr>
<tr>
<td>4</td>
<td>Hartini, S.</td>
<td>4</td>
</tr>
<tr>
<td>4</td>
<td>Wardani, R.</td>
<td>4</td>
</tr>
</tbody>
</table>

Table 1 shows the top five authors with publications in Physics Local Wisdom in the Scopus database. The table shows that Kuswanto, H. is the most contributing author in research on this topic. In detail, Kuswanto, H., with his partner, conducted research related to local wisdom, which was then integrated into teaching material in the form of digital media, comics, virtual laboratories, and the use of local wisdom as material in physics practicum [18, 21, 27-29].

In addition, Misbah et al. researched Local Wisdom topic, which was integrated into learning in the form of physics textbooks and modules based on local wisdom [15, 30-33]. Another second top Author, Supahar et al., researched the topic of local wisdom, which was integrated into learning in the form of textbooks based on local wisdom and physics modules [16, 34-37]. Most researchers develop learning material or media with Local Wisdom as a context and content of learning.

In Figure 3, most research on the topic of Local Wisdom was published as conference papers. There are 98 papers in conferences (conference proceedings) compared to 65 papers published in scientific journals. Researchers mainly chose conferences because they deliver fast and reliable publications compared to scientific journals. Furthermore, 4 of the top 5 of the source title are conference proceedings (see Table 2).
Table 2. Top Five Source Title Publication about Local Wisdom

<table>
<thead>
<tr>
<th>Rank</th>
<th>Source Title</th>
<th>Document Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Journal of Physics Conference Series</td>
<td>69</td>
</tr>
<tr>
<td>2</td>
<td>IOP Conference Series Materials Science and Engineering</td>
<td>9</td>
</tr>
<tr>
<td>3</td>
<td>AIP Conference Proceedings</td>
<td>6</td>
</tr>
<tr>
<td>4</td>
<td>IOP Conference Series Earth and Environmental Science</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>Cultural Studies of Science Education</td>
<td>3</td>
</tr>
</tbody>
</table>

Table 2 shows the top 5 of source title publications in Scopus. Most of them are dominated by conference proceedings. The preferable publication in the Journal of Physics: Conference Series is 69 documents. This number of publications in JPCS is enormous compared with other top 5 publications in Local Wisdom. Interestingly, the only scientific journal in the top 5 source title is Cultural Studies of Science Education which only has three publications.

Table 3. Top Five Keyword about Local Wisdom

<table>
<thead>
<tr>
<th>Keyword</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physics</td>
<td>46</td>
</tr>
<tr>
<td>Students</td>
<td>29</td>
</tr>
<tr>
<td>Indigenous Knowledge</td>
<td>16</td>
</tr>
<tr>
<td>Local Wisdom</td>
<td>16</td>
</tr>
<tr>
<td>Education Computing</td>
<td>11</td>
</tr>
</tbody>
</table>

Table 3 shows the top five keywords in the Scopus database about Physics Local Wisdom. The most dominant keyword is Physics, with a total of 46 occurrences. The keywords Indigenous Knowledge and Local Wisdom are only 16. Furthermore, based on Figure 2, the total number of publications is only 177 research in 10 years. It shows that the research about local wisdom is still shallow during 2013-2022.

Another interesting finding is the "Education Computing" keyword in Table 3. Based on this data, education computing is closely related to Physics Local Wisdom. Another finding supports this result that the most research in Physics Local Wisdom is developing learning materials/media. This research needs several computing skills, especially in developing learning media.

Table 4. Top Five Affiliation with Publication About Physics Local Wisdom

<table>
<thead>
<tr>
<th>Rank</th>
<th>Affiliation</th>
<th>Document Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Universitas Negeri Yogyakarta</td>
<td>19</td>
</tr>
<tr>
<td>2</td>
<td>Universitas Lambung Mangkurat</td>
<td>11</td>
</tr>
<tr>
<td>3</td>
<td>Universitas Pendidikan Indonesia</td>
<td>7</td>
</tr>
<tr>
<td>3</td>
<td>Universitas Negeri Padang</td>
<td>6</td>
</tr>
<tr>
<td>5</td>
<td>Universitas Negeri Surabaya</td>
<td>5</td>
</tr>
<tr>
<td>5</td>
<td>Universitas Sebelas Maret</td>
<td>5</td>
</tr>
</tbody>
</table>

The top five affiliations in Physics Local Wisdom research topics are shown in Table 4. The most contributor affiliation in this research area is from Yogyakarta State University or
Universitas Negeri Yogyakarta. The second biggest author affiliation is from Lambung Mangkurat University or Universitas Lambung Mangkurat. This research result is in line with Table 1 which Heru Kuswanto from Universitas Negeri Yogyakarta is the top author, followed by Misbah from Universitas Lambung Mangkurat.

![Fig. 4. Top Five Countries in Publication About Physics Local Wisdom.](image)

Figure 4 depicts the top publication of Physics Local Wisdom by country. The top country that published this research area is Indonesia. This finding is in line with the data in Table 4. The top 5 affiliation publication is all from Indonesia University. Indonesia is known as the most diverse society in the world besides the United States and India [38]. This fact caused the local wisdom research from the point of view of Physics Education to have enormous potential in Indonesia [39].

VOSViewer was then used to analyze the 177 documents related to Local Wisdom research in the Scopus database. VOSViewer was used to visualize the keywords map and correlation between the keywords. The map can also be used to find the novelty of the research. The results show several important parameters or interrelationships between variables in Local Wisdom and other variables. Colored circles indicate keywords in the title and abstract. The size of the circle also indicates how often the research is related to the topic. The larger the circle size, the more frequently the keywords appear.

![Fig. 5. Network Visualization of Local Wisdom.](image)
Figure 5 shows the network visualization of Local Wisdom. In general, there are 4 clusters with red, yellow, green, and blue colors. The red cluster includes Local Wisdom, Learning, Test, Effectiveness, and Subject keywords. The yellow cluster has no dominant keywords. The keywords are Indigenous Knowledge, Scientific Knowledge, Tradition, Calculation, and Space. The green cluster includes Understanding, Theory, Nature, Structure, and Time keywords. The last cluster, the blue cluster, includes Idea, Work, Field, Life, and Period.

Another interesting finding is that there is no visible "physics" keyword in the keywords map. Although the search keywords in Scopus include physics (see Methods), the physics keyword is not occurring dominantly. This fact impacts the visibility of the physics keyword in Figure 5. This finding might be caused by the quantity of Local Wisdom research, especially in Physics, being very low compared with Biology, which can be clearly shown in Figure 5.

![Network Visualization](image)

Fig. 6. The visualization focuses on the Local Wisdom keyword.

Figure 6 highlight the Local Wisdom keyword related to other keywords. It can be seen that Local Wisdom is closely related to the red cluster (Questionnaire, Tests, and Effectiveness), the yellow cluster (Ethnoscience, Physics Concept, and Tradition), the blue cluster (Work, Field, and Idea), and the green cluster (Understanding, Structure, and Nature). Based on the finding, the Local Wisdom research has various dimensions, including the development of learning materials/media in the red cluster, the content analysis of the Local Wisdom from the ethnoscience point of view in the yellow cluster, the social dimension of Local Wisdom in the blue cluster, and student understanding about Local Wisdom in the green cluster.

In the red cluster, the researcher study about learning materials/media development based on Local Wisdom [10,15,16,18,21,36]. The researchers used the research and development method, especially the ADDIE models. They develop the learning materials/media and find the validation using questionnaires. After the materials/media is valid based on the experts' validation, researchers use the materials/media in the class and find the effectiveness using the test.

The yellow cluster illustrates the local wisdom content analysis research from the ethnoscience point of view [40-42]. Researchers analyze the Local Wisdom from the science or physics concept point of view. They analyze the physics/science concept behind the Local Wisdom. Meanwhile, the blue and green clusters will be discussed deeply in Figures 8 and 9.
Figure 7 illustrates the correlation between Local Wisdom with Physics Concept. In Figure 7, it can be seen that Local Wisdom directly correlates with Physics Concept. However, this correlation is categorized as having a low correlation in comparison with the other correlation of Local Wisdom. This result shows that the topic of Local Wisdom can be connected with the concept of Physics in learning. Local Wisdom can be used as an alternative approach to learning physics concepts. The concept of physics has an extensive knowledge than any other knowledge. Physics is a science that is very often encountered in everyday life. So, Local Wisdom can be connected with physics, for example, in the traditional game of hopscotch or embroidery, which can be related to physics concepts such as momentum and impulse [18-19]. Traditions and customs can be related to physics because physics has extensive knowledge and is closely related to human life [43].

Figure 8 depicts the relation between Local Wisdom and Understanding keywords. Based on the Figure, Local Wisdom has a direct and quite strong correlation with Understanding. Most researchers use Local Wisdom as a content and context of the learning to improve student understanding. Physics concepts taught using Local Wisdom can improve the motivation for learning because the phenomena are closely related to daily life. The motivated student can improve the student's understanding in learning Physics.

The existence of local wisdom can be linked to physics learning so that students can learn physics from existing local wisdom and understand science/physics concepts related
to local wisdom [44]. With local wisdom, students can understand physics concepts more quickly and increase their deep understanding of physics concepts. The educator who relates the physics concepts of momentum and impulse to a traditional game may improve the student's understanding of the game and its physics concept [18].

**Fig. 9. Visualization of the relationship between Local Wisdom and Work.**

Figure 9 shows the relationship between Local Wisdom and Work keywords. Local Wisdom has a direct and quite strong correlation with Work. Some of the local wisdom in society is correlated with their work. For example, farmers regularly organize "Sedekah Bumi" to express their gratitude to God for the great harvest [45]. In addition, cattle breeders as a local job in Madura contribute to "Kerapan Sapi" local wisdom [46]. Thus, the teacher who makes teaching materials based on local wisdom also preserves the local tradition and work in society [47].

**Fig. 10. Overlay Visualization.**

Figure 10 illustrates the research trends every year. Based on Figure 11, the research topic in Physics Local Wisdom is shifting from Understanding and Work clusters to Local Wisdom cluster. Nowadays, researchers prefer to develop learning materials and media based on Local Wisdom. It is shown in Figure 11 that Android is the most preferred media...
platform for Local Wisdom learning media. Until now, Local Wisdom is still relevant and exciting research topic despite its low quantity of research.

![Density Visualization](image)

**Fig. 11. Density Visualization**

Figure 11 illustrates the keywords density. According to the figure, the most dominant keyword is Local Wisdom, followed by Understanding and Theory. Most of the publication has these keywords. It can be inferred that the local wisdom educational research aims to make the student understand the science/physics concept based on the theory. Teachers and researchers used Local wisdom as the content and context of the learning to improve the student understanding of the concept or theory.

### 4 Conclusion

The study examines the research trend of physics learning based on local wisdom. This research used the bibliometric method with a range of 2013-2022. Generally, the research trend has increased yearly, although the number of local wisdom research has been very low for ten years. Based on bibliometrics mapping, it was found that there were 4 clusters, namely red cluster, yellow cluster, green cluster, and blue cluster. In addition, there are dominant keywords, namely Local Wisdom, Indigenous Science, Work, and Understanding. In this case, the top 5 authors and affiliations are from Indonesia.

### 5 Acknowledgements

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### References


