



## Science and Technology in Civic Education Learning: A Bibliometric Review of Recent Research

Matang<sup>1,\*</sup>, Karim Suryadi<sup>1</sup>, Cecep Darmawan<sup>1</sup>, Leni Anggraeni<sup>1</sup>, Sri Wahyuni Tanszil<sup>1</sup>

<sup>1</sup> Department of Civic Education, Indonesia University of Education, Kota Bandung, Jawa Barat 40154, Indonesia

### ARTICLE INFO

#### Article history:

Received 4 April 2024  
Received in revised form 30 June 2024  
Accepted 7 October 2024  
Available online 31 January 2025

#### Keywords:

Bibliometric; civic education; education; science and technology

### ABSTRACT

This study is a bibliometric review aimed at analysing recent research on science and technology in civic education learning. Research data was obtained using the reference management application Publish or Perish from journals indexed by Google Scholar. A total of 181 articles relevant to the keywords "Civic Education Learning" AND "Science and Technology" were collected from 2018 to 2023. The VOSviewer application was then used to visualize and analyse the bibliometric data. The results of the study can provide insights into the contribution of science and technology to civic education learning. With a better understanding of the contribution of science and technology to civic education learning, educators and researchers can develop more effective strategies to prepare the younger generation to face the complex challenges of the current global era. This research can also help identify research gaps that need further investigation and guide future research on science and technology in civic education learning.

## 1. Introduction

Civic education has become an important aspect in shaping active, participatory, and responsible citizens [1-4]. In an era dominated by scientific and technological advancements, understanding how science and technology can contribute to civic education becomes increasingly relevant [5,6].

Recent studies have highlighted the importance of integrating science and technology in the context of civic education learning [7]. The dynamic changes in contemporary society that are becoming more technologically interconnected are what drive integration. Therefore, understanding science and the application of technology in education becomes crucial for educators, enabling students to become more skilled and adaptable to social and technological changes.

To comprehend the latest developments in the relationship between science, technology, and civic education learning, a bibliometric analysis is required. Bibliometric research provides deeper insights into trends and contributions in research. For instance, a bibliometric study by Nandiyanto & Al Husaeni [8] successfully mapped research developments in Indonesia. Using this approach, this

\* Corresponding author.

E-mail address: [matang@upi.edu](mailto:matang@upi.edu)

<https://doi.org/10.37934/araset.55.2.5568>

study aims to analyse articles related to science and technology in civic education learning that have been published within a specific time frame. Detailed information for the bibliometric is shown in Table 1.

**Table 1**  
 Previous studies on bibliometric

No	Title	Ref.
1	Involving Particle Technology in Computational Fluid Dynamics Research: A Bibliometric Analysis	[9]
2	Bibliometric Computational Mapping Analysis of Trend Metaverse in Education using VOSviewer	[10]
3	The Use of Information Technology and Lifestyle: An Evaluation of Digital Technology Intervention for Improving Physical Activity and Eating Behaviour	[11]
4	Strategies in language education to improve science student understanding during practicum in laboratory: Review and computational bibliometric analysis	[12]
5	How language and technology can improve student learning quality in engineering? definition, factors for enhancing students' comprehension, and computational bibliometric analysis	[13]
6	Mapping of nanotechnology research in animal science: Scientometric analysis	[14]
7	Scientific research trends of flooding stress in plant science and agriculture subject areas (1962-2021)	[15]
8	Introducing ASEAN Journal of Science and Engineering: A bibliometric analysis study	[16]
9	A bibliometric analysis of chemical engineering research using VOSviewer and its correlation with Covid-19 pandemic condition	[17]
10	A bibliometric analysis of materials research in Indonesian journal using VOSviewer	[18]
11	Bibliometric analysis of engineering research using VOSviewer indexed by google scholar	[19]
12	Bibliometric computational mapping analysis of publications on mechanical engineering education using VOSviewer	[20]
13	Research trend on the use of mercury in gold mining: Literature review and bibliometric analysis	[21]
14	Domestic waste (eggshells and banana peels particles) as sustainable and renewable resources for improving resin-based brakepad performance: Bibliometric literature review, techno-economic analysis, dual-sized reinforcing experiments, to comparison with commercial product	[22]
15	Bibliometric analysis of educational research in 2017 to 2021 using VOSviewer: Google scholar indexed research	[23]
16	Corncob-derived sulfonated magnetic solid catalyst synthesis as heterogeneous catalyst in the esterification of waste cooking oil and bibliometric analysis	[24]
17	The compleat lextutor application tool for academic and technological lexical learning: Review and bibliometric approach	[25]
18	Use of blockchain technology for the exchange and secure transmission of medical images in the cloud: Systematic review with bibliometric analysis	[26]
19	Computational bibliometric analysis of research on science and Islam with VOSviewer: Scopus database in 2012 to 2022	[27]
20	Digital transformation in special needs education: Computational bibliometrics	[28]
21	Antiangiogenesis activity of Indonesian local black garlic ( <i>Allium Sativum</i> 'Solo'): Experiments and bibliometric analysis	[29]
22	Characteristics of tamarind seed biochar at different pyrolysis temperatures as waste management strategy: experiments and bibliometric analysis	[30]
23	The compleat lextutor application tool for academic and technological lexical learning: Review and bibliometric approach	[31]
24	Corncob-derived sulfonated magnetic solid catalyst synthesis as heterogeneous catalyst in the esterification of waste cooking oil and bibliometric analysis	[32]

The goal of this study is to conduct a bibliometric analysis of Google Scholar-indexed articles on science and technology in civic education learning. The analysis was conducted using the Publish or Perish and VOSviewer applications. Through this research, it is expected to provide guidance for researchers in determining research themes related to science and technology in civic education learning. The findings and results of this study are expected to serve as a basis for researchers to

explore more specific and relevant topics regarding science and technology in the context of civic education.

## **2. Methodology**

The data for this study was derived from journals indexed by Google Scholar. Google Scholar has been used in several previous bibliometric studies to collect research data [33,34]. To obtain research data, the reference management application Publish or Perish was employed. Publish or Perish allows for gathering research data from Google Scholar using relevant keywords [20,35]. After collecting the research data, bibliometric analysis was conducted using the VOSviewer application. VOSviewer is a software to visualize and analyse bibliometric data in the form of maps and networks. Data mapping using VOSviewer has been widely used in bibliometric research to identify trends, connections, and characteristics of scientific publications [36].

This study followed four stages, as outlined by Al Husaeni & Nandiyanto [23]: first, the collection of publication data using the Publish or Perish application; second, the processing of bibliometric data from the collected articles using Microsoft Excel; third, the application of bibliometric mapping analysis to the publication data using the VOSviewer application; and fourth, the analysis and interpretation of the results from the computational mapping analysis.

The bibliometric analysis in this research focused on the number of publications, the most productive authors, the most cited journals, and frequently used keywords. The article data was searched using the Publish or Perish application using the keywords “Science and Technology” AND “Civic Education Learning” to filter publications based on research needs. The articles used were published between 2018 and 2023. The collected article data was then exported into “.ris” and “.csv” file formats. The VOSviewer application was then used for network visualization, overlay visualization, and density visualization. In visualizing the data, keyword frequencies were set to be found at least three times, and less relevant keywords were removed. The bibliometric analysis of trends and contributions of science and technology in civic education learning will be further discussed below.

## **3. Results**

### *3.1 Publication Data Search Results*

Based on the data search through the Publish or Perish reference management application from the Google Scholar database, a total of 181 articles that met the research criteria were obtained. The data obtained consisted of article metadata, including author names, titles, years, journal names, publishers, citation counts, article links, and related URLs. Table 2 shows examples of some data used in the VOSviewer analysis in this study. The sample data taken consisted of the top 18 articles with the highest citation counts. The total citation count for all articles used in this research reached 644.

**Table 2**  
 Publication data on science and technology in civic education learning

No	Authors	Title	Year	Cites	Ref.
1	Rachmadtullah <i>et al.</i> ,	Development of computer-based interactive multimedia: study on learning in elementary education	2018	158	[37]
2	Septiani <i>et al.</i> ,	Development of Interactive Multimedia Learning Courseware to Strengthen Students' Character.	2020	58	[38]
3	Rahayu and Sukardi	The development of E-modules project-based learning for students of computer and basic networks at vocational school	2020	50	[39]
4	Putra and Afrilia	Systematic literature review: penggunaan kahoot pada pembelajaran matematika	2020	43	[40]
5	Holbert <i>et al.</i> ,	Afrofuturism as critical constructionist design: Building futures from the past and present	2020	39	[41]
6	Irawatie <i>et al.</i> ,	Education learning development of character education-based state defense	2019	36	[42]
7	Abdulkarim <i>et al.</i> ,	Developing civicpedia as a civic education E-learning media to improve students' information literacy	2018	31	[43]
8	Budiarto <i>et al.</i> ,	Student's View of Using Digital Learning Media in Classroom Activities: A Case of Public Senior High School in Cirebon, Indonesia	2020	29	[44]
9	Casmana <i>et al.</i> ,	Global citizenship: preparing the younger generation to possess pro-environment behaviour, mutual assistance and tolerance awareness through school engagement	2021	28	[45]
10	Karliani <i>et al.</i> ,	Indonesian civic engagement among college students	2019	22	[46]
11	Pratiwi and Wuryandani	Effect of problem-based learning (PBL) models on motivation and learning outcomes in learning civic education	2020	21	[47]
12	Uzunboylu <i>et al.</i> ,	The Views of the Teacher Candidates on the Use of Kahoot as A Gaming Tool.	2020	18	[48]
13	Sartono <i>et al.</i> ,	Interactive Multimedia Based on Indonesian Cultural Diversity in Civics Learning in Elementary Schools.	2022	16	[49]
14	Tetep and Arista	Students' Perception towards Kahoot Learning Media and Its Influence towards Students' Motivation in Learning Social Studies and Civic Education amid Pandemic in SMKN 9 Garut	2022	15	[50]
15	Asrial <i>et al.</i> ,	Implementation of web-based character assessment on students' character outcomes: A review on perception and gender	2023	15	[51]
16	Stahl and Literat	# GenZ on TikTok: the collective online self-Portrait of the social media generation	2022	15	[52]
17	Tohri <i>et al.</i> ,	The Urgency of Sasak Local Wisdom-Based Character Education for Elementary School in East Lombok, Indonesia.	2022	14	[53]
18	Suyanto <i>et al.</i> ,	The study perception of social sciences and law faculty students for hoax in social media	2018	13	[54]

### 3.2 Trends in Research on Science and Technology in Civic Education Learning

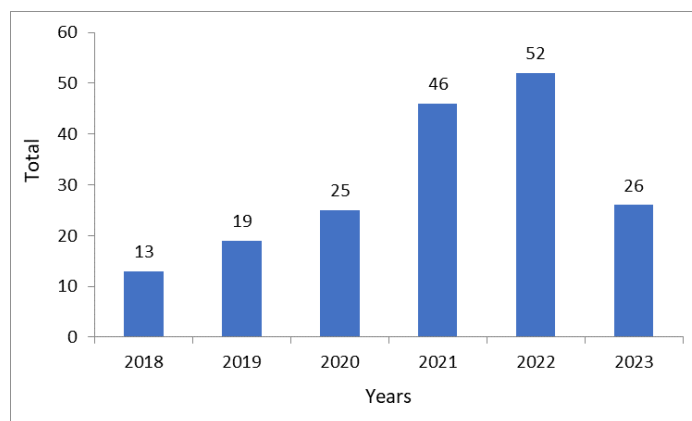
Table 3 displays the development of research on science and technology in civic education learning published in Google Scholar-indexed journals. The data in Table 3 indicates a total of 181 research articles in the field of science and technology in civic education learning published between 2018 and 2023. In 2018, there were 13 articles published. The number of articles increased to 19 in 2019, 25 in 2020, 46 in 2021, 52 in 2022, and 26 in 2023. From the data, it can be observed that research on science and technology in civic education learning was relatively less studied in the period from 2018 to 2020. However, there has been a significant increase in research on this topic in the past three years, namely in 2021, 2022, and 2023, as clearly seen in Figure 1.

**Table 3**

Development of research on science and technology in civic education learning

Years	Total
2018	13
2019	19
2020	25
2021	46
2022	52
2023	26

Figure 1 displays the development of research in the field of chemical engineering education over the past 10 years, from 2012 to 2021. Based on Figure 1, it can be noted that research on science and technology in civic education learning was relatively less studied in the period from 2018 to 2020. However, there has been a significant increase and development in research on this topic from 2021 to 2023.



**Fig. 1.** Level of development of research on science and technology in civic education learning

### 3.3 Visualization of Research Topics on Science and Technology in Civic Education Learning using VOSviewer

Computational mapping was performed on the collected article data using the VOSviewer analysis tool. Through this computational mapping, a total of 66 items related to research on science and technology in civic education learning were identified. The results of the computational mapping showed the division of the mapping data into 7 distinct clusters. Each cluster encompasses articles that are closely related to the research topic. The 7 clusters are as follows:

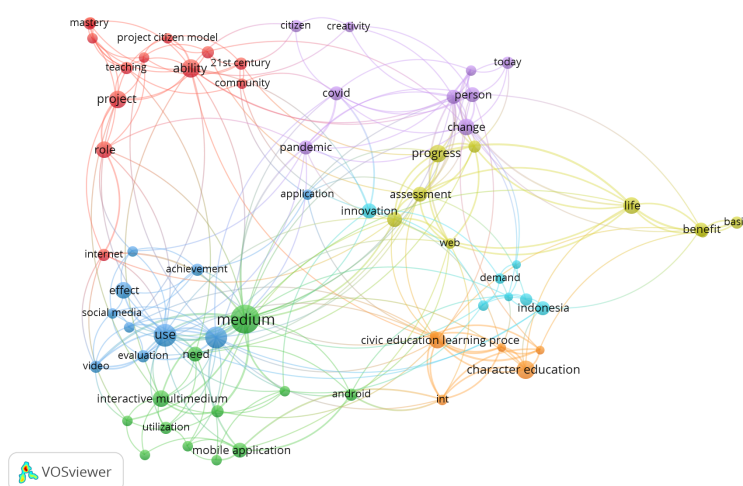
- i. Cluster 1 consists of 13 items and is marked in red. The 13 items are 21st century, ability, addition, characteristic, community, country, internet, mastery, project, project citizen, project citizen model, role, teaching.
- ii. Cluster 2 consists of 12 items and is marked in green. The 12 items are android, civic, educational science, interactive multimedia, interactive multimedum, international, international journal, medium, mobile application, need, teaching material, utilization.
- iii. Cluster 3 consists of 10 items and is marked in blue. The 10 items are achievement, application, effect, evaluation, higher education, online learning, research, social media, use, video.

- iv. Cluster 4 consists of 9 items and is marked in yellow. The 9 items are advance, assessment, basis, benefit, human, life, perception, progress, web.
- v. Cluster 5 consists of 9 items and is marked in purple. The 9 items are change, citizen, covid, creativity, information, pandemic, person, rapid progress, today.
- vi. Cluster 6 consists of 7 items and is marked in sky blue. The 7 items are demand, effectiveness, Indonesia, innovation, line, principle, technology development.
- vii. Cluster 7 consists of 6 items and is marked in orange. The 6 items are accordance, character education, character formation, civic education learning, formation, int.

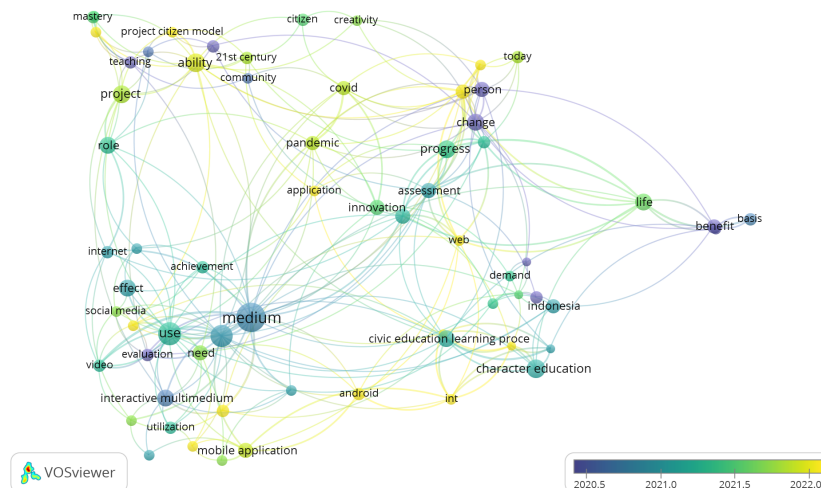
In each cluster, the interrelationships between different terms are visually depicted. Within each cluster, the terms are labelled and represented by coloured circles. The size of the circle for each term varies depending on the frequency of its occurrence in the titles and abstracts of the articles. The more frequently a term appears, the larger its label circle size. The visualization of the mapping analysed in this study consists of three main parts: network visualization (see Figure 2), overlay visualization (see Figure 3), and density visualization (see Figure 4). Each visualization part provides a different overview of the relationships between the terms in this research. By utilizing these three visualization parts, this study can offer a more comprehensive and detailed understanding of the interconnections between the terms in the mapping of research on science and technology in civic education learning.

This study gives information for further development as reported elsewhere regarding several subjects:

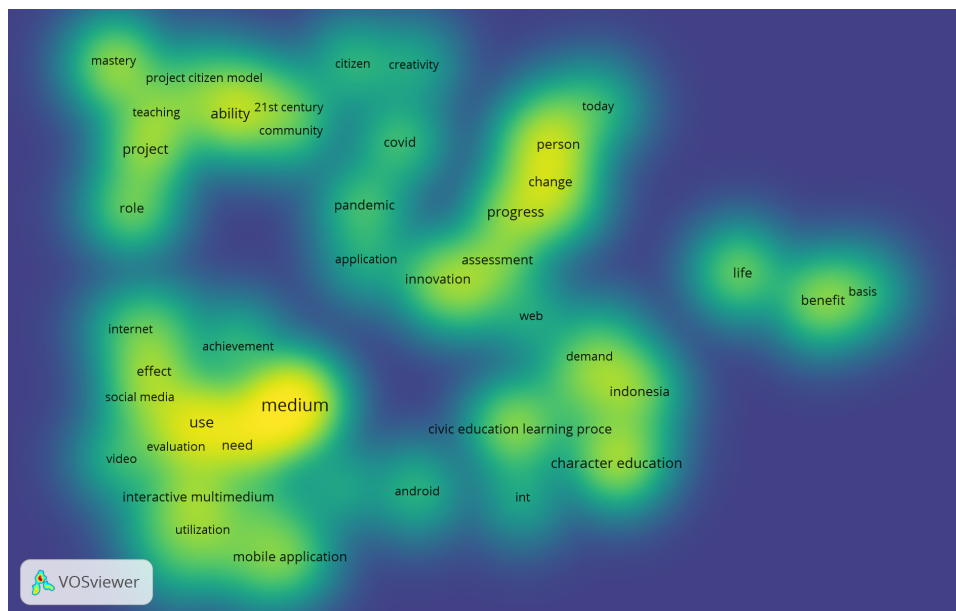
- i. Mathematics [55-83]
- ii. Biology [84-93]
- iii. Physics [94-98]
- iv. Chemistry [99-106]
- v. Engineering [107-117]



**Fig. 2.** Network Visualization of research on science and technology in civic education learning



**Fig. 3.** Overlay Visualization of research on science and technology in civic education learning



**Fig. 4.** Density Visualization of research on science and technology in civic education learning

#### 4. Conclusions

Through data search on Google Scholar, a total of 181 relevant research articles on the topic of science and technology in civic education learning were found within the time range of 2018 to 2023. Bibliometric analysis using VOSviewer mapping has been conducted to analyse the bibliometric data from the collected articles. A total of 66 items related to research on science and technology in civic education learning were identified. The mapping results depict 7 clusters that encompass articles with close relationships to the research topic. These clusters allow for the identification of collaboration patterns among authors, dominant research centres, and frequently discussed research themes. It is evident that research on science and technology in civic education learning has gained increased interest and focus in recent years, particularly in 2021, 2022, and 2023. This study demonstrates that the research topic of science and technology in civic education learning is

receiving more attention and becoming a trend in civic education research. The bibliometric analysis and VOSviewer mapping provide valuable insights into understanding the development and direction of research in this field. Further research is expected to focus on the development of innovative teaching methods and strategies, exploring the impact of using cutting-edge technologies such as virtual reality (VR) in civic education learning.

## Acknowledgement

This research was not funded by any grant.

## References

- [1] Dehdar, Mojtaba, Leila Sayegani, Esmaeil Arbab, Mohammad Arzhandeh, Mohammad Roshanray, Ahmad Raeisi, and Lotfollah Kuhi. "Role of schools in educating the active citizen." *Journal of Social Sciences and Humanities Research* 7, no. 02 (2019).
- [2] Kennelly, Jacqueline, and Kristina R. Llewellyn. "Educating for active compliance: Discursive constructions in citizenship education." *Citizenship Studies* 15, no. 6-7 (2011): 897-914. <https://doi.org/10.1080/13621025.2011.600103>
- [3] Ammatulloh, Mutiara Imtisyah, Noviani Permana, Rizwan Firmansyah, Lussy Nur Sa'adah, Zahra Ihsani Izzatunnisa, and Dwi Iman Muthaqqin. "Strengthening character education of students through civics caring apps based on m-learning during the covid-19 pandemic." *Indonesian Journal of Educational Research and Technology* 2, no. 2 (2022): 87-96. <https://doi.org/10.17509/ijert.v2i2.39633>
- [4] Maulidayani, Tiana, M. Muktiarni, and Jonah Mupita. "Strengthening the value of pancasila in elementary schools in online learning through whatsapp group media." *Indonesian Journal of Multidisciplinary Research* 2, no. 1 (2022): 117-124. <https://doi.org/10.17509/ijomr.v2i1.38648>
- [5] Igbokwe, Charity O. "Recent curriculum reforms at the basic education level in Nigeria aimed at catching them young to create change." *American Journal of Educational Research* 3, no. 1 (2015): 31-37. <https://doi.org/10.12691/education-3-1-7>
- [6] Fawwazi, Faris Mu'taz, Aim Abdulkarim, and Kokom Komalasari. "Teacher Competency in Civic Education Learning to Encounter Industrial Revolution 4.0 (Case Study at Sekolah Menengah Pertama 2 Bandung)." In *Journal of International Conference Proceedings*, vol. 3, no. 1, pp. 107-115. 2020. <https://doi.org/10.32535/jicp.v2i4.785>
- [7] Rahmadi, Imam Fitri, Eti Hayati, and Aulia Nursyifa. "Comparing pre-service civic education teachers' TPACK confidence across course modes." *Research in Social Sciences and Technology* 5, no. 2 (2020): 113-133. <https://doi.org/10.46303/ressat.05.02.7>
- [8] Nandiyanto, Asep Bayu Dani, and Dwi Fitria Al Husaeni. "A bibliometric analysis of materials research in Indonesian journal using VOSviewer." *Journal of Engineering Research* (2021).
- [9] Nandiyanto, Asep Bayu Dani, Risti Ragadhita, and Muhammad Aziz. "Involving particle technology in computational fluid dynamics research: A bibliometric analysis." *CFD Letters* 15, no. 11 (2023): 92-109. <https://doi.org/10.37934/cfdl.15.11.92109>
- [10] Muktiarni, M., Nur Indri Rahayu, Affero Ismail, and Amalia Kusuma Wardani. "Bibliometric computational mapping analysis of trend metaverse in education using vosviewer." *Journal of Advanced Research in Applied Sciences and Engineering Technology* 32, no. 2 (2023): 95-106. <https://doi.org/10.37934/araset.32.2.95106>
- [11] Rahayu, Nur Indri, Adang Suherman, and M. Muktiarni. "The use of information technology and lifestyle: An evaluation of digital technology intervention for improving physical activity and eating behavior." *Journal of Advanced Research in Applied Sciences and Engineering Technology* 32, no. 1 (2023): 303-314. <https://doi.org/10.37934/araset.32.1.303314>
- [12] Fauziah, Siti Pupu, Irman Suherman, Mega Febriani Sya, Martin Roestamy, Amirullah Abduh, and Asep Bayu Dani Nandiyanto. "Strategies in language education to improve science student understanding during practicum in laboratory: Review and computational bibliometric analysis." *International Journal of Language Education* 5, no. 4 (2021).
- [13] Al Husaeni, D. F., D. N. Al Husaeni, R. Ragadhita, M. R. Bilad, A. S. M. Al-Obaidi, A. Abduh, and A. B. D. Nandiyanto. "How language and technology can improve student learning quality in engineering? Definition, factors for enhancing students comprehension, and computational bibliometric analysis." *International Journal of Language Education* 6, no. 4 (2022): 445-476. <https://doi.org/10.26858/ijole.v6i4.53587>
- [14] Kumar, Kutty. "Mapping of nanotechnology research in animal science: Scientometric analysis." *Kumar (2021) Mapping of Nanotechnology Research in Animal Science: Scientometric Analysis. ASEAN Journal of Science and Engineering* 1, no. 2 (2021): 111-126. <https://doi.org/10.17509/ajse.v1i2.35092>



- [15] Nurrahma, Arinal Haq Izzawati, Hana Haruna Putri, and Ray March Syahadat. "Scientific research trends of flooding stress in plant science and agriculture subject areas (1962-2021)." *ASEAN Journal of Science and Engineering* 3, no. 2 (2023): 163-178. <https://doi.org/10.17509/ajse.v3i2.46148>
- [16] Nandiyanto, Asep Bayu Dani, Dwi Novia Al Husaeni, and Dwi Fitria Al Husaeni. "Introducing ASEAN journal of science and engineering: A bibliometric analysis study." *Journal of Advanced Research in Applied Sciences and Engineering Technology* 31, no. 3 (2023): 173-190. <https://doi.org/10.37934/araset.31.3.173190>
- [17] Nandiyanto, Asep Bayu Dani, D. N. Al Husaeni, and D. F. Al Husaeni. "A bibliometric analysis of chemical engineering research using vosviewer and its correlation with covid-19 pandemic condition." *Journal of Engineering Science and Technology* 16, no. 6 (2021): 4414-4422.
- [18] Nandiyanto, Asep Bayu Dani, and Dwi Fitria Al Husaeni. "A bibliometric analysis of materials research in Indonesian journal using VOSviewer." *Journal of Engineering Research* (2021).
- [19] Nandiyanto, Asep Bayu Dani, and Dwi Fitria Al Husaeni. "Bibliometric analysis of engineering research using vosviewer indexed by google scholar." *Journal of Engineering Science and Technology* 17, no. 2 (2022): 883-894.
- [20] Al Husaeni, Dwi Fitria, and Asep Bayu Dani Nandiyanto. "Bibliometric using Vosviewer with Publish or Perish (using google scholar data): From step-by-step processing for users to the practical examples in the analysis of digital learning articles in pre and post Covid-19 pandemic." *ASEAN Journal of Science and Engineering* 2, no. 1 (2022): 19-46. <https://doi.org/10.17509/ajse.v2i1.37368>
- [21] Nandiyanto, A. B. D., R. Ragadhita, D. N. Al Husaeni, and W. C. Nugraha. "Research trend on the use of mercury in gold mining: Literature review and bibliometric analysis." *Moroccan Journal of Chemistry* 11, no. 1 (2023): 11-1.
- [22] Nandiyanto, Asep Bayu Dani, Risti Ragadhita, Meli Fiandini, Dwi Fitria Al Husaeni, Dwi Novia Al Husaeni, and Farid Fadhillah. "Domestic waste (eggshells and banana peels particles) as sustainable and renewable resources for improving resin-based brakepad performance: Bibliometric literature review, techno-economic analysis, dual-sized reinforcing experiments, to comparison..." *Communications in Science and Technology* 7, no. 1 (2022): 50-61. <https://doi.org/10.21924/cst.7.1.2022.757>
- [23] Al Husaeni, Dwi Novia, Asep Bayu Dani Nandiyanto, and Rina Maryanti. "Bibliometric analysis of special needs education keyword using VOSviewer indexed by google scholar." *Indonesian Journal of Community and Special Needs Education* 3, no. 1 (2023): 1-10. <https://doi.org/10.17509/ijcsne.v3i1.43181>
- [24] Mardina, Primata, Hesti Wijayanti, Rinna Juwita, Meilana Dharma Putra, Iryanti Fatyasari Nata, Rowina Lestari, Muhammad Faqih Al-Amin, Regi Abizar Suciagi, Oktefani Kusuma Rawei, and Liza Lestari. "Corn-cob-derived sulfonated magnetic solid catalyst synthesis as heterogeneous catalyst in the esterification of waste cooking oil and bibliometric analysis." *Indonesian Journal of Science and Technology* 9, no. 1 (2024): 109-124. <https://doi.org/10.17509/ijost.v9i1.64219>
- [25] Abduh, Amirullah, Ade Mulianah, Besse Darmawati, Fairul Zabadi, Umar Sidik, Wuri Handoko, Karta Jayadi, and Rosmaladewi Rosmaladewi. "The compleat lextutor application tool for academic and technological lexical learning: Review and bibliometric approach." *Indonesian Journal of Science and Technology* 8, no. 3 (2023): 539-560. <https://doi.org/10.17509/ijost.v8i3.63539>
- [26] Lizama, Maria Guzman, Jair Huesa, and Brian Meneses Claudio. "Use of blockchain technology for the exchange and secure transmission of medical images in the cloud: Systematic review with bibliometric analysis." *ASEAN Journal of Science and Engineering* 4, no. 1 (2024): 71-92. <https://doi.org/10.17509/ajse.v4i1.65039>
- [27] Al Husaeni, Dwi Novia, Dwi Fitria Al Husaeni, Asep Bayu Dani Nandiyanto, and Abdulkareem Sh Mahdi Al-Obaidi. "Introducing ASEAN Journal of Science and Engineering Education: A bibliometric analysis study for understanding internationalization." *Data and Metadata* 1 (2022): 43-43. <https://doi.org/10.56294/dm202282>
- [28] Al Husaeni, Dwi Fitria, and W. Wahyudin. "Digital transformation in special needs education: Computational bibliometrics." *ASEAN Journal of Community and Special Needs Education* 2, no. 2 (2023): 97-110.
- [29] Arianingrum, Retno, Nurfina Aznam, Sri Atun, S. Senam, Alya Rizkita Irwan, Nida Qurbaniah Juhara, Nadiya Fitri Anisa, and Latifah Kurnia Devani. "Antiangiogenesis activity of Indonesian local black garlic (*Allium Sativum* 'Solo'): Experiments and bibliometric analysis." *Indonesian Journal of Science and Technology* 8, no. 3 (2023): 487-498. <https://doi.org/10.17509/ijost.v8i3.63334>
- [30] Rahmat, Ali, Sutiharni Sutiharni, Yetti Elfina, Yusnaini Yusnaini, Hadidjah Latuponu, Faidliyah Nilna Minah, Yeny Sulistyowati, and Abdul Mutolib. "Characteristics of tamarind seed biochar at different pyrolysis temperatures as waste management strategy: experiments and bibliometric analysis." *Indonesian Journal of Science and Technology* 8, no. 3 (2023): 517-538. <https://doi.org/10.17509/ijost.v8i3.63500>
- [31] Abduh, Amirullah, Ade Mulianah, Besse Darmawati, Fairul Zabadi, Umar Sidik, Wuri Handoko, Karta Jayadi, and Rosmaladewi Rosmaladewi. "The compleat lextutor application tool for academic and technological lexical learning: Review and bibliometric approach." *Indonesian Journal of Science and Technology* 8, no. 3 (2023): 539-560. <https://doi.org/10.17509/ijost.v8i3.63539>

- [32] Mardina, Primata, Hesti Wijayanti, Rinna Juwita, Meilana Dharma Putra, Iryanti Fatyasari Nata, Rowina Lestari, Muhammad Faqih Al-Amin, Regi Abizar Suciagi, Oktefani Kusuma Rawei, and Liza Lestari. "Corncob-derived sulfonated magnetic solid catalyst synthesis as heterogeneous catalyst in the esterification of waste cooking oil and bibliometric analysis." *Indonesian Journal of Science and Technology* 9, no. 1 (2024): 109-124. <https://doi.org/10.17509/ijost.v9i1.64219>
- [33] Al Husaeni, Dwi Fitria, and Asep Bayu Dani Nandiyanto. "Bibliometric using Vosviewer with Publish or Perish (using google scholar data): From step-by-step processing for users to the practical examples in the analysis of digital learning articles in pre and post Covid-19 pandemic." *ASEAN Journal of Science and Engineering* 2, no. 1 (2022): 19-46. <https://doi.org/10.17509/ajse.v2i1.37368>
- [34] Nandiyanto, Asep Bayu Dani, Muhammad Kunta Biddinika, and Farid Triawan. "How bibliographic dataset portrays decreasing number of scientific publication from Indonesia." *Indonesian Journal of Science and Technology* 5, no. 1 (2020): 154-175. <https://doi.org/10.17509/ijost.v5i1.22265>
- [35] Fauzan, Tegar Ahmad, and Eddy Soeryanto Soegoto. "Computational bibliometric analysis of education technology using VOSviewer application with publish or perish (using Google Scholar data)." *Journal of Engineering Science and Technology* 18, no. 3 (2023): 1498-1508.
- [36] McAllister, James T., Lora Lennertz, and Zayuris Atencio Mojica. "Mapping a discipline: a guide to using VOSviewer for bibliometric and visual analysis." *Science & Technology Libraries* 41, no. 3 (2022): 319-348. <https://doi.org/10.1080/0194262X.2021.1991547>
- [37] Rachmadtullah, R. M. S. Z., Zulela Ms, and M. Syarif Sumantri. "Development of computer-based interactive multimedia: study on learning in elementary education." *Int. J. Eng. Technol* 7, no. 4 (2018): 2035-2038. <https://doi.org/10.14419/ijet.v7i4.16384>
- [38] Septiani, An-nisa Nur Sholihah Indah, and Triana Rejekiningsih. "Development of Interactive Multimedia Learning Courseware to Strengthen Students' Character." *European Journal of Educational Research* 9, no. 3 (2020): 1267-1280. <https://doi.org/10.12973/eu-jer.9.3.1267>
- [39] Rahayu, Ismi, and Sukardi Sukardi. "The development of e-modules project based learning for students of computer and basic networks at vocational school." *Journal of Education Technology* 4, no. 4 (2020): 398-403. <https://doi.org/10.23887/jet.v4i4.29230>
- [40] Putra, Aan, and Kesi Afrilia. "Systematic literature review: penggunaan kahoot pada pembelajaran matematika." *Jurnal Ilmiah Pendidikan Matematika Al Qalasadi* 4, no. 2 (2020): 110-122. <https://doi.org/10.32505/qalasadi.v4i2.2127>
- [41] Holbert, Nathan, Michael Dando, and Isabel Correa. "Afrofuturism as critical constructionist design: Building futures from the past and present." *Learning, Media and Technology* 45, no. 4 (2020): 328-344. <https://doi.org/10.1080/17439884.2020.1754237>
- [42] Irawatie, Aniek, Iswahyuni Iswahyuni, and Marina Eri Setyawati. "Education learning development of character education-based state defense." *International Journal of Multicultural and Multireligious Understanding* 6, no. 8 (2019): 27-42.
- [43] Abdulkarim, Aim, Neiny Ratmaningsih, and Diana Noor Anggraini. "Developing civicpedia as a civic education E-learning media to improve students' information literacy." *Journal of Social Studies Education Research* 9, no. 3 (2018): 45-61.
- [44] Budiarto, Mochamad Kamil, Hermanu Joebagio, and Sudiyanto Sudiyanto. "Student's View of Using Digital Learning Media in Classroom Activities: A Case of Public Senior High School in Cirebon, Indonesia." *Jurnal Pendidikan Progresif* 10, no. 1 (2020): 47-54. <https://doi.org/10.23960/jpp.v10.i1.202006>
- [45] Casmana, Asep Rudi, Jagad Aditya Dewantara, Dwi Afrimetty Timoera, Adistyana Pitaloka Kusmawati, and Iqbal Syafrudin. "Global citizenship: preparing the younger generation to possess pro-environment behavior, mutual assistance and tolerance awareness through school engagement." *Globalisation, Societies and Education* 21, no. 1 (2023): 15-32. <https://doi.org/10.1080/14767724.2021.2013167>
- [46] Karliani, Eli, Sapriya Kartadinata, Udin S. Winataputra, and Kokom Komalasari. "Indonesian civic engagement among college students." *Journal of Human Behavior in the Social Environment* 29, no. 5 (2019): 582-592. <https://doi.org/10.1080/10911359.2019.1571980>
- [47] Pratiwi, Vinni Dini, and Wuri Wuryandani. "Effect of problem based learning (PBL) models on motivation and learning outcomes in learning civic education." *JPI (Jurnal Pendidikan Indonesia)* 9, no. 3 (2020): 401-412. <https://doi.org/10.23887/jpi-undiksha.v9i3.21565>
- [48] Uzunboylu, Huseyin, Elvira Galimova, Rashad Kurbanov, Asiya Belyalova, Nelia Deberdeeva, and Mariia Timofeeva. "The views of the teacher candidates on the use of Kahoot as a gaming tool." *International Journal of Emerging Technologies in Learning (IJET)* 15, no. 23 (2020): 158-168. <https://doi.org/10.3991/ijet.v15i23.18811>

- [49] Sartono, E., Ria Ambarsari, and Herwin Herwin. "Interactive Multimedia Based on Indonesian Cultural Diversity in Civics Learning in Elementary Schools." *Cypriot Journal of Educational Sciences* 17, no. 4 (2022): 1192-1203. <https://doi.org/10.18844/cjes.v17i4.7136>
- [50] Tetep, Tetep, and Yuni Arista. "Students' Perception towards Kahoot Learning Media and Its Influence towards Students' Motivation in Learning Social Studies and Civic Education amid Pandemic in SMKN 9 Garut." *The Innovation of Social Studies Journal* 4, no. 1 (2022): 99-108. <https://doi.org/10.20527/iis.v4i1.5537>
- [51] Asrial, Asrial, Syahrial Syahrial, Dwi Agus Kurniawan, Febri Tia Aldila, and Muhammad Iqbal. "Implementation of web-based character assessment on students' character outcomes: A review on perception and gender." *JOTSE: Journal of Technology and Science Education* 13, no. 1 (2023): 301-328. <https://doi.org/10.3926/jotse.1564>
- [52] Stahl, Catherine Cheng, and Ioana Literat. "# GenZ on TikTok: the collective online self-portrait of the social media generation." *Journal of youth studies* 26, no. 7 (2023): 925-946. <https://doi.org/10.1080/13676261.2022.2053671>
- [53] Tohri, Ahmad, Abdul Rasyad, Muhammad Sururuddin, and Lalu Muhammad Istiqlal. "The Urgency of Sasak Local Wisdom-Based Character Education for Elementary School in East Lombok, Indonesia." *International Journal of Evaluation and Research in Education* 11, no. 1 (2022): 333-344. <https://doi.org/10.11591/ijere.v11i1.21869>
- [54] Suyanto, Totok, I. M. Zen, K. Prasetyo, P. Isbandono, G. Gamaputra, and I. P. Purba. "The study perception of social sciences and law faculty students for hoax in social media." In *Journal of Physics: Conference Series*, vol. 953, no. 1, p. 012151. IOP Publishing, 2018. <https://doi.org/10.1088/1742-6596/953/1/012151>
- [55] Dallyono, Ruswan, Didi Sukyadi, and Lukman Hakim. "A mathematical model of the cognitive semantics of the English preposition on." *Indonesian Journal of Science and Technology* 5, no. 1 (2020): 133-153. <https://doi.org/10.17509/ijost.v5i1.22774>
- [56] Hashim, Suhaizal, Alias Masek, Bismi Nurnazatul Shima Mohd Mahthir, Ana Haziqah A. Rashid, and Danakorn Nincarean. "Association of interest, attitude and learning habit in mathematics learning towards enhancing students' achievement." *Indonesian Journal of Science and Technology* 6, no. 1 (2021): 113-122. <https://doi.org/10.17509/ijost.v6i1.31526>
- [57] Akinoso, Sabainah Oyebola. "Motivation and ICT in secondary school mathematics using unified theory of acceptance and use of technology model." *Indonesian Journal of Educational Research and Technology* 3, no. 1 (2023): 79-90. <https://doi.org/10.17509/ijert.v3i1.47183>
- [58] Radiamoda, Arsad A. "Difficulties encountered by the students in learning mathematics." *Indonesian Journal of Educational Research and Technology* 4, no. 1 (2024): 63-70.
- [59] Husnah, Annisa Ul, Muhammad Alif Hidayat, and Miftahul Jannah. "The journey of a math: As a mathematics learning innovation." *Indonesian Journal of Multidisciplinary Research* 1, no. 1 (2021): 129-136. <https://doi.org/10.17509/ijomr.v1i1.33814>
- [60] Marasabessy, Rosida. "Study of mathematical reasoning ability for mathematics learning in schools: A literature review." *Indonesian Journal of Teaching in Science* 1, no. 2 (2021): 79-90. <https://doi.org/10.17509/ijotis.v1i2.37950>
- [61] Maryati, Wahyuni Eka, Endah Retnowati, and Ng Khar Thoe. "Learning mathematics formulas by listening and reading worked examples." *Indonesian Journal of Teaching in Science* 2, no. 1 (2022): 61-74. <https://doi.org/10.17509/ijotis.v2i1.45801>
- [62] Ogunjimi, Mayowa Olurotimi, and Taofeek Akolade Gbadeyanka. "Effect of guided inquiry and explicit-instructional strategies on lower basic students' academic performance in mathematics." *Indonesian Journal of Teaching in Science* 3, no. 1 (2023): 23-32. <https://doi.org/10.17509/ijotis.v3i1.54191>
- [63] Obafemi, K. E., U. T. Saadu, A. Adesokan, O. Yahaya, J. T. Sulaimon, T. O. Obafemi, and F. M. Yakubu. "Self-efficacy as a correlate of pupils' academic achievement in mathematics." *Indonesian Journal of Teaching in Science* 3, no. 2 (2023): 113-120. <https://doi.org/10.17509/ijotis.v3i2.59775>
- [64] Mitrayana, M., and Elah Nurlaelah. "Computational thinking in mathematics learning: Systematic literature review." *Indonesian Journal of Teaching in Science* 3, no. 2 (2023): 133-142. <https://doi.org/10.17509/ijotis.v3i2.60179>
- [65] Camenda, Datu Yuri, Cybelle Angela Gaba, Nazirev Lacord, Dania Natango, Alecshane Pabl, and Hassanal Abusam. "How difficult is 1+1? A phenomenological study of high school students struggling in mathematics." *ASEAN Journal of Science and Engineering Education* 1, no. 2 (2021): 111-116. <https://doi.org/10.17509/ajsee.v1i2.33403>
- [66] Omolafe, Eyiemi Veronica. "Primary educators experts' validation of the developed mathematics mobile application to enhance the teaching of mathematics in Nigeria primary schools." *ASEAN Journal of Science and Engineering Education* 1, no. 3 (2021): 157-166. <https://doi.org/10.17509/ajsee.v1i3.38505>
- [67] Serra, Elmer JR P., Nikko Jay R. Senope, and Charls M. Lariosa. "Potholes in the implementation of printed module in mathematics and feedbacks of learners in Lambayong national high school during covid-19 pandemic." *ASEAN Journal of Science and Engineering Education* 1, no. 3 (2021): 177-182. <https://doi.org/10.17509/ajsee.v1i3.40897>

- [68] Wijaya, Hanna, Rina Maryanti, Verra Wulandary, and Asep Rudi Irawan. "Numerical minimum competence assessment for increasing students' interest in mathematics." *ASEAN Journal of Science and Engineering Education* 2, no. 3 (2022): 183-192.
- [69] Awofala, Adeneye Olarewaju A. "Examining sources of mathematics self-efficacy beliefs of senior secondary school students." *ASEAN Journal of Science and Engineering Education* 3, no. 3 (2023): 229-244.
- [70] Awofala, Adeneye Olarewaju A., Oladiran S. Olabiyi, Omolabake T. Ojo, Adenike J. Oladipo, Alfred O. Fatade, and Uchenna N. Udeani. "Personal and contextual factors as correlates of entrepreneurial intentions among pre-service science, technology, and mathematics teachers." *ASEAN Journal of Science and Engineering Education* 3, no. 3 (2023): 265-278.
- [71] Obafemi, Kayode Ezecheal, Ayodele Fajonyomi, and Eniola Keji Ola-Alani. "Effect of reversed jigsaw instructional strategy on pupils academic achievement in mathematics." *ASEAN Journal of Science and Engineering Education* 3, no. 3 (2023): 297-304.
- [72] Awofala, Adeneye Olarewaju A., Sabainah O. Akinoso, Comfort O. Adeniyi, Sufiyanu H. Jega, Alfred O. Fatade, and Abayomi A. Arigbabu. "Primary teachers' mathematics anxiety and mathematics teaching anxiety as predictors of students' performance in mathematics." *ASEAN Journal of Science and Engineering Education* 4, no. 1 (2024): 9-24.
- [73] Obafemi, K. E. "Enhancing pupils' academic performance in mathematics using brainstorming instructional strategy." *ASEAN Journal of Science and Engineering Education* 4, no. 2 (2024): 99-106.
- [74] Maryanti, Rina. "Assessment of mathematical abilities of students with intellectual disabilities during the COVID-19 pandemic." *Indonesian Journal of Community and Special Needs Education* 1, no. 2 (2021): 47-52. <https://doi.org/10.17509/ijcsne.v1i2.33402>
- [75] San Jose, Maria Tricia N. "Factors that affect the performance of selected high school students from the third district of Albay in International Mathematics Competitions." *ASEAN Journal for Science Education* 1, no. 1 (2022): 9-16.
- [76] Dermawan, Rian, M. Muktiarni, and Jonah Mupita. "Efforts to increase the interest of junior high school students in mathematics lessons using the tik tok learning tool." *ASEAN Journal for Science Education* 1, no. 2 (2022): 81-88.
- [77] Lagcao, Yvrin Gabriel D., Jean Paul Andrei D. Dechavez, Daven John G. Goleng, Alyssa Khate E. Lamzon, Khalid Yasper M. Tangklii, and Welard Jay C. Vicera. "Math readiness and its Effect on the online academic performance of science, technology, engineering, and mathematics students." *ASEAN Journal for Science Education* 2, no. 1 (2023): 33-38.
- [78] Awofala, Adeneye Olarewaju A., and Afolabi Oladayo Olaniyi. "Assessing teachers' formative evaluation strategy as related to senior secondary school students' achievement in mathematics." *ASEAN Journal for Science Education* 2, no. 2 (2023): 77-86.
- [79] Obafemi, K. E., U. T. Saadu, O. Yahaya, T. O. Obafemi, and F. M. Yakubu. "Exploration of the effect of scaffolding instructional strategy on pupils' academic performance in mathematics." *ASEAN Journal for Science Education* 2, no. 2 (2023): 121-128.
- [80] Awofala, Adeneye Olarewaju A., and Felicia OO Agbolade. "Effect of peer-tutoring strategy on senior secondary school students' achievement in mathematics." *ASEAN Journal for Science Education* 3, no. 1 (2023): 1-12.
- [81] Padmore, Edward Abanie, and Clement Ayarebilla Ali. "Exploring effective differentiated instruction in the teaching and learning of mathematics." *ASEAN Journal for Science Education* 3, no. 1 (2024): 41-54.
- [82] Lasisi, Adekola Kamil, Abdulhafis Adeyinka Hassan, and Habibat Bolanle Abdulkareem. "Impact of single parenting on academic performance of junior secondary school students in mathematics." *ASEAN Journal for Science Education* 3, no. 2 (2024): 129-138.
- [83] Mohamed, Rosmawati, Mohd Zaid Mamat, and Anuar Ab Razak. "Using GeoGebra with Van Hiele's Model in Geometry Classroom: An Experience with Prospective Teacher." *Semarak International Journal of STEM Education* 1, no. 1 (2024): 1-19. <https://doi.org/10.37934/sijste.1.1.119>
- [84] Glorifica, Ivonne. "Media analysis of biology teaching book grade xii: A study based on science literacy category." *Indonesian Journal of Educational Research and Technology* 1, no. 1 (2021): 17-22. <https://doi.org/10.17509/ijert.v1i1.32659>
- [85] Olumorin, Charles Olabode, Ebenezer Omolafe Babalola, Gboyega Ayodeji Aladesusi, Ahmed Idris Issa, and Eyiemi Veronica Omolafe. "Experts' validation of the developed 3-dimensional automated model of the human heart to teach a biology concept in Ilorin, Nigeria." *Indonesian Journal of Multidisciplinary Research* 1, no. 2 (2021): 299-308. <https://doi.org/10.17509/ijomr.v1i2.37840>
- [86] Babalola, Ebenezer Omolafe. "Design and development of 3-dimensional model of human circulatory system to teach a concept of biology in senior secondary schools." *Indonesian Journal of Teaching in Science* 2, no. 1 (2022): 17-28. <https://doi.org/10.17509/ijotis.v2i1.39006>
- [87] Olumorin, Charles Olabode, Ebenezer Omolafe Babalola, and Desire Adunola Ayoola. "Design and development of human excretory system model to teach a biology concept in Ilorin, Nigeria." *Indonesian Journal of Teaching in Science* 2, no. 2 (2022): 107-116. <https://doi.org/10.17509/ijotis.v2i2.45782>

- [88] Hofifah, Siti Nur, and S. Sumiati. "The effectiveness of the practicum video guide on distance learning in improving biology learning outcomes in enzyme content." *Indonesian Journal of Teaching in Science* 3, no. 2 (2023): 201-212. <https://doi.org/10.17509/ijotis.v3i2.62905>
- [89] Alhassan, Najmuddeen, Amina Alhassan, and Akazi Frances Chioma. "Examining the role of biology teachers' beliefs, motivations, and self-reported practices in constructing curves for biology class." *Indonesian Journal of Teaching in Science* 4, no. 1 (2024): 11-26.
- [90] Tipmontiane, Krittin, and P. John Williams. "The integration of the engineering design process in biology-related STEM activity: A review of Thai secondary education." *ASEAN Journal of Science and Engineering Education* 2, no. 1 (2022): 1-10. <https://doi.org/10.17509/ajsee.v2i1.35097>
- [91] Abdussemiu, Ahmad. "Problems of teaching practical biology in senior secondary schools." *ASEAN Journal of Science and Engineering Education* 2, no. 3 (2022): 199-206.
- [92] Babalola, Ebenezer Omolafe, Desire Adunola Ayoola, and Eyiemi Veronica Omolafe. "Analysis of experts' opinion on the human excretory system model for teaching biology in Nigeria." *ASEAN Journal of Science and Engineering Education* 3, no. 1 (2023): 19-26.
- [93] Ala, N. A., A. O. Onojah, A. M. Ishyaku, and S. B. Adamu. "Development of an animation package in biology for teaching vertebrate, anatomy, and physiology." *ASEAN Journal for Science Education* 1, no. 2 (2022): 117-130.
- [94] Susilowati, Nisfullail Indah, Winny Liliawati, and Dadi Rusdiana. "Science process skills test instruments in the new Indonesian curriculum (merdeka): Physics subject in renewable energy topic." *Indonesian Journal of Teaching in Science* 3, no. 2 (2023): 121-132. <https://doi.org/10.17509/ijotis.v3i2.60112>
- [95] Lestari, Dwi Ayu, I. R. Suwarma, and Endi Suhendi. "Feasibility analysis of the development of STEM-based physics e-book with self-regulated learning on global warming topics." *Indonesian Journal of Teaching in Science* 4, no. 1 (2024): 1-10.
- [96] Abosede, Peter Joy, Samuel A. Onasanya, and Okonkwo Clementina Ngozi. "Students self-assessment of demonstration-based flipped classroom on senior secondary school students' performance in physics." *Indonesian Journal of Teaching in Science* 4, no. 1 (2024): 27-40.
- [97] Azizah, Elza Varih, Asep Bayu Dani Nandiyanto, Tedi Kurniawan, and Muhammad Roil Bilad. "The effectiveness of using a virtual laboratory in distance learning on the measurement materials of the natural sciences of physics for junior high school students." *ASEAN Journal of Science and Engineering Education* 2, no. 3 (2022): 207-214.
- [98] Ibrahim, Abdulwaheed Opeyemi. "Impact of blended learning method on secondary school physics students' achievement and retention in Lokoja, Nigeria." *ASEAN Journal for Science Education* 2, no. 2 (2023): 57-66.
- [99] Francis, Torpev Terver, and Salaudeen Jaleel Baba. "Effect of concept mapping teaching approach on students' academic performance in chemistry in senior secondary schools." *Indonesian Journal of Educational Research and Technology* 3, no. 1 (2023): 69-78. <https://doi.org/10.17509/ijert.v3i1.46145>
- [100] Putri, Silmi Ridwan, Siti Nur Hofifah, Gabriela Chelvina Santiuly Girsang, and Asep Bayu Dani Nandiyanto. "How to identify misconception using certainty of response index (CRI): A study case of mathematical chemistry subject by experimental demonstration of adsorption." *Indonesian Journal of Multidisciplinary Research* 2, no. 1 (2022): 143-158. <https://doi.org/10.17509/ijomr.v2i1.38738>
- [101] Wirzal, Mohd Dzul Hakim, and Nur Syakinah Abd Halim. "Short play approach for analytical chemistry class." *ASEAN Journal of Science and Engineering Education* 2, no. 2 (2022): 163-168. <https://doi.org/10.17509/ajsee.v2i2.42762>
- [102] Barke, Hans-Dieter, and Joline Büchter. "Laboratory jargon and misconceptions in Chemistry—an empirical study." *ASEAN Journal of Science and Engineering Education* 3, no. 1 (2023): 65-70.
- [103] Darmawan, Cecep, Karim Suryadi, And Leni Anggraeni. "Sport fans using social media: A study on celebrity sports fans." *Sport & Tourism Central European Journal/Sport i Turystyka Srodkowoeuropejskie Czasopismo Naukowe* 6, no. 3 (2023). <https://doi.org/10.16926/sit.2023.03.06>
- [104] Sombria, Khezel Jean F., Diane L. Celestial, Clea Grace M. Jalagat, and Anamarie G. Valdez. "Online learning through google classroom: Effects on students critical thinking skills in chemistry." *ASEAN Journal of Science and Engineering Education* 3, no. 2 (2023): 193-210.
- [105] Swafiyah, Bawa, Binta Asabe Muhammad, and Abdullahi Zaharaddeen Yamusa. "Effect of conceptual change instructional strategy on chemistry students' performance in acids and bases concepts." *ASEAN Journal for Science Education* 2, no. 1 (2023): 47-54.
- [106] Bilad, Muhammad Roil. "Bibliometric analysis for understanding the correlation between chemistry and special needs education using vosviewer indexed by google." *ASEAN Journal of Community and Special Needs Education* 1, no. 2 (2022): 61-68.
- [107] Sambudi, Nonni Soraya, and Raihan Mahirah Ramli. "Integrated project as innovative assessment to enhance learning experience in thermodynamics class." *ASEAN Journal of Science and Engineering Education* 1, no. 3 (2021): 167-176. <https://doi.org/10.17509/ajsee.v1i3.40896>

- [108] Haritha, K. "Exploring historical seismic events through secondary data analysis: Implications for understanding submarine earthquakes in marine geophysics for educational purposes." *Indonesian Journal of Multidisciplinary Research* 3, no. 2 (2023): 349-370.
- [109] Mohamed, Rosmawati, Mohd Zaid Mamat, and Anuar Ab Razak. "Using GeoGebra with Van Hiele's Model in Geometry Classroom: An Experience with Prospective Teacher." *Semarak International Journal of STEM Education* 1, no. 1 (2024): 1-19. <https://doi.org/10.37934/sijste.1.1.119>
- [110] Saleh, Zubaidah Md, Geetha Subramaniam, and Nurul Munira Mohd Shariff. "Mathematics Anxiety among Architecture Students at Polytechnic Sultan Idris Shah: A Preliminary Study as An Attempt to Strengthen Mathematics Education in TVET Institution." *Semarak International Journal of STEM Education* 1, no. 1 (2024): 39-48. <https://doi.org/10.37934/sijste.1.1.3948>
- [111] Bilad, Muhammad Roil, and Saiful Prayogi. "Portfolio workbook as an effective method for student-centered learning of chemical engineering principles." *ASEAN Journal of Science and Engineering Education* 1, no. 1 (2021): 31-36. <https://doi.org/10.17509/ajsee.v1i1.32404>
- [112] Andika, Riezqa, and Zulfan Adi Putra. "Teaching programming to chemical engineering students." *ASEAN Journal of Science and Engineering Education* 2, no. 1 (2022): 51-60. <https://doi.org/10.17509/ajsee.v2i1.36935>
- [113] Hanapi, Normadiana Mohammad, and Mohd Mawardi Mohd Kamal. "Jigsaw classroom: A process of cooperative learning and discussion." *Semarak International Journal of Innovation in Learning and Education* 1, no. 1 (2024): 24-31. <https://doi.org/10.37934/sijile.1.1.2431>
- [114] Samsuri, Shafirah. "Teaching chemical engineering thermodynamics using substituted blended learning techniques." *ASEAN Journal of Science and Engineering Education* 4, no. 2 (2024): 143-162.
- [115] Zakaria, Zaki Yamani, Abdelrahim Minalla, and Fatin Aliah Phang. "Developing Theoretical Framework for Evaluation of Engineering Education in Sub-Saharan African Countries." *International Journal of Advanced Research in Future Ready Learning and Education* 35, no. 1 (2024): 52-74. <https://doi.org/10.37934/frle.35.1.5274>
- [116] Veza, Ibhah, Mohd Farid Muhamad Said, Tri Widodo Besar Riyadi, Mohd Azman Abas, and Zulkarnain Abdul Latiff. "Issues in the Science and Engineering Education in Indonesia: How to Improve Competitiveness Through STEM Mastery." *International Journal of Advanced Research in Future Ready Learning and Education* 24, no. 1 (2021): 1-6.
- [117] Wirzal, Mohd Dzul Hakim, and Zulfan Adi Putra. "What is the correlation between chemical engineering and special needs education from the perspective of bibliometric analysis using vosviewer indexed by google scholar." *Indonesian Journal of Community and Special Needs Education* 2, no. 2 (2022): 103-110. <https://doi.org/10.17509/ijsne.v2i2.44581>