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## Indonesian Research Output on Online Learning/e-Learning Publication using the Scopus Database: A Scientometric Analysis

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### Abstract

e-Learning is considered to be one of the most relevant topics to discuss in this study, because the COVID-19 pandemic has resulted in the implementation of teaching and learning to be carried out from home. This study was conducted by using Scientometrics analysis method, which is also known as bibliometric analysis. This analysis was carried out to determine how the development of scientific publications in the e-Learning field in Indonesia. The data in this study were collected by searching through the Scopus database with keywords: *(TITLE-ABS-KEY(elearning) OR TITLE-ABS-KEY(e-learning) AND AFFILCOUNTRY(indonesia))* and the data were taken on March 20, 2021. The results of the study indicated that (1) the publication of Indonesian articles related to e-Learning increased significantly in 2018-2020 in the Scopus database; (2) on the map of the development of e-Learning publications based on co-authors, there were 24 research clusters obtained; (3) dominant publications were published in the Journal of Physics Conference Series by 32.88%; and (4) the productive writer of the publication was Santoso, H.B. (49 articles), which was subsequently followed by Hasibuan, Z.A. (24 articles).

Keywords: e-Learning; Online Learning; Scientometric; Indonesia.

### 1. Introduction

Learning is one of the fundamental priorities in Indonesian education system. Based on the Law of the Republic of Indonesia Number 20 of 2003 concerning the National Education System, it explains that learning is a process of interaction between learners and educators and learning resources in a particular learning environment, and this Law further explains that education is a mandate contained in the 1945 Constitution of the Republic of Indonesia, namely “to protect the entire nation and all Indonesian bloodshed and to promote public welfare, and to educate the nation’s life.

Indonesia is one of the countries most affected by COVID-19. COVID-19 not only contributes to the impact on the health sector but also in the social sector specifically in the education and economy sectors [2]-[4]. COVID-19 was first detected in Wuhan, China at the end of 2019 [1] and began to be confirmed in Indonesia in 2020. Data as of March 20, 2021 based on the Worldometer website indicates that Indonesia is in the top 20 countries with the most COVID-19

cases of 1.450.132 cases with a total death of 39.339 cases (17th position in the world). During the COVID-19 pandemic, the 2020 learning process was carried out online or known as Learning From Home (BDR) in accordance with the Circular of the Ministry of Education and Culture Number 15 of 2020 concerning Guidelines for Organizing Learning from Home in an Emergency for the Spread of COVID-19. The online learning process (e-Learning) has been widely applied in Indonesia, specifically at the Kindergarten to College level. Prior to the COVID-19 pandemic, e-Learning had not been widely applied to the Indonesian education system.

Due to the growing popularity of E-learning, it is necessary to conduct a bibliometric study of e-Learning from the Scopus database. This study was intended to determine the publications of Indonesian researchers in connection with e-Learning. This study used the bibliometric analysis method. The bibliometric analysis is part of the research evaluation. Bibliometric analysis can provide information on (1) the growth in the number of scientific publications; (2) researcher productivity; (3) the number of documents based on author, subject, field; and (4) map of publication development based on keywords [5]. Bibliometric analysis study had been conducted by various researchers including: Wulansari, et.al. [6]; Glänzel, Schubert, & Czerwon (1999) [7]; Lisée, Larivière, & Archambault (2008) [8]; and Iskandar, et.al. [9].

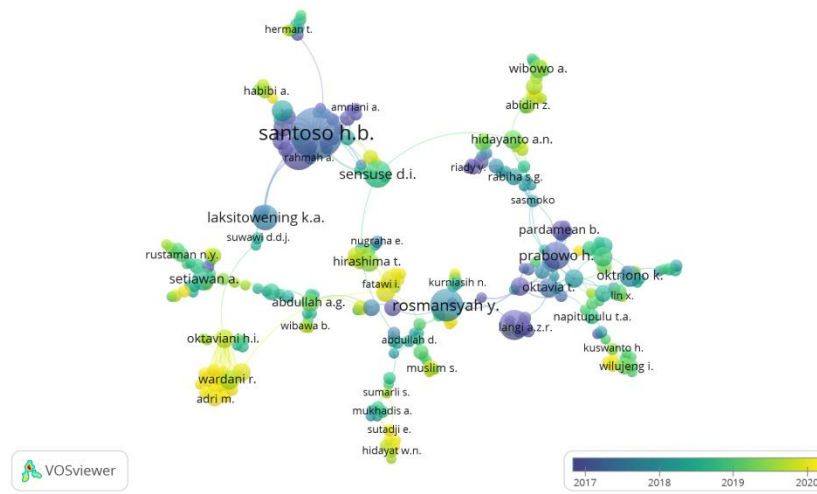
## 2. Methods

This study was a bibliometric analysis. The data in this study were further analyzed using VosViewer. VosViewer is considered capable of contributing many advantages over other analysis software. VosViewer uses a text mining function to identify combinations of noun phrases relevant to mapping and an integrated clustering approach to examine network data co-citation and co-occurrence [10]. In addition, VosViewer has the advantage of optimizing the labels in the visualization [11].

The data of this study were obtained from the Scopus database using the following keywords: ***(TITLE-ABS-KEY(elearning) OR TITLE-ABS-KEY(e-learning) AND AFFILCOUNTRY(indonesia))***. The data were taken on March 20, 2021. Analysis with VosViewer was carried out with the following settings: (1) type of analysis: Co-authorship; (2) unit of analysis: Authors; (3) the minimum number of documents per author is 2 and the minimum number of citations is 0.

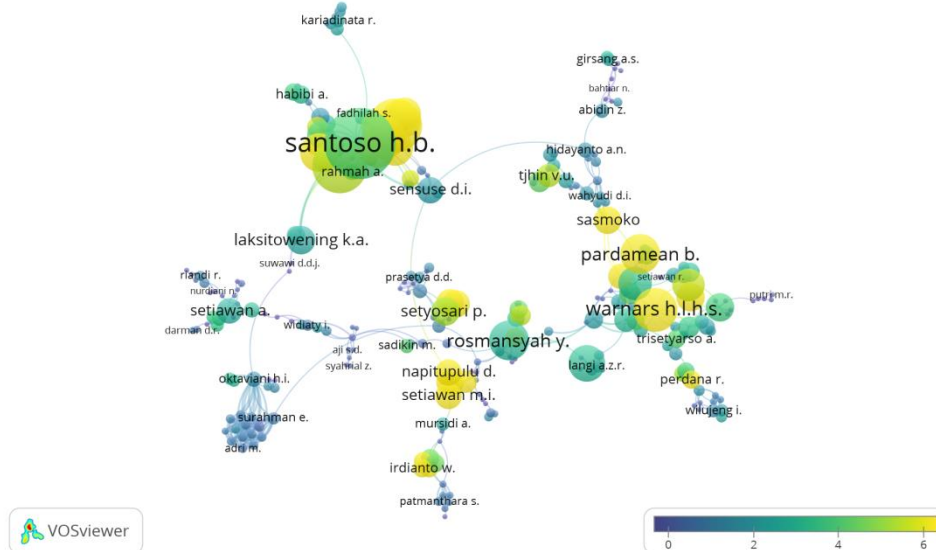
## 3. Result and Discussion

From the results of the VosViewer analysis, 24 research clusters and 1776 publications were successfully obtained. The research cluster is presented in Table 1 and its network visualization is shown in Figure 1.



**Fig. 1.** Network visualization by using weights: number of documents

From fig.1, it is indicated that there were 4 large clusters among 24 clusters that contributed a strong network discussing e-Learning based on weights, namely the number of documents. Those clusters were Santoso H.B. Cluster, Rosmansyah Y. Cluster, Prabowo H. Cluster, and Laksitowening K.A. Cluster. Based on fig. 1, it can be found that 4 large clusters had successfully conducted studies between 2017-2018. Relatively new studies (2020) were successfully conducted by Wardani R. Cluster; Adri M. Cluster; and Fatawi I.



**Fig. 2.** Network visualization by using weights: citations and score: avg. citations

Cluster. based on weights: citations and score: avg. citations, there were 6 large clusters obtained (fig. 2), namely Santoso H.B. Cluster; Laksitowening K.A. Cluster; Rosmansyah Y. Cluster; Pardamean B. Cluster; Warnars H.L.H.S. Cluster; and Sasmoko Cluster. The number of citations in these cluster is amounted to 4-6 citations in articles that discuss e-Learning.

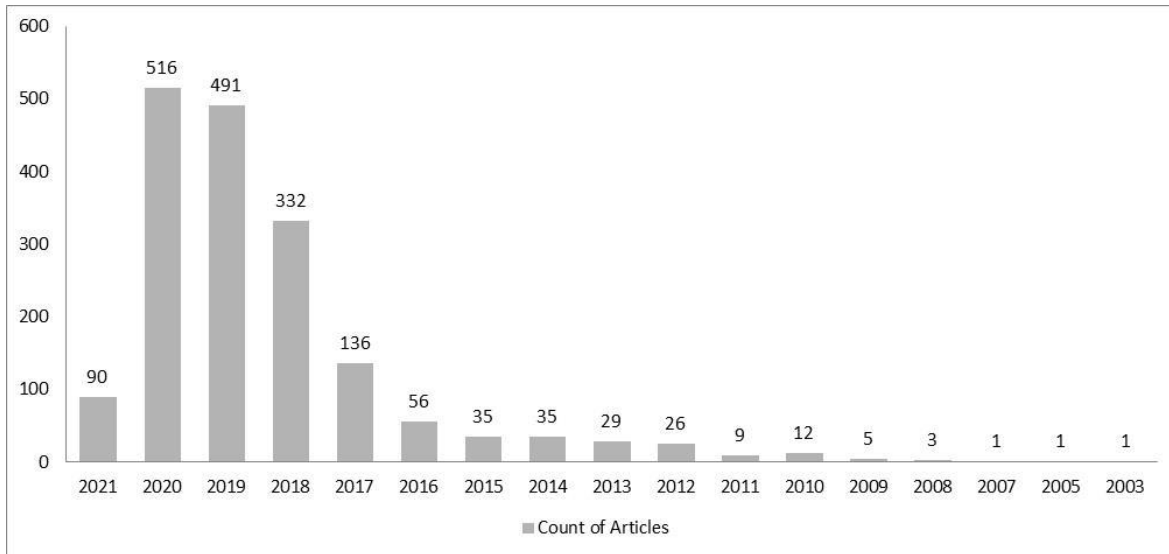
Each cluster has an authors group, the Top 10 authors who conducted eLearning-related study in Indonesia can be seen in table 1.

**Table 1.** Top 10 Authors

<b>Author name</b>	<b>Number of Articles</b>
Santoso, H.B.	49
Hasibuan, Z.A.	24
Rosmansyah, Y.	21
Bandung, Y.	16
Prabowo, H.	15
Sensuse, D.I.	13
Laksitowening, K.A.	12
Santosa, P.I.	12
Meyliana	11
Jumadi	10

From table 1, it can be seen that the most eLearning related articles were mostly published by Santoso, H.B. with 49 articles. This is in line with Fig. 1 which shows that the color of Santoso, H.B. more was concentrated than the other members. The details of the number of publications each year on the topic of eLearning are presented in Fig. 3.

From Fig. 3, it can be seen that e-Learning-related publications began to dominate in 2018-2020, and would likely be the same in 2021, because learning had been successfully carried out online (learning from home). Publication regarding online learning had increased in 2018, which was primarily improved due to the Indonesian government's policy through the Regulation of the Minister of Research, Technology and Higher Education Number 51 of 2018, which accommodates the implementation of distance learning as a higher education strategy to answer the challenges of the Industrial Revolution 4.0. The increase in Indonesian publications is in line with the results of ASEAN Benchmarking on SINTA based on the results from [www.scival.com](http://www.scival.com) on Last Update: 2021-03-25 08:06:37 [12].



**Fig. 3.** Number of annual publications

Publication of articles related to e-Learning based on their source type was dominated by conference series (77.59%), journals (20.89%), as well as book series and books, respectively 1.41% and 0.11%. For more details, see table 2 and table 3.

Table 2. Source type of publication

Source type	Documents	Percentage
Conference Proceeding	1378	77,59
Journal	371	20,89
Book Series	25	1,41
Book	2	0,11
Total	1776	100,00

Table 3. Top 10 of source title of publication

Source title	Documents	Percentage
Journal of Physics Conference Series	584	32,88
ACM International Conference Proceeding Series	97	5,46
IOP Conference Series Materials Science and Engineering	71	4,00
International Journal of Emerging Technologies in Learning	50	2,82
IOP Conference Series Earth and Environmental Science	27	1,52
Journal of Theoretical and Applied Information Technology	19	1,07

Source title	Documents	Percentage
Proceedings 2020 6th International Conference on Education and Technology ICET 2020	19	1,07
4th International Conference on Nano Electronics Research and Education Toward Advanced Imaging Science Creation ICNERE 2018	16	0,90
2020 8th International Conference on Cyber and IT Service Management CITSM 2020	15	0,84
International Journal of Scientific and Technology Research	15	0,84

In general, the publication of ASEAN countries, specifically Indonesia, has increased significantly in publication in conference proceedings [13]. The increase in Indonesian publications in conference proceedings began in 2016-2018 [14]. These results subsequently caused Indonesian publications in conference proceedings in 2019-2020 to also increase because publication and research are one of the tridharma of higher education. This is also in line with the circulars regarding the Publication of Scientific Works for Undergraduate Programs, Masters Programs, and Doctoral Programs [15].

#### 4. Conclusion

Based on the results and discussion, it can be concluded that the publication of Indonesian articles related to e-Learning contributed to a significant increase in 2018-2020 on the Scopus database. On the map of the development of e-Learning publications based on co-authors, 24 clusters of researchers were successfully found. Most publications in the e-Learning field were published in the Journal of Physics Conference Series by 32.88%. The productive writer in the scientific publication of e-Learning is Santoso, H.B. (49 articles), which is subsequently followed by Hasibuan, Z.A. (24 articles). For further research, it is hoped that the analysis of the relationship between the author and the source type of publication can be then applied, so that the mapping results of author publications based on source type can be easily determined.

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