Systematic Mapping in Mobile Learning Topics Based on Bibliometric Analysis

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Abstract—The study aims to reverse the trend in mobile learning research through bibliometric analysis by focusing on authors, publications, keywords, and countries. The data from 2011-2021. This research uses various applications that can assist in the bibliometric analysis, namely Publish or Perish (PoP), VosViewer, and Ms. Excel. Bibliometric analysis shows that most of the countries doing mobile learning are Malaysia, Indonesia, India, the United States, Saudi Arabia, Spain, Australia, Taiwan, Turkey, and China. According to the keyword "Mobile learning', "M-Learning", "E-Learning", and "Mobile Device" are the most keywords is a platform, mobile application, m-learning application, mobile learning technology, multimedia, and educational process. It was found citing largest analyzed that research by Emran, Mezhuyev, and Kamaludin (2015) is 268 citation. And the last, was found the highest number of authors is shown in 3, the number of authors is 877 with percentages 88% researchers who collaborite in mobile learning research.

Keywords: Bibliometric, mobile learning, m-learning

1. INTRODUCTION

The development of technology every day has increased significantly and the use of mobile devices has become a primary need. This is in line with the ease of internet access in the world (Revalia, et al, 2016). Mobile technology is even more interesting with various device features in the mobile, such a simple operation and accessibility. As of 2019, global mobile or ponsel usage was 67% and active use of social media in mobile use was 42% (We are social, 2019). Lee, et al (2014) show that have become a part of our lives. Based on the Central Statistic (2021) the result of the 2020 population census at the end of January, the composition of the Indonesia populations mostly comes from Generation Z much as 27,94%, higher than the Milenial Generation at 25,87%. This prove that existence of Generation Z more and influence the development of Indonesia today and the future. We know that Generation Z born in 2000 – 2010, the caracteristhic of Generation Z which tend to be instant. Mobile learning become even more important due to the fact the age ownership of mobile technology is declining and that it must be used for learning process in order to use it intensively.

As a part of our lives, mobile technology can be used in education. Sarada, et al (2016) stated that the use of mobile learning for teachers is widely used as an approach to learning. Various features or icons in mobile learning make mobile learning more interesting. In Indonesia, especially at the State University of Jakarta, many mobile learning developments have been carried out. The use of mobile learning is currently very much needed, especially the situation in Indonesia is still in a state of the Covid-19 pandemic which requires students to do mobile learning. In addition, the use of mobile learning has many advantages such as access can be done anytime and anywhere, instant, and very close to the students who use mobile a lot in every aspect of life.

However, when using mobile learning for learning teacher and students must be attentions to such as network conditions, infrastructure, and knowledge capabilities in the field of technology.

This is in accordance with Asabere (2013) saying that mobile learning can also have a negative impact, including the lack of control over student activities and not being able to detect how students use mobile learning which is expected only for the learning process. This is inconsistent with numerous studies using mobile learning as a learning environment and mobile learning continues to evolve to make learning successful.

All these studies show that mobile learning research has increased in recent years. This shows that mobile learning is an important and growing area to improve academic achievement. Apparently, until now mobile learning has been widely reviewed based on systematic reviews or what is often called meta-analysis. Around the last 5 years mobile learning research research has increased. This proves that mobile learning research is growing rapidly and shows a positive impact. There are many studies on mobile learning, but none have been developed using bibliometric mapping techniques to encompass mobile learning in a broader context. Therefore, researchers perform a bibliographic analysis of mobile learning with search questions.

1. What is the most publications of publication years?
2. What is the most influential countries?
3. Who is the most influential author?
4. What are the trends of keywords?
5. What is the position of researches when citing similar publications?

2. METHODS
2.1 Research Design and Data Analysis

Bibliometric was first used in 1969 by Alan Pritchad. Bibliometric is the application of the mathematical and statistical analysis to pattern contained in the publication and use of document in the form textbooks, journal, articles, students disertation, or the other sources (Rohanda & Winoto, 2019).
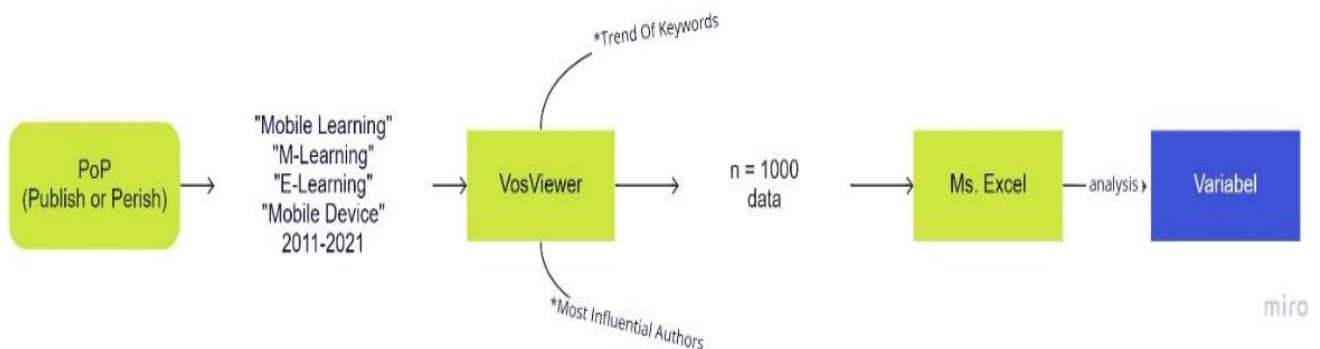

Figure 1. Diagram of the data processing

Analysis Bibliometric makes it possible to follow up on the studies of researches, institutions and scientific studies related to the specified scientic subject. In the mapping, bibliometric as a spatial representation in the relationship between dicipline, fields, publications of individuals, or author (Small, 1999). In a bibliometric study, it is posible to identify trends in the field by examing several characters of a particular field study and evaluating the result (Kasamodel, et all, 2016). In this article, author describe a bibliometric study that systematic analyzed the literature using existing article on Publis or Perish (PoP) and VosViewer. Publish or Persis (PoP) is designed to help academic to

present any case in the study. VosViewer is the most popular computer software with various visualization techniques (Waltmans and Gatzsel, 2017). In this study, VosViewer was used to collect, analyze, and visualize bibliographic data. The database of PoP show totals 1000 record publicaion relate the theme, which were processed and interpreted using Microsoft Excel. This study conduct a blibiometric analysis of international publication which are expected to provide useful refrences for the future research.

2.2 Data Collecting
The data used in this study is secondary data, which is data obtained indirectly, where the information obtained comes from articles and can be accounted. The data used in this study is publication data from PoP with the seacrh key:

Tittle   : "Mobile learning", "m-Learning", or "M-Learning"
Keywords   : "Mobile learning", "M-Learning, "E-Learning", and "Mobile Device"
Years   : 2011-2021
Results   : 1000 publications

2.3 Data Analysis
In this analyzing bibliometric, the author uses variabel to the result more focused, is:
a)   Publications by publication years
b)   The most influental countries
c)   The most influential authors
d)   Trend of keyword
e)   The status of researcher citing similar of publications

3. RESULTS
In this sections, author show descriptive and evaluate analysis result. Bibliometric variable is a publications by publication years, most influental countries, most influental authors, trend of keyword, and cite similar of keyword.

3.1 Publications by Publication Years
Figure 1 shows the record of publication by publication years. The indicator show a growth in interest subject from 2015 and 2013 being the most productive years with 32 articles and 19 articles.
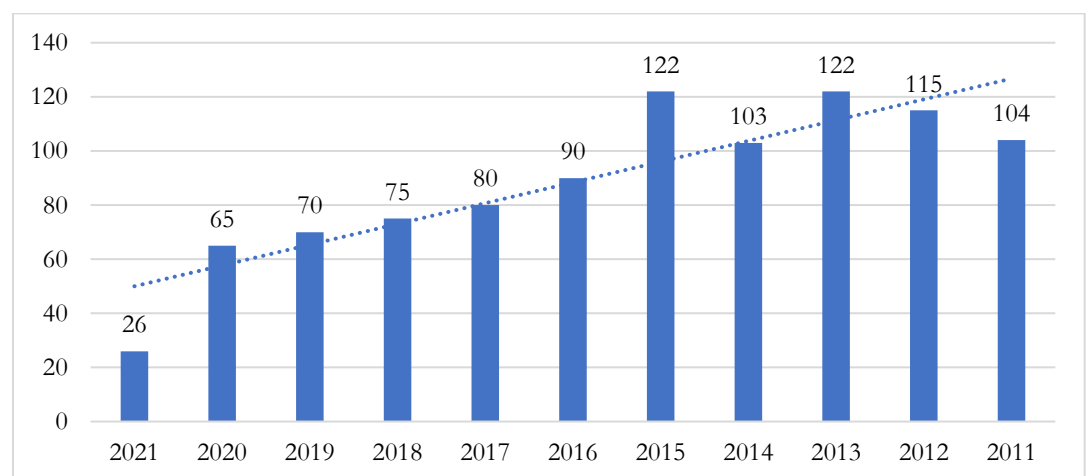

Figure 2. Number of publications per years

However, in thin increase has not been consitent over the years. For example, from 2016 comes a decrease in interest in this subject, while a decrease indentify by number of publications (Burns & Lohenry, 2010) among others, the use of mobile learning in the classroom can reduce students' concentration in learning so that it shows a negative impact, including a decrease in academic scores. In Figure 1 shows a decline in mobile learning research over the last five years, this is in accordance with the statement of Alsweyy and Alsamarrie (2019), it turns out that there are several problems with the development of mobile learning, namely the problem of lack of knowledge, ownership of mobile learning, and the speed of adaptation to mobile learning which is still very lacking.

3.2 The Most Influential Countries

The results of the analysis identified the most effective countries in the field of mobile learning. The results show that research is being done on mobile learning in 79 different countries. The top 10 countries in mobile learning are presented in Table 1. In this research detected from 1000 publications, 735 founded identified the countries with the most influence the subject. In the Table 1 shows that Malaysia, Indonesian, India, United State of America, Saudi Arabian, Spain, Autralia, Taiwan, Turkey, and China. Although the quantity of article in each country doesn't show significant figure, the spread of research on mobile learning is spread across 79 countries.

Table 1. Top 10 most influental countries

Rank	Country	N
1	Malaysia	79
2	Indonesia	69
3	India	55
4	United State	54
5	Saudi Arabia	48
6	Spain	28
7	Australia	25
8	Taiwan	24
9	Turkey	23
10	China	21

3.3 The Most Influential Authors

Result of the analysis show on Table 2 or Fig 2. Table 2 show summarizes the results of the authorship analysis performed to determine whether or not to cooperate with the research. It can be seen that the highest number of authors is shown in 3, the number of authors is 877 with percentages 88% researchers who collaborite in mobile learning research. Fig 2. Show that Sarrab, M., Al-Shi hih., and Al-Khanjari have a most cluster for collaborite in mobile learning research. The fact shows that not many researchers collaborite in mobile learning research which shows that the clusters are formed a little.

Table 1. Number of Authorship in the field mobile learning

No	*N* of Authors	Total	Percentage
1	6	1	0%
2	5	8	1%
3	4	29	3%
4	3	877	88%
5	2	41	4%
6	1	39	4%
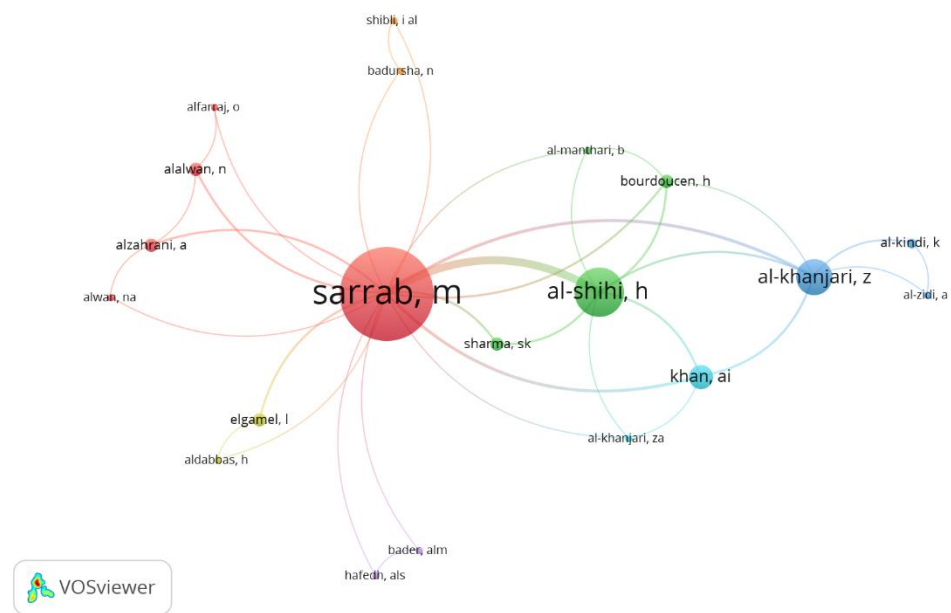
Figuge 3. Cluster authorship collaboration

3.4 Keywords in Mobile Learning

The result show that 3531 keywords were used in 1000 publications of articles in the field of mobile learning. The study included Mobile Learning, M-Learning, E-Learning, and Mobile Device keywords. Keywords in this study provide information on related topics. As can be seen in Figure 3. Largest cluster in purple with words like platform, mobile app, learning app, mobile learning technology, multimedia and education process. In the second clusteer show in red cluster, where word such as theory, difference, literatur riview, strategy, project, and m-learning tools. In the third cluster show in blue cluster, where word such as mobile learning applications, next generation, quality, intention, and high educator student. This finding show indicated from important of mobile learning in a platform, smartphone, mobile learning application, and strategy.

3.5 Citation Status of Similar Publications

In the academic life which is scientic the quality of publishing of article is seen by counting the number of citing publications by other. In this research, Table 3 show the citing largest analyzed that research by Emran, Mezhuyev, and Kamaludin (2015) is 268 citation. And the last show that research by Marifati (2011); Madhubala and Akila (2013); Fazeena, Hewamagea, and Ekanayaka (2017) is 94 citation.
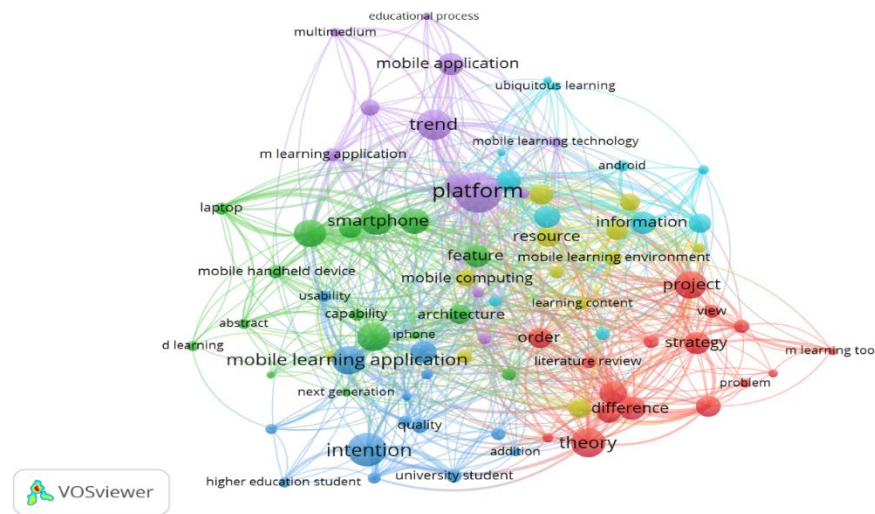
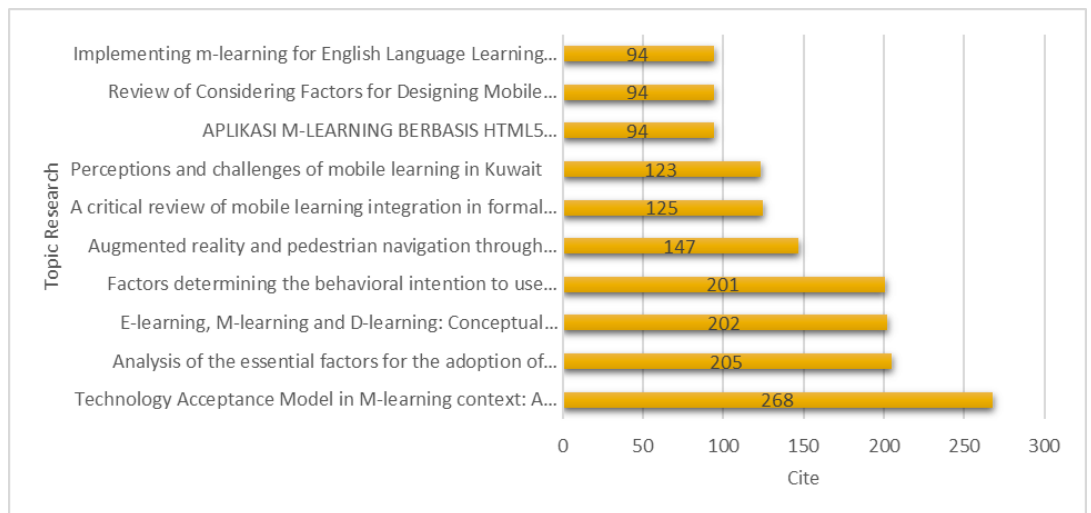**Figure 4.** The network visualitation map of keywords

Figure 5. Citing similar publications

4. CONCLUSION

Based on result, network authorship in mobile learning research, trend keywords, publications by the years, most country researcher we found the documentation and discussed it. As such, we aim to map the realm of mobile learning in a biometric sense and present research that researchers can applied to further explore mobile learning.

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