

## Introduction to Bibliometric Studies for Lecturers of the Faculty of Health Sciences, Universitas Muhammadiyah Palangkaraya

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### ABSTRACT

Bibliometric studies have become a new standard in finding gap research for further research. Mastering software such as VOSviewer can be beneficial in carrying out these bibliometric studies utilizing databases of international scientific publications. However, bibliometric research still needs to be discovered by some academics, especially those unfamiliar with it, such as lecturers at the Faculty of Health Sciences, Universitas Muhammadiyah Palangkaraya. Therefore, this service activity aims to introduce and train these lecturers regarding bibliometric studies using VOSviewer. The solution offered by the servant is to carry out introductory activities and training in operating VOSviewer in carrying out the bibliometric study. Apart from introducing the lecturers to the branch of science, which is currently in great demand worldwide, it also increases the enthusiasm for writing for the participants. Through the activities, the participants have carried out a bibliometric study in Pharmacy and Medical Laboratory Technology, which can then be published as a separate bibliometric study. As a follow-up to this activity, apart from being able to do it for lecturers in other faculties within the Universitas Muhammadiyah Palangkaraya, training is also planned to be carried out to publish scientific articles on the results of the bibliometric study.

### KEYWORDS

Bibliometric;  
Health Sciences;  
Training;  
VOSviewer



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### 1. Introduction

What is bibliometrics? What is the bibliometric study? For some academic circles, the term bibliometric study may sound unfamiliar, especially in fields of science where the majority obtain information not from electronic scientific publication sources but based on factual data in the area (such as some non-exact fields) [1]. However, the reality is only sometimes the case. In fact, some non-exact fields, such as education and economics, have a large number of publications related to bibliometrics, and conversely, there are not too many exact fields, such as science (at least not as many as the health sector, which in fact should have a narrower scope) [2], [3]. Therefore, it is interesting to look at this phenomenon and analyze it so that the academic community involved can develop an ideal and relevant research program using this bibliometric study approach [4], [5].

Before starting further, it's an excellent idea to re-analyze the definitions related to the bibliometric study [6]. Literally, bibliometrics is a field of science that measures or analyzes the history of the development of literature using mathematical and statistical techniques to study the publication of information [7]. Meanwhile, bibliometric study or analysis is a quantitative method for analyzing bibliographic data in articles/journals [8], [9]. There are four benefits to using bibliometric analysis methods: exploring trends in individual research or areas of study, providing evidence for the impact of personal research or areas of study, discovering new and emerging research areas, identifying potential research collaborators, and identifying suitable sources to be published [10].

Publication in the field of bibliometrics is one of the most developed today [11], [12]. Along with the development of computational science, bibliometric analysis has become very easy and benefits from various software that can facilitate the preparation, analysis, and visualization processes [13], [14]. One that is quite well-known and often used by researchers both in Indonesia and abroad is VOSviewer [15]. Since it was first developed [16], [17], VOSviewer has become a ranking bibliometric study aid updated

yearly [18], [19]. At least 19 offline and one online version of VOSviewer are currently available and will continue to grow annually [20], [21]. VOSviewer itself can be downloaded for free on the website <https://www.vosviewer.com/>.

The existence of VOSviewer, of course, can speed up the publication of scientific articles because, in addition to the processing and analysis process that is fast, many journals currently specialize in publishing various manuscripts in the field of bibliometrics [22], [23]. One of the most famous is Springer's Scientometrics, which publishes numerous articles on bibliometric methods [21], [24]–[31]. Currently, many journals from Indonesia focus on publishing articles based on bibliometric studies. However, the number of authors from Indonesia who can enter reputable international journals in bibliometrics still needs to be increased. Apart from unfamiliarity, the difficulty in using supporting tools such as VOSviewer is also a very influential factor. Therefore, in this service activity, an introduction and training were carried out for the use of VOSviewer in bibliometric studies, especially for lecturers of the Faculty of Health Sciences, Universitas Muhammadiyah Palangkaraya.

## 2. Method

Community service activities are carried out at the Multipurpose Room of the Faculty of Health Sciences, Universitas Muhammadiyah Palangkaraya, from 31 March to 19 April 2023. The facilities used include presentation and audio devices, the software used is VOSviewer 1.6.19 (<https://www.vosviewer.com/>) from the Center for Science and Technology Studies, Leiden University, as well as access to Scopus (<https://www.scopus.com/>), Web of Science (<https://www.webofscience.com/wos/author/search>), PubMed (<https://pubmed.ncbi.nlm.nih.gov/>), and Dimensions (<https://app.dimensions.ai/discover/publication>) databases. Full access to the Scopus database and Web of Science is provided by Universitas Airlangga, Indonesia. Training activities are carried out in four stages of activity, starting with preparation (including licensing), introductory materials and software installation, tracing and visualization practices, as well as analysis of results and evaluation, as shown in Figure 1.

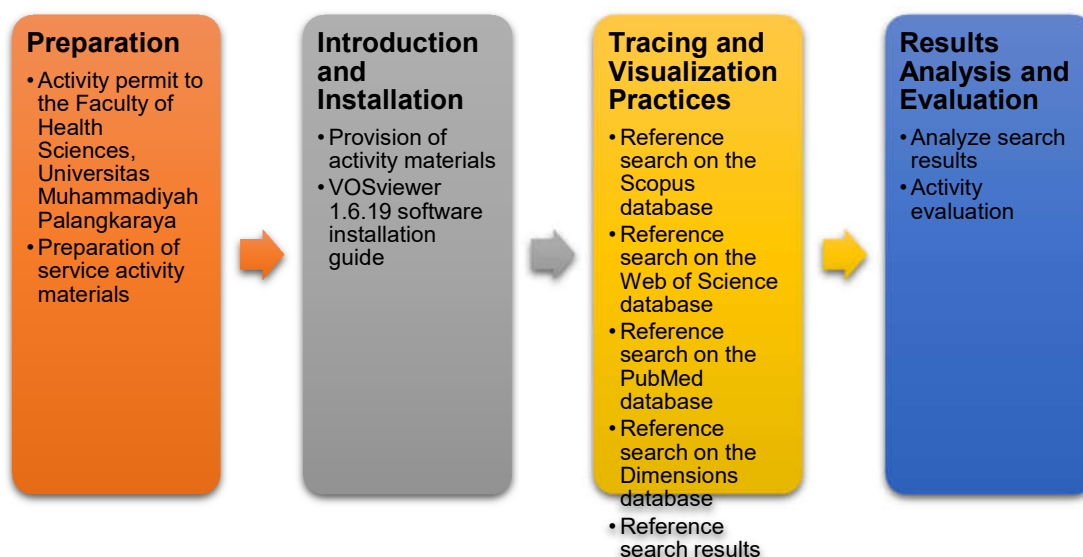


Fig. 1. Flowchart of service activities

## 3. Results and Discussion

The target of this activity was lecturers in the Faculty of Health Sciences, Universitas Muhammadiyah Palangkaraya, which totaled 23 people. The consideration for selecting activity targets is because the lecturers in the Faculty have the highest research activity and scientific publications compared to other faculties at the Universitas Muhammadiyah Palangkaraya, which totals six faculties. In comparison, 18 out of 23 people, or 78% of the lecturers at the Faculty of Health Sciences, Universitas Muhammadiyah Palangkaraya, already have a Scopus ID, with eight of them having an *h*-index of at least 1, which is the highest number within the Universitas Muhammadiyah Palangkaraya. In

other words, lecturers (including students) within the Faculty of Health Sciences, Universitas Muhammadiyah Palangkaraya, have the most significant potential to be able to take advantage of this bibliometric study approach to increase the output of their scientific publications, bearing in mind that generally conducting bibliometric studies itself requires experience to have published a scientific publication as well to perform a better analysis of the results. In this activity, a total of ten participants can attend all activity sessions until it is finished.

Community service activities were implemented in the Even Semester of the 2022/2023 Academic Year as part of the "Catur Dharma" of Higher Education for academics at Muhammadiyah Aisyiyah College. Community service activities occurred during April 2023, coinciding with Ramadan 1444 H. Implementing activities were carried out as part of learning movements in the Holy Month for Muslims to obtain more optimal rewards from Allah SWT.

The first implementation stage was done by arranging licensing with the Dean of the Faculty of Health Sciences, Universitas Muhammadiyah Palangkaraya, through an introduction from the Head of the Institute for Research and Community Service, Universitas Muhammadiyah Palangkaraya on March 31, 2023. The licensing process went smoothly, and after the permit was obtained on April 7, 2023, the servant then arranged the material for community service activities as a tool for the introduction of bibliometric studies and the software used. The material used was then delivered in the second phase of the activity, which was held on April 18, 2023, in the first session from 10.00 to 12.00 local time. In this session, the material was delivered offline at the Multipurpose Room of the Faculty of Health Sciences, Universitas Muhammadiyah Palangkaraya, accompanied by guidance on the VOSviewer software installation process as a tool for analyzing the results obtained. In this session, there were many interactive discussions between the servant and the participants, both about the bibliometric study and related to the database and software used, as shown in Figures 2 and 3.



**Fig. 2.** The servant provides introductory material about bibliometric studies



**Fig. 3.** The servant guides the VOSviewer installation process to the participants

After taking a worship break, the activities continued with the third stage in the afternoon at 13.00 to 15.00 local time. In this session, hands-on practice was carried out to gain experience in conducting reference searches in each database, refining the literature obtained, visualizing the results, and analyzing the results obtained. In this session, the participants were allowed to search the Scopus, Web of Science, PubMed, and Dimensions databases, using keyword preferences according to their respective areas of research interest. The steps taken in this session include:

1. Determination of Search Keywords
2. Initial Search Results
3. Refinement of Search Results
4. Compile Preliminary Data Statistics
5. Data Analysis

After the participants obtained a list of references to be analyzed, then the participants were guided to carry out analysis and visualization with VOSviewer. For visualization, participants are directed to make good observations based on network, overlay, and density visualization so that participants can understand the results obtained systematically, chronologically, and volume-based. The data analyzed was adjusted to the search results of each participant, in which the observed parameters included:

1. Number of articles
2. Number of journals
3. Publications and citation structures
4. Authors and co-authorship relations
5. Subject areas of research
6. Country of study location
7. Keyword's network

This session was then closed with a group photo between the servant and the participants, as shown in Figure 4.



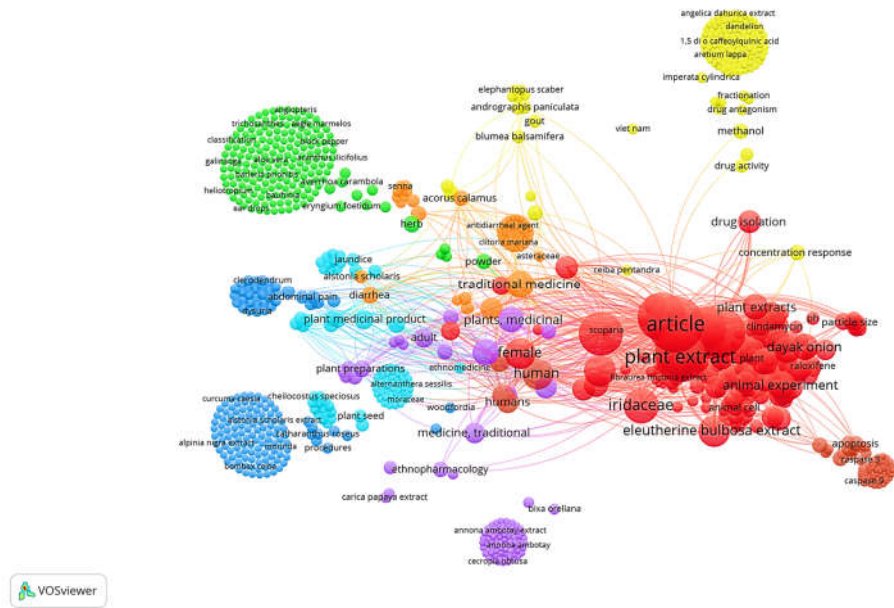
**Fig. 4.** Servants and participants in community service activities from the Faculty of Health Sciences Universitas Muhammadiyah Palangkaraya



In the final stage, which was carried out on April 19, 2023, an analysis of the results and evaluation of the activities carried out. The results were analyzed using keywords with Scopus databases that had been agreed upon at the previous meeting, representing the fields of study of each study program at the Faculty of Health Sciences, Universitas Muhammadiyah Palangkaraya, as presented in Table 1. The analysis session focused on keyword analysis to find publication networks between keywords research, which aims to find research gaps from the topics discussed. For the keywords representing the Pharmacy Study Program, it can be seen that from the keywords "*Eleutherine*" AND "*palmifolia*" OR "*bulbosa*", there were 126 documents studied, with dense network visualization. However, there were several loci of keywords that were still not connected, including between giant locus from *Eleutherine palmifolia* / *E. bulbosa* and antiprotozoal agents. In other words, the participants had succeeded in obtaining inspiration for gap research from the medicinal plant *E. palmifolia* / *E. bulbosa*, which had never been linked to its potential activity as an antiprotozoal agent, as shown in Figure 5. While in the Medical Laboratory Technology Study Program with the search keywords "*Clinical laboratory*" AND "*Quality control*" AND "*Six Sigma*" with a total of 73 documents, it can be seen that the network disconnection is most visible between the giant locus "*Quality control*" and "*Six Sigma*" with locus blood cell count, as shown in Figure 6. In other words, applying Six Sigma in Quality Control in clinical laboratories for blood cell count analysis has never been reported before and can be an exciting gap in research.

**Table 1.** Search keywords per each study program in the Faculty of Health Sciences Universitas Muhammadiyah Palangkaraya

Study program	Search keywords				
	First keyword		Second keyword		Third keyword
Pharmacy	Eleutherine	AND	palmifolia	OR	Bulbosa
Medical Laboratory Technology	Clinical laboratory	AND	Quality control	AND	Six Sigma



**Fig. 5.**The analysis of service participants from the Pharmacy Study Program shows a network disconnection between *E. palmifolia* / *E. bulbosa* (significant red locus on the right) and activity as an antiprotozoal agent (purple locus at the bottom).



**Fig. 6.** The analysis of service participants from the Medical Laboratory Technology Study Program shows a network disconnection between *Quality control and Six Sigma* (significant colorful locus on the left) and blood cell count analysis (cyan locus at the top right).

During the implementation of community service activities, no significant obstacles were encountered. Offline implementation of activities allows optimal interaction between servants and participants so that all problems can be resolved quickly without disrupting the implementation of activities. **Error! Reference source not found..** The most significant barrier was encountered on each participant's computer during the VOSviewer installation process. Not all participants used computers that could support using the latest version of VOSviewer due to the Java Runtime Environment not being installed on their computers. This problem can be solved after the servant guides the participants to install the application.

In closing, the positive response given by the participants during and after the community service activities can indicate that similar activities can be held again at different targets within the Universitas Muhammadiyah Palangkaraya. In addition, participants who have been given an introduction and can carry out data analysis independently can also be given assistance in writing manuscripts for bibliometric studies, which can later be published in national and international journals. In addition, this series of introductions to bibliometric studies should also be accompanied by assistance in writing review articles, which use the same publication database but differ in purpose **Error! Reference source not found..** Finally, the service activities carried out, although short in terms of time and number of participants, are expected to have an optimal impact, especially regarding the number of publications for lecturers at the Faculty of Health Sciences, Universitas Muhammadiyah Palangkaraya.

## 4. Conclusion

The introduction and training activities on bibliometric studies using VOSviewer for the lecturers of the Faculty of Health Sciences, Universitas Muhammadiyah Palangkaraya, ran smoothly, and the lecturers could understand the objectives and procedures of the bibliometric study well. The lecturers can't even wait for future activities related to this bibliometric study training. The design of follow-up service activities is the practice of writing scientific articles from bibliometric studies to lecturers at the Faculty of Health Sciences, Universitas Muhammadiyah Palangkaraya, as well as introducing bibliometric studies to lecturers from other faculties at the Universitas Muhammadiyah Palangkaraya.

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### Author Contribution

All servants have contributed to the following service activities. Mohammad Rizki Fadhil Pratama acts as the head of the community service activities.

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### Conflict of Interest

The authors declare no conflict of interest.

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