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Strengthening Student Research Literacy through Scopus and VOSviewer Training

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Abstrak

Kemampuan menelusuri dan mengevaluasi literatur ilmiah diperlukan mahasiswa untuk menyusun penelitian yang memiliki dasar akademik yang jelas. Kegiatan pengabdian ini bertujuan membekali mahasiswa dengan keterampilan menentukan kata kunci, menelusuri artikel melalui Scopus, dan melakukan pemetaan bibliometrik menggunakan VOSviewer. Kegiatan dilaksanakan pada 14 Oktober 2026 di Serang dengan melibatkan 30 mahasiswa Jurusan Ilmu Ekonomi Pembangunan Universitas Sultan Ageng Tirtayasa. Metode pelaksanaan mencakup pemaparan materi, demonstrasi, praktik terbimbing, dan diskusi. Evaluasi dilakukan menggunakan 10 soal pilihan ganda melalui pre-test dan post-test serta pengamatan selama praktik. Analisis terhadap 30 pasangan respons menunjukkan rata-rata pre-test sebesar 95,67 dan post-test sebesar 96,67. Sebanyak empat mahasiswa mengalami peningkatan nilai, 19 mahasiswa memperoleh nilai tetap, dan tujuh mahasiswa mengalami peningkatan. Rata-rata skor keseluruhan meningkat, jawaban benar pada soal pemahaman *co-occurrence* bertambah dari 24 menjadi 29 mahasiswa. Berdasarkan pengamatan pelaksana, peserta berhasil menyusun kata kunci, mencari artikel, dan membuat peta bibliometrik menggunakan VOSviewer. Kesulitan utama terletak pada penentuan jumlah dan ketepatan kata kunci agar hasil pencarian sesuai dengan cakupan penelitian. Kegiatan memberikan pengalaman praktik penelusuran dan pemetaan literatur, dengan kebutuhan penguatan pada strategi pencarian serta interpretasi hasil pemetaan. Tindak lanjut diarahkan pada latihan mandiri berbasis topik penelitian mahasiswa.

Kata kunci: ***Literasi Riset, Scopus, VOSviewer, Penelusuran Literatur, Mahasiswa***

Abstract

The ability to browse and evaluate scientific literature is needed by students to compile research that has a clear academic basis. This service activity aims to equip students with the skills to determine keywords, search articles through Scopus, and conduct bibliometric mapping using VOSviewer. The activity was carried out in 2026 in Serang involving 30 students of the Department of Development Economics, Sultan Ageng Tirtayasa University. The implementation method includes material presentation, demonstrations, guided practices, and discussions. The evaluation was carried out using 10 multiple-choice questions through pre-test and post-test as well as observation during practice. Analysis of 30

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response pairs showed an average pre-test of 95.67 and a post-test of 96.67. A total of four students experienced an increase in scores, 19 students obtained fixed scores, and seven students experienced an improvement. The average overall score increased, the correct answers to the co-occurrence comprehension question increased from 24 to 29 students. Based on the observations of the implementers, participants succeeded in compiling keywords, searching for articles, and creating bibliometric maps using VOSviewer. The main difficulty lies in determining the number and accuracy of keywords so that the search results are in accordance with the scope of the research. The activity provides practical experience in searching and mapping literature, with the need to strengthen the search strategy and interpretation of the mapping results. The follow-up is directed to independent exercises based on student research topics.

Keywords* : *Research Literacy, Scopus, VOSviewer, Literature Search, Students.

Introduction

Community service has fundamental urgency as a tangible manifestation of the implementation of the Tri Dharma of Higher Education which bridges science and technology innovation on campus with real needs in the community (Putra et al., 2024; Sudrajat et al., 2022). Through community service activities, academics can transfer knowledge and improve technical skills and digital literacy so as to overcome technological limitations and increase the capacity of the academic community and partner communities (Azmi, Muhammad Ulil et al., 2024). More than that, community service plays a strategic role in solving various real problems in the field, ranging from increasing productivity and quality of scientific publications, mentoring entrepreneurs based on local potential and Sustainable Development Goals (SDGs) (Zahara, 2026), to strengthening children's literacy in the regions as a form of long-term human capital investment (Zahara et al., 2025). Therefore, community service not only facilitates the role of students and lecturers as agents of change, but also becomes a driving force for just, inclusive, and sustainable development for the progress of the nation.

With this from of the strategic role of community service in bridging the needs of academics and the community, the implementation of VOSviewer nbased scientific literacy training is present as a concrete form of targeted technological intervention. This need is triggered by the fact in the field that there are still limited skills and low digital technology literacy among lecturers and students in processing scientific literature comprehensively. Through a structured community service program, these technical obstacles are transformed into opportunities to strengthen research capacity, where academics are equipped with the ability to map research trends, find novelty, and design data-driven publication strategies independently. Thus, the VOSviewer training not only realizes the mission of service in transferring modern science, but also directly strengthens the foundation of academic literacy and the competitiveness of university scientific works at the national and international levels.

Student research preparation requires the skill of identifying problems and placing them in the scientific discussion that has developed. At this stage, literature search determines the sources read, concepts used, and questions that are then formulated. Searches that rely only on one term or title sentence can miss relevant publications that use different equivalents. Therefore, the ability to determine keywords needs to be taught

along with the ability to evaluate the suitability of documents for the purpose of research. Information literacy provides the foundation for this process. The Association of College and Research Libraries places search as a strategic exploration and research as a research process. In the context of research learning, this idea can be applied through the practice of translating topics into concepts, examining alternative terms, and refining search strategies after reading the initial results. Students thus need to understand the reasons behind keyword choices, not just memorize the sequence of device use.

Scopus provides abstract information and citations that can be used to search scientific publications. Searches can be structured with Boolean operators as well as search field delimiters, including TITLE-ABS-KEY for titles, abstracts, and keywords. Its utilization requires an understanding of the scope of searches, filters, and exported information. The ability to access metadata also needs to be distinguished from the availability of full text, as access to articles follows the terms of publisher sources and institutional access. Bibliometric maps can complement the exploration stage by showing the relationships between elements of the literature. VOSviewer provides facilities for building and exploring bibliometric networks, including co-occurrence networks of keywords (Van Eck & Waltman, 2010). In basic training, these facilities can be used as a means of practice reading interthematic relationships. The interpretation still needs to consider the data source, search strategy, and processing options used.

VOSviewer training has a high urgency in the academic world because the mastery of bibliometric data analysis and visualization technology is now the main need to improve the quality and productivity of research (Bato et al., 2025; Putra et al., 2024). Although VOSviewer is very effective for mapping knowledge networks, identifying global research trends, determining novelty, and finding research gaps (Nurdiyani et al., 2025; Putra et al., 2024; Sudrajat et al., 2022), the reality is that there are still many lecturers and students who face limited technical skills and are not familiar with the operation of this application. Therefore, VOSviewer training is very important to be carried out to equip academics with practical understanding in processing literature data independently, so that they are able to design data-driven research strategies, prepare relevant and targeted scientific publications, and strengthen the competitiveness of scientific works at the national and international levels.

Bibliometric analysis requires alignment between study objectives, data selection, analysis techniques, and interpretation of results (Donthu et al., 2021). Therefore, this activity connects keyword learning with literature search and mapping in one flow. Emphasis is placed on the ability to explain the meaning of search results and maps, so that participants do not equate keywords that rarely appear with automatic evidence of research gaps. The target of the activity is students of the Department of Development Economics, Sultan Ageng Tirtayasa University. The initial problems underlying the activity based on the preliminary interview include students' difficulties in determining the right keywords, limiting keywords according to the research, searching for scopus indexed articles in accordance with the research design, and mapping the research gap as the background of the research. Information about the source of identification of these needs is important to explain the relationship between the participant's problem and the chosen material. The activity aims to equip participants with the basis for keyword determination, search for Scopus documents, and interpretation of keyword mapping using VOSviewer.

Implementation Method

The activity was held on 2026 in Serang for 120 minutes. Participants totaled 30 students from the seventh semester Development Economics with. Participants participated in this activity based on the selection of Monetary concentration. Activities were held in the form of training. The following stages follow the training design and need to be adjusted to the actual implementation. Preparation includes the preparation of materials, evaluation instruments, and the preparation of access to Scopus and the VOSviewer device. The material focuses on the needs of searching the literature on economic research. Examples prepared include unemployment and poverty as well as foreign direct investment and economic growth. At the stage of delivering the material, the speaker explained the separation of the main concept and the context of the research, the selection of English equivalents, and the use of AND and OR. The demonstration of the search used the example of TITLE-ABS-KEY (unemployment AND poverty). Participants were introduced to the reading of titles and abstracts, the use of appropriate filters, and the recording of search strategies. In the mapping stage, the material discussed metadata preparation, keyword co-occurrence, term checking, and interpretation of map elements.

Table 1 Scope of material and form of activity

Components	Key Materials
Keyword determination	Concepts, term equivalents, AND and OR
Scopus Search	TITLE-ABS-KEY, relevance, filters, export
VOSviewer Mapping	Co-occurrence and term cleanup
Interpretation	Nodes, relationships, clusters, inference boundaries
Evaluation	Initial and final tests

Knowledge evaluation used 10 equal multiple-choice questions in the pre-test and post-test. The question material included Scopus function, keyword determination, Boolean operators, TITLE-ABS-KEY, document selection, metadata, co-occurrence, node size, and initial interpretation of research gaps. Each correct answer received 10 points and incorrect answers received 0 points, so the value was in the range of 0–100. Pre-test and post-test data were matched based on NIM, with the participant's name checked if a discrepancy in identity writing was found. In the pre-test recap, one duplicate response with identical answers was found that was counted once. After the examination, 30 complete data pairs were obtained for analysis.

The analysis was carried out descriptively by presenting the number of participants, average, standard deviation, and minimum and maximum scores. The difference in scores was calculated by subtracting the pre-test score from the post-test score in the same participant. The average change was reported in units of points, while the percentage of participants who improved, obtained a fixed score, and decreased was calculated based on the number of participants in each group divided by 30 complete data pairs, then multiplied by 100%. Analysis per question item was also carried out by

comparing the number of correct answers before and after the activity to identify material that still needed reinforcement.

Practice evaluation was carried out qualitatively through the observation of implementers during guided practice and discussion. Observation focused on participants' ability to compile keywords according to the research topic, browse articles through Scopus, and create bibliometric maps using VOSviewer. Participants' difficulties in determining the number and accuracy of keywords so that search results match the scope of the research were used as learning evaluation materials. The results of practical observations were presented descriptively without providing individual skill scores because they did not use standardized assessment rubrics. Therefore, test results were used to describe participants' knowledge, while practical observations were used to explain application achievements and difficulties that arose during the activity.

Result and Discussion

The research literacy strengthening activity was carried out on 2026 in Serang involving 30 students of the Department of Development Economics, Faculty of Economics and Business, Sultan Ageng Tirtayasa University. The implementation of the activity included material presentations, demonstrations, guided practices, and discussions. A total of 30 students had pre-test and post-test data pairs that could be analyzed after one duplicate pre-test response with identical answers was counted once. Thus, the number of participants in the activity was in accordance with the number of participants included in the evaluation analysis.

The material presented included an introduction to the Scopus function, the determination of research concepts and keywords, the use of Boolean AND and OR operators, a search via TITLE-ABS-KEY, document selection, and the preparation of metadata for VOSviewer. The bibliometric mapping material included the analysis of keyword co-occurrence and the basic interpretation of the mapping results. Participants were involved in the practice of arranging keywords according to the research topic, browsing articles through Scopus, and creating bibliometric maps using VOSviewer.

Based on the observations of the implementers during the guided practice, the students successfully carried out all three activities. The main difficulty of the participants lies in determining the number and accuracy of keywords so that the articles that appear in the Scopus search are in accordance with the scope of the research. These findings are the basis for the need for further training in the selection of terms and the preparation of search strategies. The achievements of the practice describe the abilities displayed during the mentoring, while the level of independence of each participant has not been assessed individually.



Figure 1. Implementation of literature search training through Scopus and bibliometric mapping using VOSviewer for students of the Department of Development Economics, Sultan Ageng Tirtayasa University in Serang

Table 2 presents test results on 30 participants who had complete data pairs. The pre-test results showed an average score of 90.67 with a standard deviation of 6.26, while the post-test results showed an average score of 96.67 with a standard deviation of 5.47. The average difference between the post-test and the pre-test was 6.00 points, which showed an increase in the average score of 1.00 points. Participants with increased scores amounted to 4 students (13.33%), while participants with fixed and decreasing scores were 19 students (63.33%) and 7 students (23.33%) respectively.

Tabel 2 Recap of participant knowledge evaluation

Indicator	Pre-test	Post-test
Number of incoming responses	31	30
Number of complete pairs	30	30
Average value of complete pairs	90,67	96,67
Default deviation	5,47	6,26
Minimum–maximum values	80–100	80–100

Practice evaluation examined participants' ability to relate research concepts to search terms. In the example of unemployment and poverty, attention was paid to the suitability of keywords as well as the use of Boolean operators to connect concepts. Based on the observations of implementers during guided practice, participants were able to compile keywords and search for articles through Scopus. The difficulties found were mainly related to determining the number and accuracy of keywords so that the search results were in accordance with the scope of the research. These difficulties became the focus of mentoring and discussion on the suitability of search terms with the chosen topic. This achievement was reported descriptively because there was no recap of individual assessment of participants' training outputs.

In the literature mapping, participants followed the practice of making bibliometric maps using VOSviewer. Based on the observations of the implementers, participants managed to make maps during the guided practice. However, the number of maps examined individually, examples of participants' interpretations, and errors in the selection of analysis units and term cleaning have not been documented in detail. Therefore, the achievements of the practice are limited to the implementation of map-making during mentoring and have not been used to conclude mastery of all stages of analysis

independently. Follow-up evaluation needs to check the suitability of the analysis arrangements, the consistency of terms, and the accuracy of participants' explanations of the mapping results.

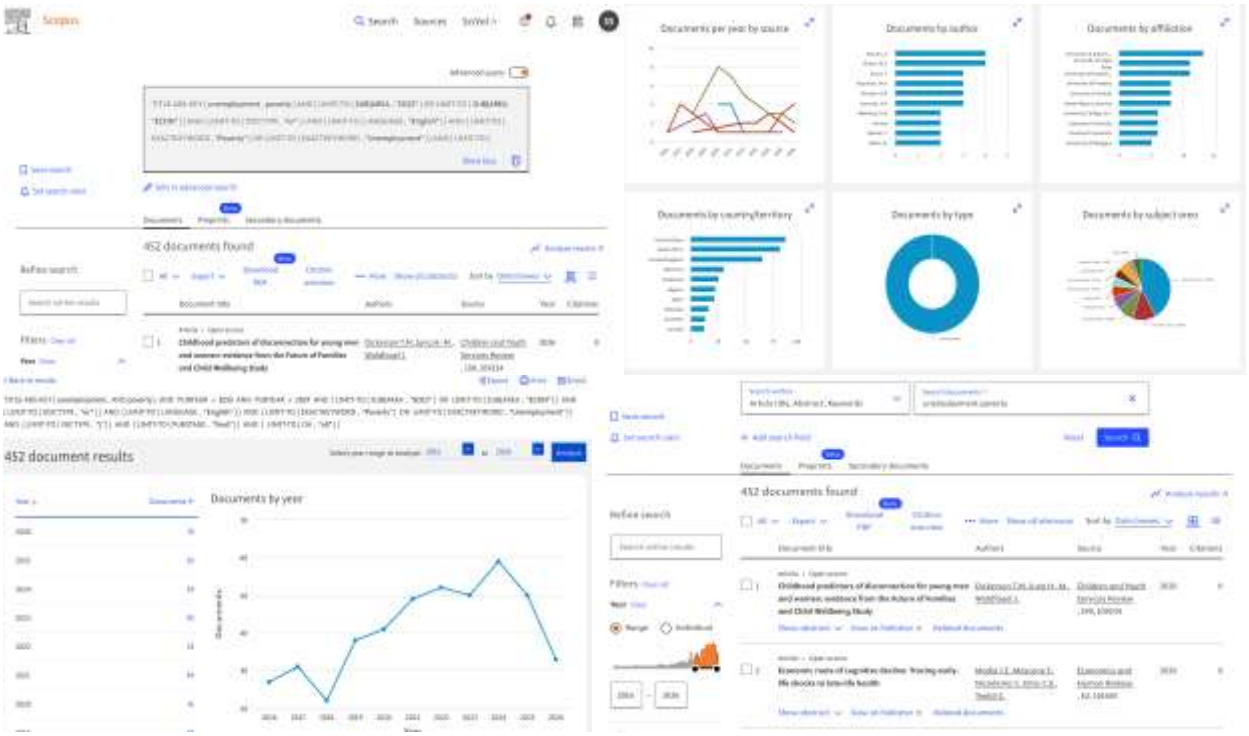


Figure 2. Search results of unemployment and poverty literature in Scopus used in training demonstrations

The series of materials places literature search as a process that can be improved after participants check the initial results. This approach is consistent with the strategic exploration framework in information literacy (Association of College and Research Libraries, 2016). In this activity, the relevance of learning can be seen from the difficulty of participants determining the number and accuracy of keywords so that the Scopus search results are in accordance with the scope of the research. The findings show the need for term selection exercises and the use of Boolean operators based on the suitability of search results. However, because the examples of changes in search strategies for each participant have not been documented in detail, this activity has not been able to show the pattern of keyword revision or changes in search ability individually.

The relationship between bibliometric maps and research gaps also requires attention. The low frequency of keyword occurrences can be influenced by the scope of the database, the year limit, the search term, and the selected appearance threshold. Therefore, the map in this training is used as an exploration material that needs to be examined through the reading of articles. The results of the evaluation show that the correct answers to the question of the interpretation of the infrequently appearing keywords increased from 21 to 27 students. These findings show that the initial interpretation of the research gap still needs strengthening, especially the understanding that the infrequent keywords are not enough to prove the existence of the research gap.

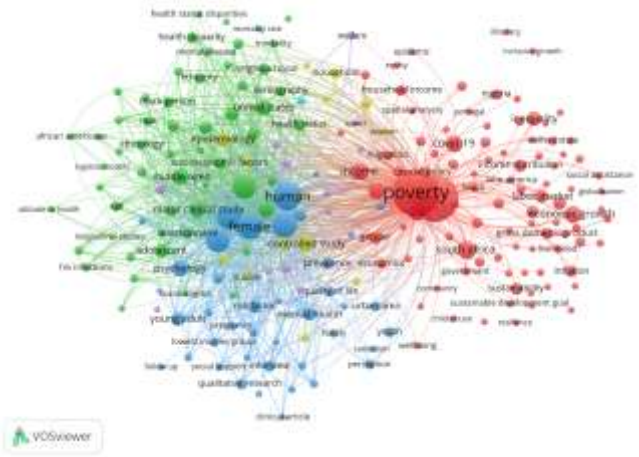


Figure 3. Keyword co-occurrence map of Scopus search result metadata used as VOSviewer practice material.

The limitations of evaluation include the use of one group without a comparator and the same question instruments in the pre-test and post-test. The repetition of questions allows the effect of familiarity on the answers, so that the change in score cannot be fully attributed to the training. In addition, practical achievements are assessed through the observation of the implementer without a standardized individual assessment rubric, so that the level of mastery of each participant's skills cannot be systematically compared. The evaluation carried out immediately after the activity also does not reflect the sustainability of the participants' ability to apply skills independently. Conclusions about the ability to prepare proposals, the quality of thesis, or scientific publications require further assessment and observation.

Conclusion

Scopus and VOSviewer training activities have been carried out to support the research literacy of 30 students of the Department of Development Economics, Sultan Ageng Tirtayasa University. The material includes keyword determination, use of Boolean operators, search and selection of articles through Scopus, as well as creation and basic interpretation of bibliometric maps using VOSviewer. Based on the evaluation of 30 complete data pairs, the average pre-test score of 95.67 and post-test of 96.67 showed that an increase in knowledge was detected through the overall score. In several previous papers, the results of pre-test and post-test evaluations from various training programs showed that the VOSviewer training intervention succeeded in significantly improving participants' understanding and technical skills, changing the initial conditions that the majority were unfamiliar with to being able to operate the software with a success rate of 75% to 85% (Akhmad & Satrianingsih, 2025; Bato et al., 2025; Juliansyah et al., 2024; Putra et al., 2024; Sudrajat et al., 2022).

Observations during the guided practice showed that participants were able to compile keywords, search for articles, and create bibliometric maps, but the mastery of skills independently had not been assessed using individual rubrics. The main difficulty of the participants lies in determining the number and accuracy of keywords so that the search results match the scope of the research. The recommended follow-up is

independent exercise based on student research topics, accompanied by evaluation of the accuracy of search strategies and literature interpretation.

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