

Chamilo LMS Research Trend: A Systematic Literature Review

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Abstract

Chamilo is an open-source Learning Management System that is rarely known by campus communities in Indonesia, even though this LMS has been published for quite some time. Very little research is related to Chamilo compared to other LMS such as Moodle. This study will examine research trends over the past ten years using the Systematic Literature Review method. The subjects studied were taken from the Dimension and Scopus databases. The tools used are VoS Viewer and Mendeley software. The unit of analysis used is the "co-author," which is studied deductively. In addition, the type of "co-occurrence" is also used to see the keywords that are most often used in research. The research results showed that 69% of all articles were from Indonesia. The type of development research also dominates articles originating from Indonesia. The most dominant keyword besides Chamilo itself is e-learning. Several research keywords that are not included in the occurrence analysis unit have the potential to be studied.

Keywords:

Chamilo; LMS;
Systemtic
Literature Review;
SLR

INTRODUCTION

Chamilo is an open-source online learning platform built in 2010. This platform is a development of the previous platform, namely Dokeos, which is widely used in Latin America and Europe (Maes, 2010). Chamilo is an online learning platform with an attractive and unique interface because it is icon-based, has various features, and is easy to use. This platform is a Learning Management System (LMS) because it has at least five main requirements for an LMS: administrative features, delivery of teaching materials, exam features, assessment features, and communication features. However, Chamilo is wider than these five features. There is an attendance feature that can be used to record student attendance. There is a report feature that contains student progress information. A learning path feature can be used to set the direction of the learning process, including video conferencing features that have been integrated into the Chamilo LMS. Chamilo also supports multiple languages so that it can be used globally.

In its function as an online learning platform, the features for delivering teaching materials must function optimally. This platform supports various office files such as Word, ppt, excel, and pdf. Including multimedia files such as videos and audio, so transferring teaching materials is fine. This LMS is not only used in education but can also be used in a company.

Research on Chamilo is still limited and tends to focus on usage and user experience with the platform. Most use of Technology Enhanced Learning, such as LMS, supports creating and delivering online courses (Mohssine et al., 2021). Some researchers use the development method by designing and building learning media using Chamilo (Astriawati & Djukri, 2019; Febryana & Pujiastuti, 2020). The products obtained from the design are then used in the learning process, and their effectiveness

is measured in managing online learning (Aloni et al., 2022; Chasani & Sari, 2023). Some measure the feasibility of use (Bakri & Mulyati, 2017; Yulita et al., 2018), while others measure the practicality of the media (Rosmandi et al., 2021; Tiari et al., 2020; Wati et al., 2022). On the other hand, using Chamilo as an online learning tool can track students' activities and independent learning processes (García et al., 2019). Learning materials stored in the system allow students to repeat learning as many times as desired (Santoso et al., 2020).

Chamilo's advantages compared to other LMSs are that Chamilo is an open-source LMS. Open to be developed according to the capabilities of its users. In addition, Chamilo has a unique interface compared to other LMS. The Chamilo interface is icon-based, so it is easy to use, both by teachers and students. Chamilo is designed to be responsive, that is, to adjust the interface's shape on the various devices used. Thus Chamilo can be easily accessed using a laptop, desktop computer, gadget, or smartphone.

The age of the Chamilo LMS is very far from the Moodle LMS, which has been around since 2002, so its popularity is also very different. One thing that can be used as an indicator is the number of studies. On May 5, 2023, in the same database (Dimensions) with the same filter, the number of Moodle studies from the last ten years was 6497, while Chamilo only had 47 publications. The number of articles per year in the last ten years can be seen in Table 1.

TABLE 1. Number of articles in the last 10 years

No.	Tahun	Jumlah Artikel	
		Moodle	Chamilo
1	2023	191	1
2	2022	1102	7
3	2021	1251	10
4	2020	894	7
5	2019	686	6
6	2018	593	5
7	2017	547	3
8	2016	423	4
9	2015	430	3
10	2014	380	1
Total		6497	47

This data shows that Chamilo users are still very few compared to Moodle LMS. In fact, in terms of age, Chamilo has been developed for quite a long time. What causes this LMS not to be well known by the public? This problem is an exciting topic that needs to be studied. In terms of appearance, Chamilo is more interesting than Moodle because the menus are icon-based. In terms of features, it is equal to the features provided by Moodle. However, it can be seen from the list of published articles that there still needs to be more research on Chamilo.

The small amount of research on Chamilo allows researchers to explore more interesting topics related to the use of Chamilo. Therefore, this research focuses on finding out what topics have become a research trend in using Chamilo in the last ten years and what topics have the potential for further research.

METHOD

This research is a Systematic Literature Review research. The tool used to analyze the data is the VoS Viewer software. Journal articles used as research subjects were taken from Dimension and Scopus databases. The process of screening articles to produce research subjects uses the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analysis) process. This process consists of 3 stages: (1) Identifying relevant topics; (2) Filtering documents; (3) Submitting articles for analysis, synthesis, and description.

Identifying relevant topics is not difficult because the search only uses one keyword, "Chamilo," with the type of journal articles and proceedings in 2014-2023. The number of journal articles in the Dimension database was 42, and the Proceedings were 5. Meanwhile, from the Scopus database, in the same year, there were 12 articles. Of these 59 articles, only articles in English or Indonesian were taken. In summary, PRISMA's process of selecting research subjects can be seen in figure 1.

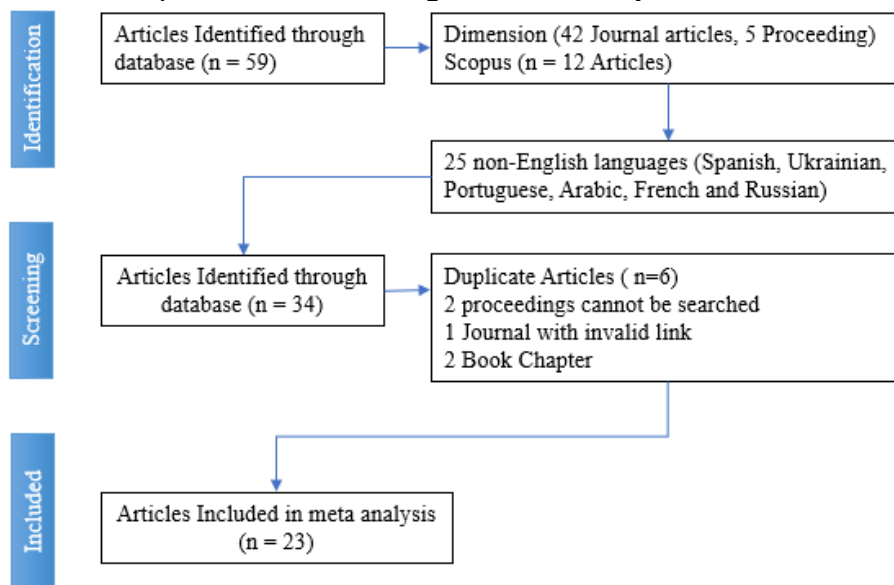


FIGURE 1. PRISMA Poces

The metadata of the twenty-three articles is then inputted into the VoS Viewer and processed. The types of analysis used to describe the data are co-authorship and co-occurrence types. Analyzing the data through the co-occurrence type requires the RIS file, which is obtained directly from the dimension database. However, the information regarding the keywords for each article is rechecked using Mendeley. Meanwhile, data analysis of the co-authorship type requires a CSV file that is directly retrieved from the dimension database. The description of the data on the co-authorship type will be explained deductively, starting from the author's country and organization to the author himself.

RESULTS AND DISCUSSION

The results of this study will be presented following the types of analysis used as follows.

Analysis of Co-Authorship (Countries)

The authors of the 23 articles that were the subject of this study came from 9 countries, including Indonesia, Australia, Vietnam, Morocco, Czech Republic, Slovakia, Colombia, Spain, and Denmark. Only Spain and Denmark are connected by

an article from Katia CezÃ³n GarcÃ³a et al. among these nine countries. This condition shows that collaboration between countries is still lacking. Indonesia ranks first in the category of the most number of articles, namely 16, but none of them collaborates with writers from other countries. For the rest, each country has only 1 article.

Analysis of Co-Authorship (Organizations)

Of the 23 existing articles, around 27 organizations were recorded, be it universities, high schools, or high schools. Some of them are connected and form separate groups because there is a collaboration between authors between organizations. However, the groups were not related. The five groups include Harapan Bangsa University in Purwokerto and STMIK Komputama Majenang Cilacap; SMPN Mandau and Riau University; MA Salafiyah Syafi'iyah and Semarang State University; Royal Botanic Garden, Spain, and GBIF Denmark; and the last group is Telkom University and ITB. The other 17 organizations are not connected to any organization.

Analisis of Co-Authorship (Authors)

The total authors of the 23 documents are 65 people. Authors who had at least two documents were taken, and obtained four people who met the requirements, namely Siahaan, Wati, Wiyono, and Bakri.

TABLE 2. Authors Who Had at Least Two Documents

No.	Author	Documents	Citation
1	Siahaan, Sardianto Markos	3	0
2	Wati	2	0
3	Wiyono, Ketang	2	0
4	Bakri, Fauzi	2	8

Table 2 shows that the author with the most articles is Siahaan from the Postgraduate Program in Educational Technology, University of Brawijaya. The first three authors are connected (see Figure 3), indicating they collaborated on several writings. Unfortunately, the collaboration is only within the same university.

If a minimum requirement of 1 document is selected and the minimum citation limit is 4, then the list of authors fulfilling it can be seen in the table 3.

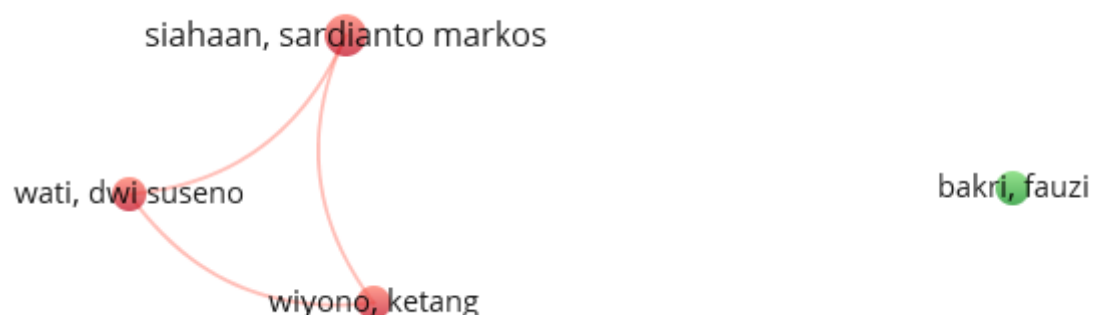


FIGURE 2. Collaboration of Multiple Authors with a Minimum of Two Articles

TABLE 3. Authors With at Least One Article and Four Citations

Author	Documents	Citations	Total Link Strength
Abdelwahed, Namir	1	4	3
Mohammed, Aitdaoud	1	4	3
Mohammed, Talbi	1	4	3
Mohsinne, Bentaib	1	4	3
Agredo, Patricia Media	1	5	2
Enriquez. Jackeline Amparo Villota	1	5	2
Valencia, Heriberto Gonzalez	1	5	2
Bakri, Fauzi	2	8	1
Mulyati, Dewi	1	5	1

From table 3 can also be seen that the author whose articles are most frequently cited is Bakri from Jakarta State University, Indonesia. One of the writers is Mulyati, with a total of 5 citations. The other authors who get five citations are Agredo, Enriquez, and Valencia, a collaboration of authors in 1 article.

Analysis of Co-Occurrences

Recorded about 69 keywords from 23 articles. Selected keywords often appear at least twice, and six groups of related keywords can be seen in Figure 3.

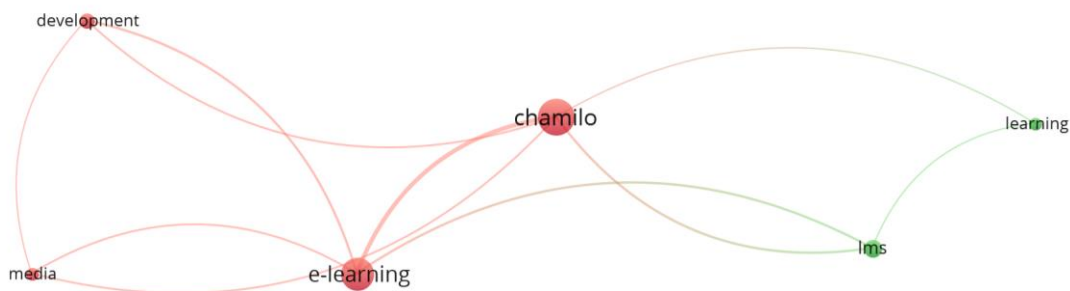


FIGURE 3. Keywords That Appear At Least Twice and Are Connected to Each Other

The largest circle indicates the keyword that has the most occurrences. The frequency of occurrence of these words in the article keywords can be seen in Table 4.

TABLE 4. The Number of Keyword Occurrences and The Strength of The Links.

Keyword	Occurences	Total Link Strength
Chamilo	16	18
E-Learning	13	18
LMS	4	7
Development	3	6
Media	2	5
Learning	2	2

Discussion

Author collaboration between institutions in this field still needs to be improved, especially collaboration between writers from different countries. Most author collaborations occur within their respective organizations. Of the 23 articles, only 1 article was written by two countries. At the same time, collaboration between

institutions and countries allows access to diverse resources and expertise. Each author can bring their unique perspective and knowledge, thus increasing the article's quality, believability and completeness. The collaboration allows articles to undergo a rigorous peer-review process involving experts from various backgrounds. As a result, articles tend to be more comprehensive, accurate and have a broader understanding of the discussed subject.

By involving writers from various institutions or countries, journal articles have the potential to reach a wider audience. This condition can increase research visibility and broaden its impact within the global academic community. Articles that are collaborated nationally and internationally can also reach readers from various cultures, languages, and contexts, enriching the understanding and application of research results. In addition, collaboration in writing journal articles between countries can strengthen international cooperation in the academic field. Authors can form networks and relationships with colleagues from various countries through this collaboration process. This condition can open the door for further collaboration, such as joint research, knowledge exchange, or other collaborative projects.

From the results of the visualization of the keyword network often used in articles, Chamilo should be in the order of the highest frequency because it is the main topic. Because Chamilo is an LMS commonly used as an e-learning medium, the keywords LMS, e-learning, and media should be connected. The second keyword after Chamilo is e-learning which LMS then follows. However, keywords like "development" are of little concern. In the table, there are only about three appearances, even though out of 23 articles, ten talks about media development. The ten articles use Research and Development research, and all come from Indonesia (Aloni et al., 2022; Astriawati & Djukri, 2019; Bakri & Mulyati, 2017; Chasani & Sari, 2023; Febryana & Pujiastuti, 2020; Nurkhofifah et al., 2022; Rosmandi et al., 2021; Tiari et al., 2020; Wati et al., 2022; Yulita et al., 2018). Of the ten articles, only three specifically use the keyword "Development" so that what is detected by the VoS software is correct (Astriawati & Djukri, 2019; Nurkhofifah et al., 2022; Rosmandi et al., 2021). Most research on Chamilo from Indonesia is developmental research (R&D). They use ADDIE, Plomp, Dick and Carey, and Alessi and Trollip models. Data collection techniques and data analysis are almost the same, namely using a questionnaire that measures the feasibility and practicality of the media.

Other articles discuss Chamilo's ability to track students' independent learning activities, Chamilo's ability to help reach a broader community in training programs, and its benefits in increasing student participation in class (García et al., 2019). This article is the only article that collaborates between countries. Chamilo can indeed be used for independent learning or asynchronous learning because of its ability to manage teaching materials storage very well. Videos and presentations that can be accessed at any time and can be repeated as many times as desired can improve the absorption of material for the better (Santoso et al., 2020).

Several articles were also made for teacher training to introduce them to technologies that can be used in distance learning management (Sholihatin et al., 2021; Sumantri & Alfiah, 2022).

From all the keywords found and the results of the review of each article, research using Chamilo is still very wide open for research. One of the topics that can be used as research material is assessment. Chamilo has a complete assessment feature with various questions ranging from multiple choice, true-false, matching,

essay, and even questions with voice answer types. The available assessment features can also be developed into gamification topics in learning. In addition, the topic of collaborative learning and mixed learning can also be used as the primary research topic. Other topics that might be of interest are the factors that influence the use of Chamilo, the perceptions of teachers and students towards the use of Chamilo, the integration of Chamilo with other systems, and many more.

CONCLUSION

From the results of the research presented, the topic that has become a research trend in using Chamilo in the last ten years is still about using Chamilo on behalf of development research. In contrast, topics that have the potential to be studied further include: (1) Factors that influence the use of Chamilo; (2) Chamilo integration with other systems; (3) Data analysis and decision making; (4) Use of Assessment on Chamilo and so on.

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