

## SOCIAL MEDIA IN COLLABORATIVE LEARNING: A SYSTEMATIC LITERATURE REVIEW

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### Abstract

Adopting social media in Collaborative learning demarcates a boundary of novel pedagogy. Collaborative learning is a behaviour that can affect the teacher's and learners' cognition and, hence, pedagogical psychology. The concept can be used to facilitate a wider remote community for teaching and learning purposes. Thus, it has brought up the lacuna of a study explaining the empirical research ecosystems associated with the topic area. The main objectives of the study are (1) to investigate the existing knowledge landscape on social, collaborative learning with social media and (2) to areas where empirical research is lacking. The PRISMA guidelines followed the systematic literature review method. Scholarly journal articles published between 1980-2023 were queried through the Lens.org database, where 63 articles were selected for the final review. Bibliometric analysis was conducted using Biblioshiny and RStudio, and the VOSviewer package was used to conduct network visualization and density visualization analysis. Results revealed a relationship between social media adoption and collaborative learning. Existing knowledge was mapped and described using visualization maps to capture the extent of the existing research conducted and highlight the links between each article used in the analysis. A new qualitative tool, Word Cloud, highlighted the study areas. It was found that there could be a relationship between the psychological aspects of teachers and learners while adopting social media into pedagogy. Thus, if available, further research needs to be conducted to identify and regulate such issues. Research areas lacking empirical research must be addressed with future possible research since there is a trending incline in research. The same systematic review can be repeated with at least two research databases to minimize the change of missing possible articles in the review. However, pilot studies, at pure and applied levels, need to be conducted prior to the practice of social media adoption in collaborative learning, and they must be conducted through policy background.


**Keywords:** Collaborative Learning, Social Media, Learning, Learning In Metaverse

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## **Introduction**

Pedagogy is one of the most affected sectors by social media (Bui et al., 2023). Collaborative learning (CL) is a strategy that allows learners to learn, create, and share thoughts among collaborators of similar interests to learn and solve problems without boundaries (Zhou & Ye, 2024). Collaborative learning enables learners to overcome the conventional boundaries of learning and connect with people with similar interests. Learners can meet their information and behavioural needs in collaborative learning environments. The new collaborative platforms, such as social media, are instantly responsive and highly interconnected. There are many individuals connected through social media and professional platforms worldwide. Thus, social media provides a perfect platform to interconnect diverse people with diverse knowledge, experiences, and perspectives through a single platform to interact and share. It fosters learning in novel concepts such as the metaverse. 'Metaverse' is an attractive digital environment that blends virtual reality (VR) and augmented reality (AR) technologies (Sharma et al., 2023). It encourages more interactions to gain personalized learning experiences such as collaborative learning, immersive learning (Onopriienko et al., 2023), learner-led learning, project-based learning, real-world simulation, and many other technologies as learning tools (Sharma et al., 2023).

In contrast, Generation change highly impacts new teaching, learning, and assessment methods in the pedagogy (Marrero Galván et al., 2023). There is a tendency among digital natives to adopt and rely on web technologies to fulfil their information needs (Aljović, 2024). Thus, the other factor that impacts pedagogy is the evolution of Web technologies. Technical advancements while evolving web technologies from Web 1.0 to Web 5.0 make this transformational impact on the pedagogy.

In parallel, the industrial revolution and globalization concepts have shed light on this transformation of new pedagogical approaches. Simultaneously, generation dynamics are also becoming a driving force for pedagogical transformation. Somaratna & Uzwyshyn (2024) highlighted the impact of the generation changes on university libraries, even transforming the term "library" towards "learning resource centres". Combining all these concepts and novelties makes the required provisions for collaborative learning through social media, which will impact the desires of the related generations.

On the other hand, university libraries are pivotal in supplementing teaching and learning across a cascade of generational variations. Thus, investigating collaborative learning via social media platforms has a timely value in higher education and the university library sector. It will also shed light on the timely populating pedagogies and pedagogical approaches such as MOOCs, Blended learning, edge learning, meta-learning, digital storytelling, adopting Artificial intelligence in learning, etc. The main objectives of the present study are to 1) investigate the current knowledge on the use of social media for collaborative learning and (2) areas where empirical research is lacking.

## **Method and Methodology**

### ***Article selection process and method***

A systematic literature review (SLR) method was followed in the research (Hasan, 2024; Lau, 1997; Mednarodno et al., 2021). SLR has given significant consideration in article selection through an inclusion criterion and analytical method (Priyashantha et al., 2022). Article selection was accomplished by the PRISMA 2020 guidelines (Page et al., 2021), which are recommended for SLRs (Page et al., 2021).

Accordingly, "identification", "screening", and "including" steps were followed in the procedure (Figure 1).

In the identification phase, search term determination, developing the search criteria and search query, identification and selection of databases, and data extraction methods were considered. Based on the key search area, "social media use in collaborative learning" was queried, including the terms "social media" and "collaborative learning". Search queries were run in the Lens.org database with the AND Boolean operator. Gureyev et al. (2023) analyzed the 'Dimensions' and 'Lens.org' databases, highlighting their competitive advantages over subscription-based platforms in terms of research content coverage and functional capabilities. These systems offer effective monitoring of scholarly output and enhanced visibility of research findings. Similarly, Pastor Ramon and Rovira (2023) conducted a scoping review of major scientific search engines, including Web of Science, Scopus, Google Scholar, Dimensions, and Lens.org. It concluded that Lens.org and Dimensions offer broader coverage but have limitations. However, the researchers could not access the SCOPUS database in Sri Lanka and continued the article selection relying on Lens.org. Recent studies followed similar methods applied the same method (Dogra & Priyashantha, 2023; Varsha P S et al., 2024).

Screening is a mandatory step in the PRISMA 2020 updated guidelines. Thus, all the identified articles were screened according to the pre-defined inclusion criterion and then by an eligibility criterion (Priyashantha et al., 2022; Timothy, 2006). Article selection and screening were done automatically and manually through the Lens.org database according to the selection criteria. The results were limited to "empirical studies" where published in "English" language and "Journal articles" with publication date between "1980-2023" through the Lens.org database. Automatic screening limitations were applied with the keywords "Social media" and "Collaborative learning" included in the Title of the article. The PRISMA guidelines defined the selection criteria accordingly (Dogra & Priyashantha, 2023; Priyashantha et al., 2022). While selecting the source documents, only the Journal articles were considered and research notes, editors' comments, books, book chapters, book reviews, conference proceedings and unpublished data were omitted (Dogra & Priyashantha, 2023; Priyashantha et al., 2022). These steps assure the methodological quality, homogeneity and validity of the relevant findings. Further, the eligibility assessment was done manually by assessing the minimum acceptance level (Timothy, 2006), which is the methodological quality, and only the "empirical studies that practised quantitative methodologies" were screened manually (Laursen et al., 2024).

### **Risk of bias assessment**

As highlighted by Priyashantha et al. (2022), there could be a risk of bias associated with article selection and analysis. Thus, a methodological remedy was applied while conducting the study to minimize the biases associated with the methodology. These are adopting a review protocol, assuring a thorough article screening process (Figure 1), and performing an independent quality assessment of each article manually. Ultimately, following all those steps will avoid the biases in the article section and analysis (Dogra & Priyashantha, 2023; Priyashantha et al., 2022).

### **Method of analysis**

A bibliometric analysis was conducted using Biblioshiny and VOSviewer packages (van Eck & Waltman, 2010, 2023). VOSviewer is essential for visualizing bibliometric networks (Priyashantha et al., 2022; Van Eck & Waltman, 2014). This analysis provides two types of analysis: (1) evaluation, performance, and

scientific productivity analysis, and (2) scientific maps Dogra & Priyashantha, 2023; Maliha, 2024). Different bibliographic information is available in articles, known as "unit of analysis", and was used to draw the maps known as bibliometric networks (Cárdenas et al., 2024.) Dogra & Priyashantha, (2023) and Sinaga et al. (2024) highlight that "keywords" are the most widely used and accepted unit of analysis. Thus, recent studies rely on keywords to conduct the bibliometric analysis using the data obtained.

Similarly, the co-occurrence of unit of analysis (keywords) in articles can derive links between different studies (Dogra & Priyashantha, 2023). "keyword co-occurrence" network visualization maps were used in the analyzing data in this study. The software platform used in the analysis in this study is VOSviewer, which can normalize network visualizations. It is associated with the strengths between different keywords (representing different topic areas and studies in consideration) and derives a two-dimensional network diagram. This network diagram depicts strongly related units of analysis (keywords) into nodes and organized them nearby and weakly related keywords far away from each other (van Eck & Waltman, 2023). These closely related nodes are then clustered by the VOSviewer, where closely related nodes accumulate into the same cluster. Those clusters represent a common topic (study area). Clusters and nodes can be stained with colours according to their relative availability and association with each other since one of the objectives of this study is to investigate the availability of existing empirical studies related to "using social media in collaborative learning" The keyword co-occurrence analysis was adopted.

The second objective of the study was to find out where the empirical evidence is lacking in the topic area ("using social media in collaborative learning"), (item) density visualization based on keyword co-occurrence was applied. According to the VOSviewer manual, "keywords' density at each position in the item density visualization map is denoted by colour range from blue to green to red by default. The closer a position's colour is to red, the greater the number of items in its proximity and the higher its weight. If fewer items are in a certain point's proximity and the weights are lower, the point's colour will be closer to blue. If items in a point are average, the colour is green" (van Eck & Waltman, 2023, pp. 10-11). Thus, the studies that fall into the green or blue areas in the density visualization map will serve as the inputs to achieve the study's second objective.

In addition to the scientific mappings, countries of document production and Cloud world maps according to the topic area were generated based on the RStudio and word cloud generators.

## **Results and findings**

### ***Study selection***

The study follows the PRISMA flow diagram to identify the required articles. Initially, 32 121 resulted in the search query in the identification stage. Through the automatic screening options available in the Lens.org database, only the keywords "social media" and "collaborative learning" contained in the Title of the article were filtered, and the rest were excluded (n=31,954). At the same time, the articles were filtered again according to the source, where only the Journal articles were considered, and the rest of the resulting articles (n=92) were excluded. Seventy-five articles were identified at the end of the initial identification step. These articles were further screened, where the final journal articles that were written in the English language (n=05) and four (n=04) duplicated were excluded, resulting in 66 articles for the next step of the PRISMA flow (Figure 01). The resulting bibliographic information was exported to the Microsoft Excel 365 application, and each article was independently reviewed for screening. Two (n=02) articles were

excluded depending on the eligibility criteria, whereas article methodologies were not quantitative. Another (n=01) editorial was excluded since it did not fit the eligibility criteria, and the methodology was unclear. Finally, 63 articles remained in the study for review, and Figure 1 depicts the logical flow in the PRISMA flow diagram. The bibliographic information of these articles was exported to Microsoft Excel and Zotero applications to fill in the missing information and modified to fit the analytical requirements to achieve the research objectives.

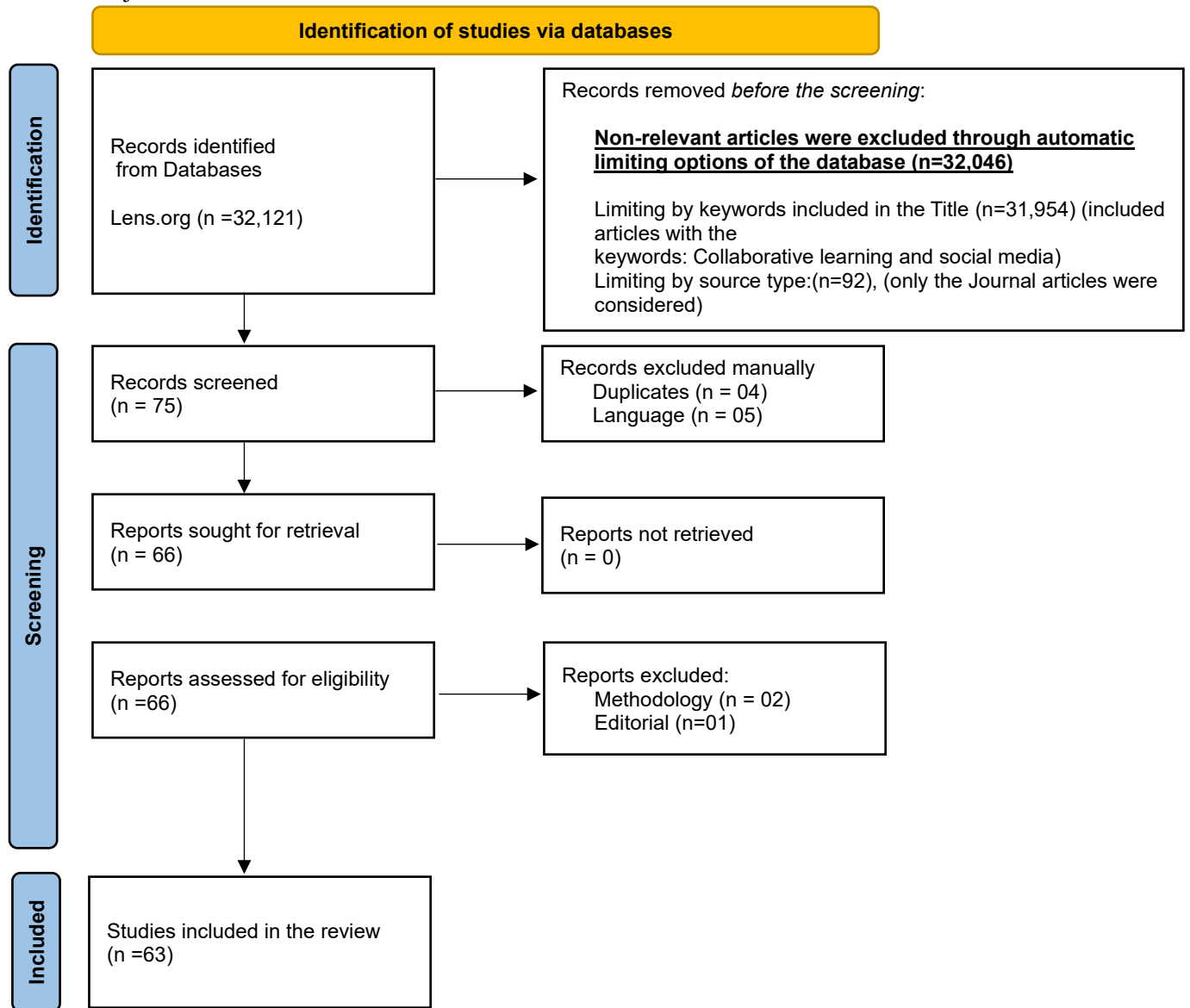


Figure 12: PRISMA article selection flow diagram

Source: Authors compiled, 2024

### Study characteristics

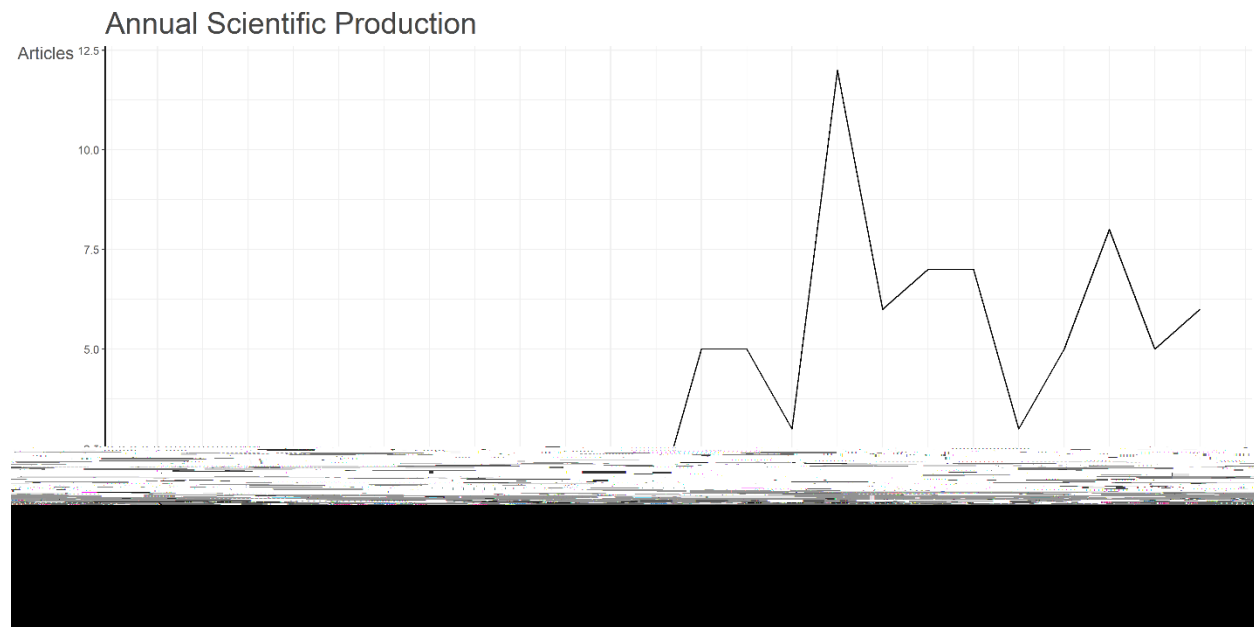
The review considered 63 articles authored by 166 authors from 32 countries and published in 64 journals with 1564 references. This information is summarized in Table 1.

**Table 2: Primary information about the article set**

Description	Results
Time span	1980:2023
Journals	63
Countries	32
References	1564
Journal articles	63
Authors keywords	18
Authors	166
Scholarly citations	1802

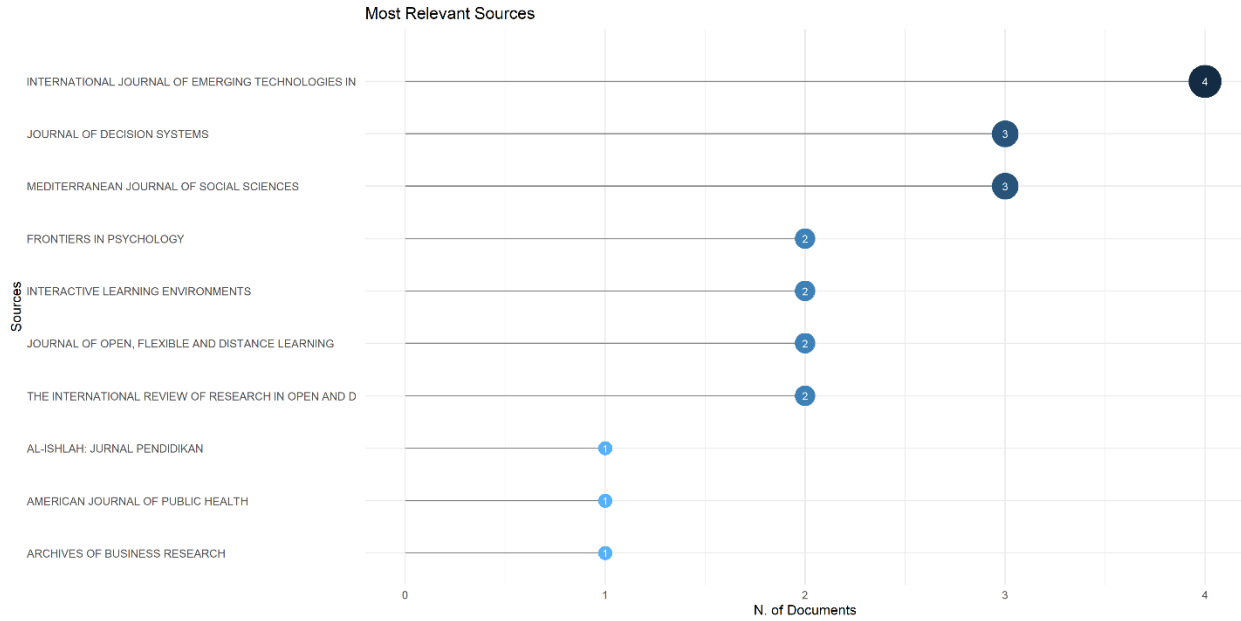
**Source: Authors compiled based on Lens.org analysis, Bibliometrix analysis through RStudio, 2024**

Figure 2 depicts the annual scientific article production. The scientific production of research on the use of social media in collaborative learning is a gradually growing trend. It will also be evident that most of the research was conducted during 2014-2016. The growing interest may also affect the enhancement of citation scores up to 1802 (Table 1). International Journal of Emerging Technologies in Learning (IJET) recorded the top of the most relevant sources in the field (Figure 2). According to Figure 3, the topmost relevant author out of ten authors was Waleed Mugahed AL-Rahmi (AL-RAHMI WM), whose ORCID was <https://orcid.org/0000-0002-0980-7439>. The same researcher has maintained publication records in the related research areas since 2014 (figure 5). Thus, future research can consider this author's work and possibly be associated as a co-researcher or a supervisor in graduate studies.



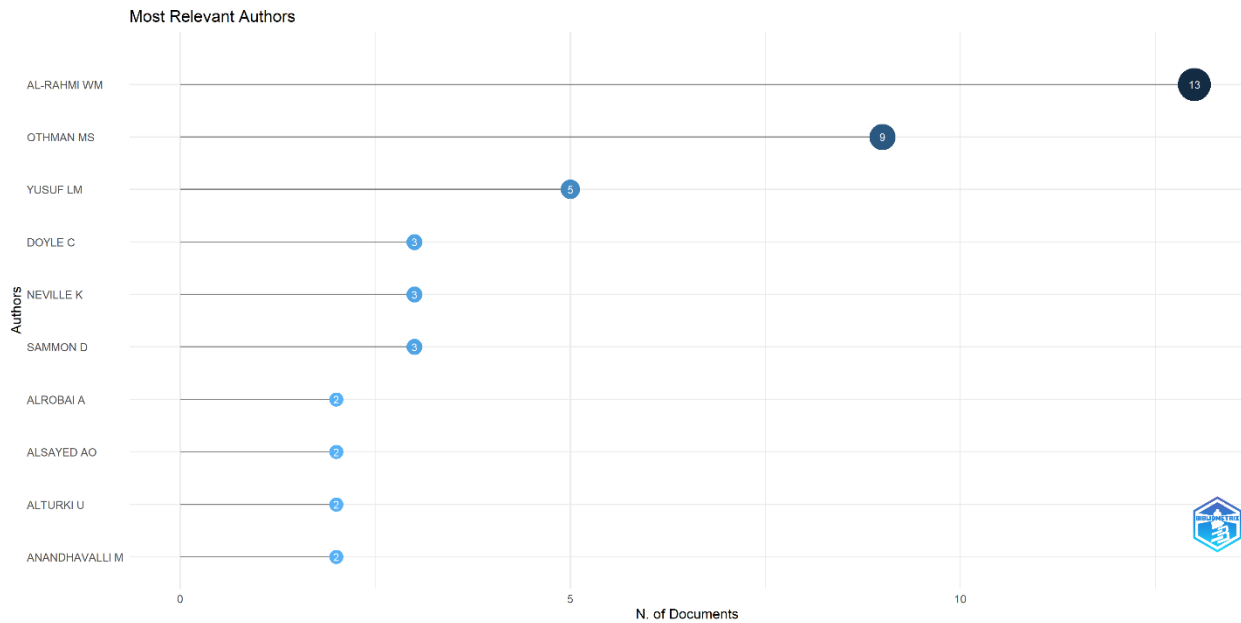
**Figure 13: Annual article production**

**Source: Authors compiled based on Bibliometric analysis through RStudio, 2024**



**Figure 14: Most relevant sources**

**Source: Authors compiled based on Bibliometric analysis through RStudio, 2024**



**Figure 15: Most relevant authors**

**Source: Authors compiled based on Bibliometric analysis through RStudio, 2024**

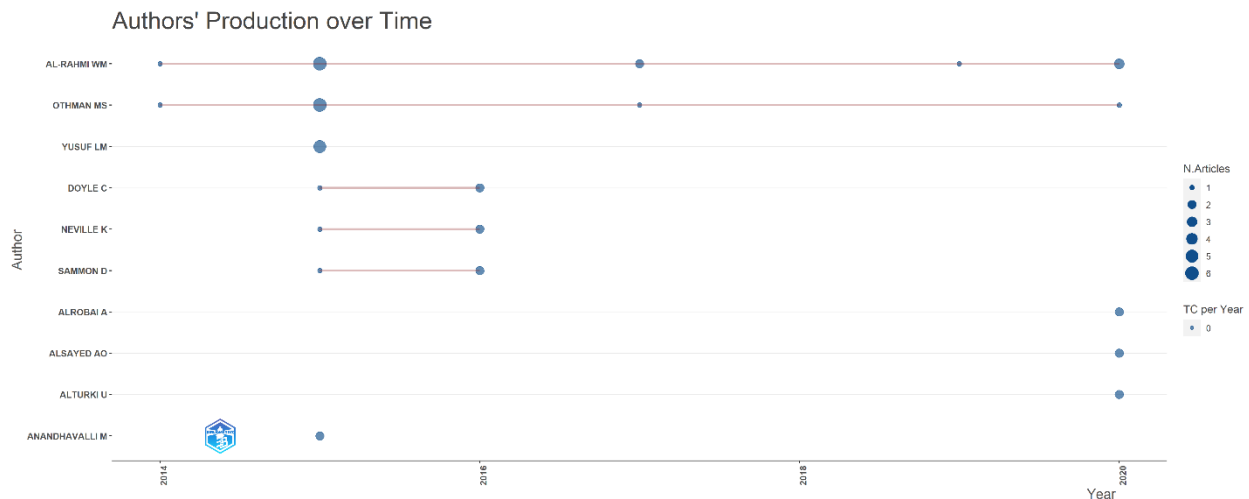


Figure 16: Authors production over time

Source: Authors compiled based on Bibliometric analysis through RStudio, 2024

### Results of the study

A study was conducted to achieve two objectives: 1. Current empirical knowledge in the field and 2. Investigate where the empirical evidence is lacking. This section reports that the findings comply with these objectives. Two keyword co-occurrences, "Network visualization" and "Density visualization", were aided in achieving the research objectives.

#### Current knowledge in adopting social media for collaborative learning

Figure 6 showcases the connection between each keyword in the nodes. The thickness of the connecting lines characterizes the relationships between nodes. Thicker lines are evident between social media and collaborative learning, social media and higher education, and collaborative learning and higher education. The larger diameter of nodes representing collaborative learning (Red) and social media (blue) depicts the volume of articles using the keywords in common. The Technology acceptance model (TAM) shows a direct relationship between students' use of social media for collaborative learning (Aliyu et al. B., 2022). Higher education faculties have adopted social media to support students to develop 21st-century skills essential to face institutional, individual, and pedagogical barriers (Machado et al., 2024). Collaborative learning has positively impacted students' academic performance and knowledge construction in higher education. Nagina Nazeef et al. (2024) found that student interactions with peers and teachers and social media use contribute to effective collaborative learning and improved academic outcomes in teacher education programs.

Similarly, (Ouyang et al., 2024) developed a Collaborative Argument Map (CAM) tool to support collaborative knowledge construction in online writing activities. Their study demonstrated that the CAM tool enhanced students' cognitive engagement and the quality of their collaborative writing products. The connections between the nodes, collaborative learning, social media, and academic performances have strong relationships.

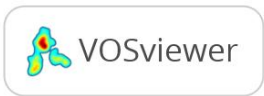
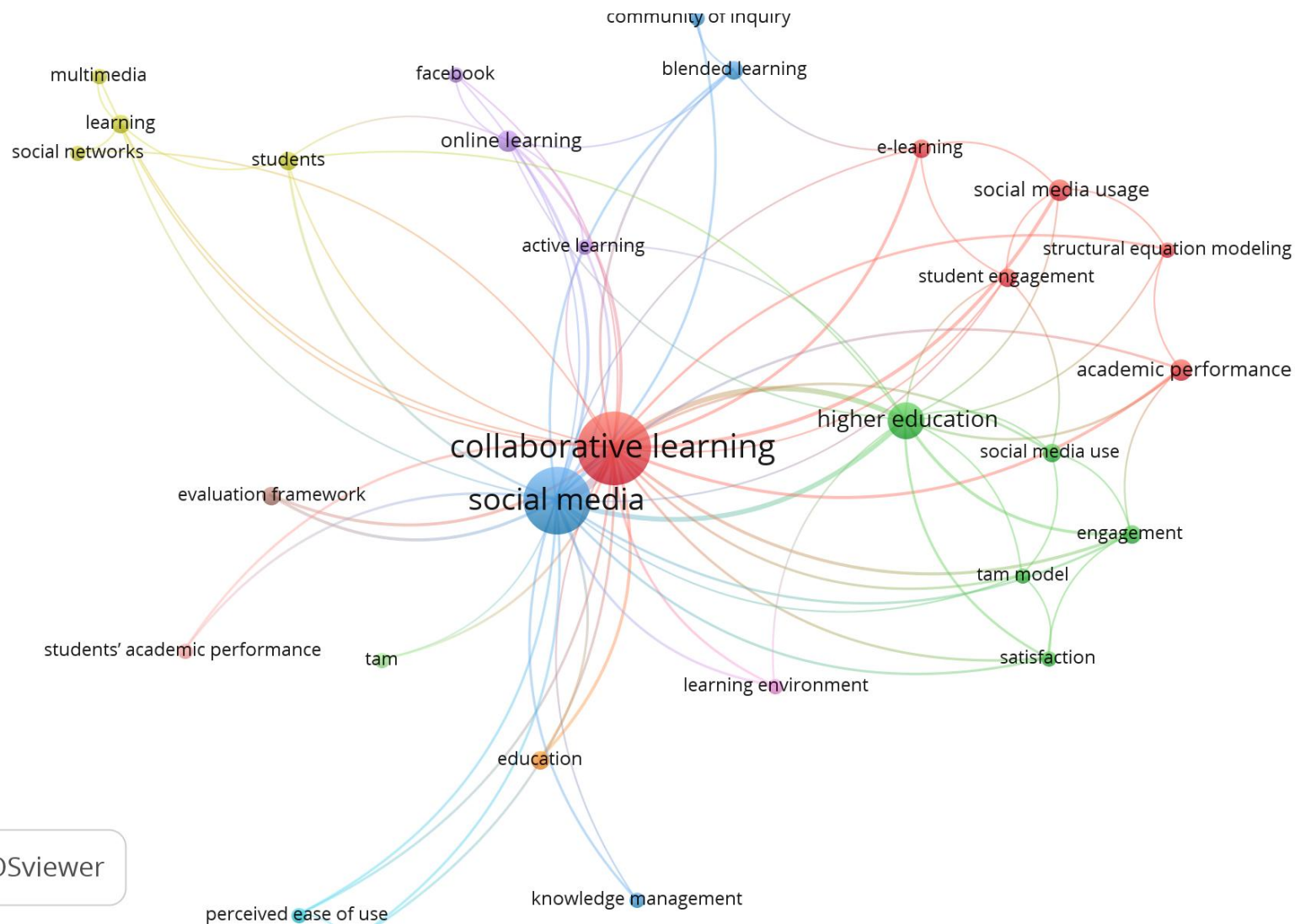


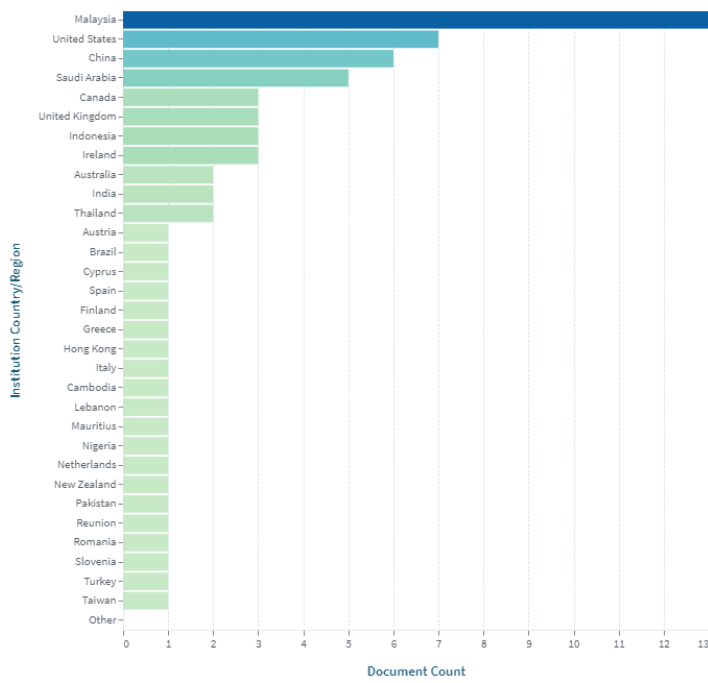
Figure 17: Keyword co-occurrence Network visualization

Recent studies highlight the importance of social factors and technological tools in facilitating collaborative learning and incorporating collaborative approaches and supportive tools in higher education can lead to improved student performance, more profound understanding of subject matter, and more effective knowledge construction (Aliyu et al. B., 2022; Bryant, 2024; Janah et al., 2024; Mohamed & Rusli, 2024; Nazeef et al., 2024b, 2024a; Ouyang et al., 2024).

Figure 7 depicts the countries of document production. Malaysia (13), the USA (07), and China (06) are the top three countries that produced empirical work related to collaborative learning through social media. Malaysia has reported many successful cases of the application of social media in collaborative learning at different levels of education (Azudin, 2024; Lee Hoi Yeh et al., 2024; Mohamed & Rusli, 2024a)

#### *Areas where empirical research is lacking*

This section covers the study's second objective, investigating areas (topics) where empirical studies are lacking. As shown in the keyword co-occurrence map depicted in Figure 8, social media, collaborative learning, and higher education are the commonly used keywords in the investigation studies. Similarly, the density visualization map, which VOSviewer generates, highlighted social media and collaborative learning in red colour in the middle (figure 8), highlighting those areas that have been extensively researched. The density visualization map was generated according to the guidelines provided in the VOSviewer manual (Van Eck & Waltman, 2023). The *item densities* in "rainbow colours" options were used to draw the map. According to the manual, the density masses denoted red background indicate that extensive research has been produced on the topics (specific area of research), and evidence for sufficient research is evident for established knowledge. Accordingly, the nodes in the green background indicate fewer keyword densities in the topic areas, which indicates insufficient research has been carried out. Thus, all the nodes in the green background indicated less research on the topics. Thus, empirical research needs to isolate and address possible empirical, knowledge, evidence, and methodological gaps.



**Figure 18: Countries of Document Production**

Sufficiently addressing the possible research gaps will shed more light on the topic area and establish connections between the associated topic areas.

Further, the word cloud map drawn according to the topic area (field of study) is presented in Figure 9. Word clouds are visual representations of text that highlight frequently used words, offering researchers a quick and visually appealing way to gain initial insights into their data (Tibaná-Herrera et al., 2018; Vilela et al., 2020). The cloud map in Figure 9 crowded counts of studies on social media (65), Collaborative learning (59), and Psychology (45) as the most frequent topic areas in related study ecosystems. This will give novel insight into psychology as a topic area related to collaborative learning and social media study or application.

**Report bias assessment**

There could be a possibility of missing results in the assessment, which needs to be considered per the PRISMA guidelines (Page et al., 2021). Following the PRISMA guidelines, using systematic and objective software tools will avoid reporting bias while reporting results (Priyashantha et al., 2022).

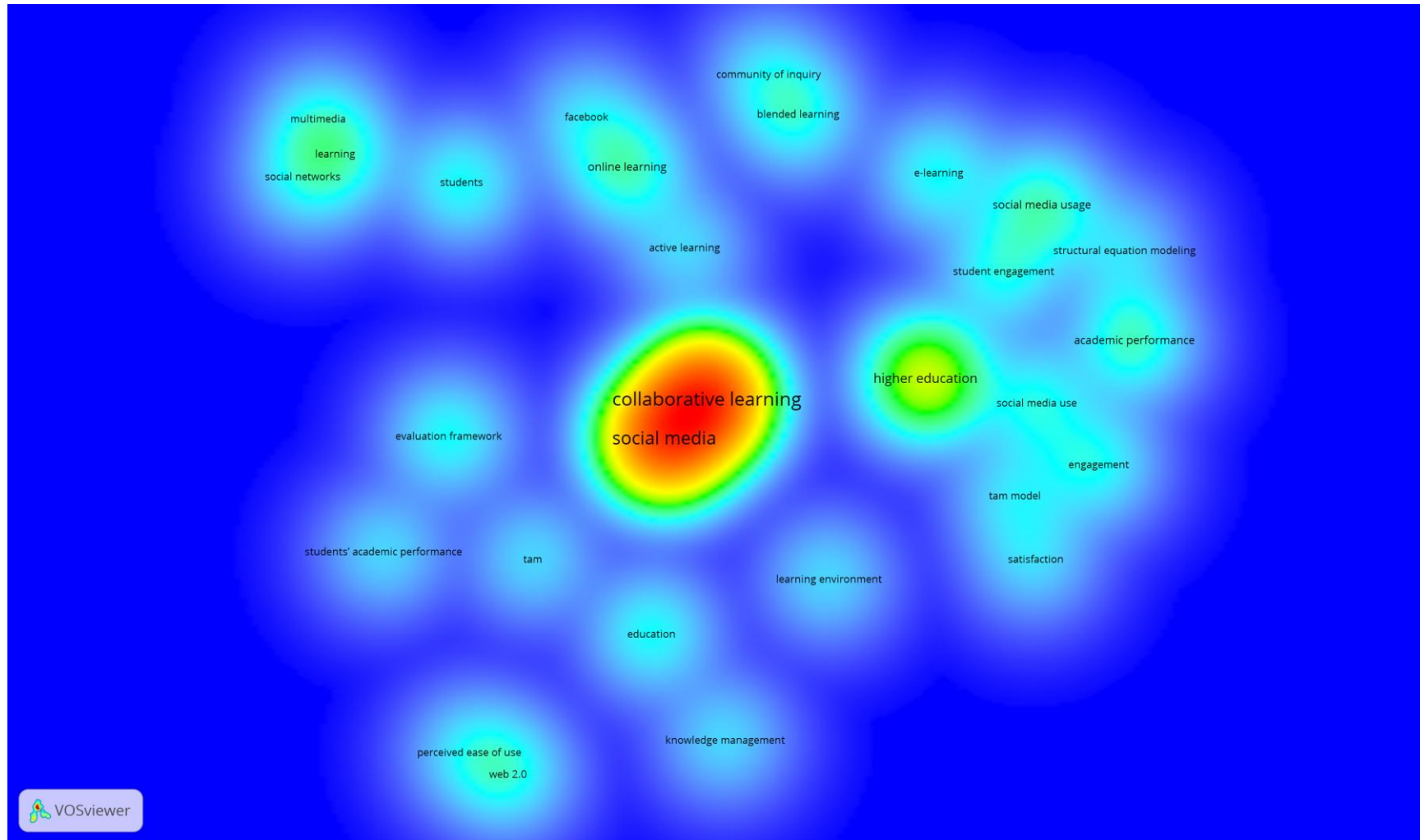


Figure 19: Density visualization

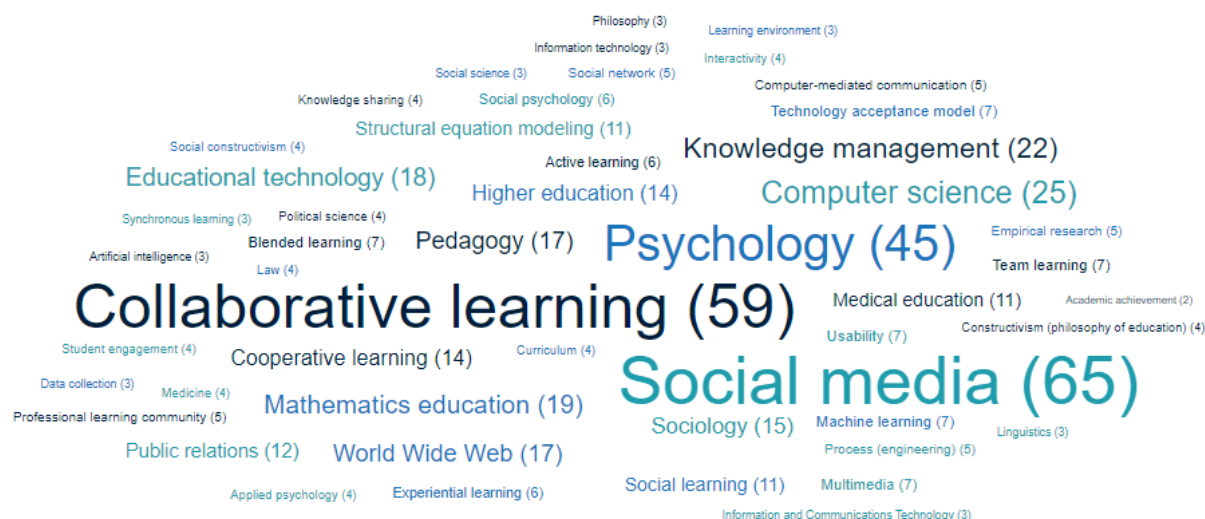


Figure 20: Cloud word map according to the topic area

## Discussion

Biblioshiny, an interface of the Bibliometric software, has emerged as a valuable tool for conducting bibliometric analyses across various fields. Recent studies have demonstrated its effectiveness in mapping scientific literature, identifying research trends, and exploring intellectual structures (Campina López et al., 2024; Huang et al., 2021; Nizaruddin et al., 2024; Silva et al., 2022). These analyses typically involve quantitative statistical methods to visualize data and identify key authors, journals, and thematic areas (Campina López et al., 2024). Biblioshiny has been applied to diverse topics, including productive thinking, weak measurement research, revealing growth patterns, influential contributors, and emerging trends in these fields (Huang et al., 2021; Nizaruddin et al., 2024; Silva et al., 2022). The software's versatility allows for both quantitative and qualitative analyses, making it suitable for examining various aspects of scientific literature, from publication outputs to conceptual structures (Huang et al., 2021; Silva et al., 2022). Systematic reviews provide comprehensive summaries of existing literature on specific research questions using systematic methods to collect, appraise, and synthesize evidence (Mednarodno et al., 2021). These reviews involve several steps, including formulating a research question, implementing a search strategy, and assessing data quality. Quantitative systematic reviews, or meta-analyses, use statistical methods to combine results from multiple studies (Lau, 1997). Meta-analyses aim to determine result similarity across studies, provide overall estimates, assess estimate precision and robustness, and explain dissimilarities. The process involves deciding whether to combine data, evaluating statistical heterogeneity, estimating common effects, and exploring heterogeneity. Sensitivity analyses are crucial for determining the robustness of standard estimates by examining the impact of changing assumptions and protocols. Both fixed-effects and random-effects models can be used, with random-effects models typically producing more comprehensive confidence intervals (Lau, 1997). Systematic reviews are valuable Quantitative tools for exploring and describing research trends by analyzing existing publications (Ramos-Galarza & García-Cruz, 2024). These reviews involve formulating research questions, searching scientific databases, and conducting statistical analyses (Ramos-Galarza & García-Cruz, 2024). Quantitative methods, such as content analysis, surveys, and experiments, aim for objectivity and reliability, allowing for the generalization of results (Hasan, 2024). Systematic literature reviews (SLRs) are increasingly popular for synthesizing literature across disciplines, particularly management (Varsha P S et al., 2024). SLRs follow systematic processes to identify research gaps and suggest future directions (Varsha et al., 2024).

Guidelines for conducting effective reviews include defining clear research questions, employing rigorous search strategies, and utilizing appropriate statistical techniques (Ramos-Galarza & García-Cruz, 2024; Varsha et al., 2024). These methodologies contribute significantly to understanding research landscapes and guiding future investigations (Ramos-Galarza & García-Cruz, 2024; Kazi, 2024; Varsha et al., 2024).

Recent studies have explored collaborative learning in virtual environments, particularly in the context of the emerging Edu-Metaverse. (Li et al. 2024). The study showed promise for supporting collaborative learning in distance education settings. Similarly, (De Gracia Ch., 2024) emphasized the importance of collaborative learning as an educational strategy in virtual environments. This approach involves students working in small groups to share, discuss, and analyze problems collectively, with each student responsible for their own learning and that of their peers. Both studies highlight the potential of collaborative learning strategies and technologies to enhance student engagement and knowledge construction in virtual educational settings, particularly in the context of distance learning and teacher training. Thus, the present investigation will be helpful in future research related to the topic area and its applications.

The results revealed much useful information related to the adoption of social media in collaborative learning. Results provide evidence of the most popular authors (figure 4) and their publication production timelines (Figure 5). It gives the researchers a cross-section of famous authors who are mostly involved in relevant research and makes contacts to do more collaborative work in the field. On the other hand, related sources provide a list of the most welcoming platforms for new related research and sources to search for more related information (figure 3). Figure 1 showcases the annual production, which will also indicate the growing interest of the research to research in the field. It will give a prior idea about the extent to which the area is researched and its trend (figure 2). The existing empirical evidence in the field also highlights the possibility of pure and applied researchers understanding the existing knowledge, which they can adopt in their concerns. Density visualization maps (figure 8) give insight into possible gaps and lacking areas of empirical work. These gaps can be either knowledge, empirical, methodological, or theoretical (Polanin et al., 2023).

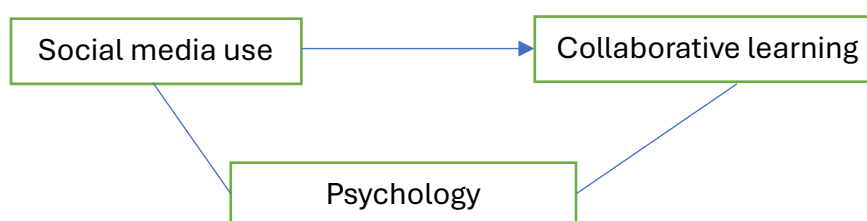
While useful for preliminary analysis and validating findings, word clouds should not replace traditional qualitative analysis methods (Vilela et al., 2020). The mapping overlay technique, used to analyze scientific domains, can be enhanced by incorporating word cloud maps to visually represent a discipline's cognitive structure (Tibaná-Herrera et al., 2018). This combination of techniques (superposition and word cloud) can be precious when exploring emerging scientific disciplines, as it stimulates new research processes and helps identify research fronts within the domain's cognitive structure (Tibaná-Herrera et al., 2018). Thus, word clouds make them practical tools for researchers to quickly grasp key concepts and themes in their data or field of study. Based on the word cloud in Figure 9, new insights can be claimed through the present study, which marks a novel demarcation to the study topic. The study planned to explain the dependency of collaborative learning on social media adoption (Figure 9).



**Figure 21: Expected Theoretical dependency of collaborative learning on social media**

Recent studies highlight the potential of social media to enhance collaborative learning and academic performance in higher education. Social media platforms can foster student engagement, knowledge sharing, and honest-(Janah et al., 2024b; Tran et al., 2024). These digital tools facilitate a dynamic

learning environment, promoting creativity and active participation among students (Mohamed & Rusli, 2024b). Integrating social media in education has positively affected students' understanding, knowledge construction, and behaviour (Mohamed & Rusli, 2024b). A randomized controlled trial demonstrated that a structured social media intervention (BE-Social) significantly improved postgraduate students' academic performance and social media engagement (Tarifa-Rodriguez et al., 2024). This study proposed the digital environment reward optimization hypothesis to explain how social media can enrich traditional education by maximizing social rewards through increased interaction opportunities and timely positive feedback (Tarifa-Rodriguez et al., 2024). However, according to the cloud word diagram, it can be suspected that there could be another relationship between Psychology and the expected and tested relationship in Figure 10. One such suspected possibility is illustrated in Figure 11, where Psychology is added as a variable (Moderator or Mediator) in the relationship between social media use and collaborative learning.



**Figure 22: Possible relationship according to the word cloud**

There is empirical evidence for the positive and negative use of social media in pedagogies and real life. Recent studies highlight the complex impact of social media on mental health and relationships. While social media offers opportunities for connection, excessive use can negatively affect well-being, potentially leading to depression, anxiety, and body image issues (Xuan Vu, 2023). Trust plays a crucial role in moderating the relationship between social media engagement and social relationships, with higher trust levels potentially fostering stronger online connections (Hatamleh et al., 2023). However, social media use may also have detrimental effects on personal relationships, reducing social skills and creating unrealistic expectations (Chakravorty, 2024). The paradoxical nature of social media is evident, as it simultaneously connects people globally while potentially diminishing face-to-face social interactions. To mitigate adverse impacts, researchers suggest moderate usage and conscious digital habits (Huong, 2023). Thus, there could be other strong relationships that could be presence associated with social media and collaborative learning.

Limitations in the present study could occur due to minimizing the scope of journal articles and other research work not being considered. Also, the study only considered the Lens.org database and similar works could be found in other databases such as Scopus, Dimensions, etc. (Dogra & Priyashantha, 2023).

***Practicality and research implications***

Practically all the findings can be used by future researchers in their pure and applied research. Social media can be associated with collaborative learning in education. Policymakers need to pay strong attention while associating social media with pedagogies since there is evidence of psychological disruptions in recent findings (Chakravorty, 2024; Tarifa-Rodriguez et al., 2024; Xuan Vu, 2023).

Future research implications include conducting similar systematic reviews or meta-analyses using multiple databases. Future researchers can easily identify and get involved in the research areas where

empirical evidence is lacking, as depicted in the density visualization map (Figure 8). Research must be conducted to investigate which study levels social media needs to adopt for collaborative learning. New outcomes from the review (Figure 11) can be taken as a starting point for new research and test the psychological involvement in the modern pedagogies that involve social medicine and collaborative learning.

## Conclusion

The systematic literature review conducted in the present study concluded with the two objectives that were investigated. The extent to which the empirical research has been carried out and where the empirical research is lacking has been systematically proven—new insights derived from new qualitative analysis techniques through the word cloud. There could be a relationship between social media use in collaborative learning and psychological aspects, which needs further investigation. The adoption of social media in collaborative learning needs to be practised through more experiments and with a strong policy background to minimize the teachers' and learners' possible psychological, knowledge, and physical barriers and issues.

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