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Bibliometric Analysis of the Impact of Academic Supervision on Teacher Performance in Educational Research

Warman[1*], Ellen Rotua Basaria Sitorus[2], Ninik Handayani[3], Widiayati[4], Agus Purwo Utomo[5]

[1]Faculty of Teacher and Education, Universitas Mulawarman, Indonesia
[2]Public Junior High School 5 Kelay, Indonesia
[3]Public Senior High School 7 Berau, Indonesia
[4]Public Elementary School 8 Tanjung Redeb, Indonesia
[5]Public Elementary School 1 Teluk Alulu, Indonesia
[*]Correspondence: warman@fkip.unm.ac.id

Article Info

Abstrak

This study examines the impact of academic supervision on teacher performance in educational research from 2014 to 2023 using bibliometric analysis. This study used the Scopus database and the PRISMA method to search for relevant literature on academic supervision and teacher performance. The analysis used includes WordCloud, word frequency, topic trends, and thematic evolution to analyze journals and conference proceedings. This study highlights the importance of academic supervision in improving teacher performance, with a focus on knowledge development and knowledge transfer. The application of technologies, such as computer vision and convolutional neural networks, can also improve teacher performance. Gender differences in the research approach indicate the need for more in-depth analysis. This research also explores the integration of technology and language analysis, with a focus on network architecture and machine learning. However, this study has limitations, including bibliometric data that does not cover all important aspects and linguistic bias. The results suggest that academic supervision has a significant role in improving teacher performance and modern technology can be an effective tool in this process. This research encourages further development in the use of technology to support academic supervision and teacher performance.

1. Introduction

Teachers play an important role in determining student success, but their performance is more than just teaching ability (Jennings and Bearak 2014; Mclean and Connor 2015). Good performance involves motivation, interpersonal skills, and commitment to the learning process (Law, Geng, and Li 2019). Educational institutions are increasingly focusing on academic supervision as an important tool to improve the quality of teaching. Academic supervision involves activities such as classroom observation, providing constructive feedback, coaching, and professional development to help teachers improve their teaching methods and achieve better learning outcomes for students (Bastalich 2017; Grimmett and Crehan 2014).

One of the main impacts of academic supervision on teacher performance is improving the quality of teaching (Kristiawan et al. 2020; Tampubolon and Sibuea 2023). By providing constructive feedback, teachers can identify their strengths and weaknesses, resulting in more effective teaching strategies. Regular classroom observation also provides opportunities for teachers to practice new skills and test different learning approaches.

Academic supervision can increase teacher motivation by providing support and opportunities for professional growth (Kemmis et al. 2014). The process of coaching and professional development integrated in supervision can make teachers feel valued and motivated to continue to improve their teaching. However, the effectiveness of academic supervision depends on the quality of the supervisor or the party carrying out the supervision, because competent and knowledgeable supervisors can provide valuable input to teachers (Ansar 2015; Susanti, Wardiah, and Lian 2020). Administrative support is also important to create an environment that supports teachers' professional development.

The role of academic supervision in improving teacher performance at various levels of education can vary depending on the unique needs and challenges at each level. Educational institutions must carefully design and implement programs that suit their individual needs and contexts (Gacs, Goertler, and Spasova 2020). Effective academic supervision involves building trust between supervisors and teachers, creating an environment that supports continued professional growth, and building relationships of trust between supervisors and teachers. In an ever-changing global context, academic supervision is becoming an increasingly important tool to ensure teachers can meet the demands of education effectively. Therefore, research and development in this area remains relevant and important for the overall advancement of education.

Academic supervision plays an important role in modern education, aimed at improving teacher teaching practices and student learning outcomes. This process involves interaction between supervisors, often administrators or senior colleagues, and teachers, who develop their skills through observation, feedback, and guidance. The importance of academic supervision in shaping future generations has led to an increased interest in educational research, particularly regarding the effectiveness of academic supervision.

Performance-based teacher contracts are an effective instrument for improving learning outcomes in education. By rewarding teachers based on objective measures of performance, such as attendance or test scores, even small

changes can result in substantial improvements at little cost. However, not all pay-for-performance programs are effective, and it is important that bonus formulas are well designed and reflect the insights of economic theory. Alternative incentive mechanisms, such as community-based monitoring, have been proposed as an alternative.

	Evidence of impact on time spent in school (RCTs)					Evidence of impact on test scores (RCTs)				
	Negative, significant	Negative, insignificant	Positive, insignificant	Positive, significant	Total studies	Negative, significant	Negative, insignificant	Positive, insignificant	Positive, significant	Total studies
Information-based interventions										
Information on returns to education	0 (0)	1 (1)	1 (1)	2 (1)	2	0 (0)	1 (1)	0 (0)	0 (0)	1
Career counseling	1 (1)	0 (0)	0 (0)	0 (0)	1	0 (0)	1 (1)	0 (0)	0 (0)	1
Cash transfer programs										
Conditional cash transfer	0 (0)	0 (0)	3 (2)	24 (13)	13	0 (0)	1 (1)	1 (1)	3 (3)	5
Unconditional cash transfers	0 (0)	0 (0)	1 (1)	1 (1)	1	0 (0)	1 (1)	1 (1)	0 (0)	1
Labeled cash transfer	0 (0)	0 (0)	0 (0)	2 (1)	1	0 (0)	0 (0)	1 (1)	0 (0)	1
Scholarship programs										
Merit-based scholarship	0 (0)	0 (0)	1 (1)	3 (2)	2	0 (0)	1 (1)	0 (0)	6 (4)	4
Other household interventions										
Mother class on child learning	0 (0)	0 (0)	1 (1)	0 (0)	1	0 (0)	0 (0)	0 (0)	1 (1)	1
Mother literacy class	0 (0)	0 (0)	1 (1)	0 (0)	1	0 (0)	0 (0)	1 (1)	0 (0)	1
Combined mother literacy class and mother class on child learning	0 (0)	0 (0)	1 (1)	0 (0)	1	0 (0)	0 (0)	0 (0)	1 (1)	1

Figure 1. Impacts for selected demand-side interventions on education outcomes in developing countries

Figure 1 explains that demand-side inputs, such as school attendance and student effort, are critical to good educational outcomes. Interventions that increase the benefits of school attendance, such as conditional cash transfers, will increase students' time in school, while interventions that increase the benefits of higher effort and better academic performance, such as merit scholarships, will improve learning outcomes. These interventions are critical to achieving optimal educational outcomes.

Bibliometric analysis emphasizes the significance of demand-side inputs, such as school attendance, in enhancing educational outcomes. Interventions like conditional cash transfer programs can increase student availability in learning environments. Academic supervision, ensuring teachers have sufficient skills and support, can optimize the implementation of these interventions, maximizing the benefits of programs like conditional cash transfers. This strengthens the link between demand-side inputs and improved student learning outcomes.

However, bibliometric analysis also highlights key problems in the existing literature, such as a lack of consistency in the definition of academic supervision (da Silva, Nunes, and Viegas 2018), the need for a deeper understanding of the underlying mechanisms, and the challenge of objectively and comprehensively measuring teacher performance. By addressing these issues, recommendations for further research and improvement of academic supervision practices can be developed.

This bibliometric analysis not only provides a better understanding of the existing literature but also serves as a solid foundation for developing more effective education strategies and policies. By better understanding how academic supervision affects teacher performance and student learning outcomes, more

effective approaches can be developed to improve the overall quality of education. Thus, this research will make a significant contribution to the development of theory and practice in the field of education, particularly in the context of academic supervision and improving teacher performance.

The literature on academic supervision and teacher performance has grown rapidly, but there are still some research issues and gaps that need to be addressed (Flores and Derrington 2018; Sunaryo 2020). One major problem is the lack of consistency in the definition and conceptualization of academic supervision across multiple educational contexts, which can lead to difficulties in comparing findings and identifying consistent patterns. In addition, there is a need to better understand the mechanisms underlying academic supervision, such as how it affects teacher teaching practices and student learning outcomes. The effectiveness of different types of surveillance, such as formative and summative surveillance, is also not fully understood, and comparisons between the various methods of supervision have not been made.

Data limitations, such as geographic coverage or small samples, can also limit the generalizability of findings. In addition, selection bias in research on academic supervision can lead to less successful supervisors being underrepresented in the literature. More holistic and accurate measurement of teacher performance can help better understand the impact of academic supervision. By addressing these research challenges and imbalances, our research aims to make a significant contribution to understanding the relationship between academic supervision and teacher performance. Our bibliometric analysis will help identify trends, patterns, and themes that dominate the existing literature and identify areas that require further research.

Academic supervision plays an important role in improving teacher performance, which in turn impacts student learning outcomes and their ability to reach their maximum potential. The urgency of this research is reinforced by the complexity of existing problems, such as the diverse needs of students and classroom environmental conditions. Problem-solving approaches are used to identify key bottlenecks in the existing literature and develop effective strategies to overcome them.

Using bibliometric analysis, the study will map trends and patterns that dominate, as well as identify research gaps that need to be filled. This will enable the development of more targeted recommendations for future research and education policymakers. A collaborative approach will be applied, working closely with experts in education and academic supervision to ensure that the research reflects real needs in the field and provides practical solutions for education practitioners.

The urgency of this research is driven by the aim to improve academic supervision practices and improve teacher performance. By involving various stakeholders, these findings will have a significant impact on improving the overall quality of education. Using problem-solving and collaborative approaches, this research aims to make a meaningful contribution in addressing the challenges facing today's education system and creating a better learning environment for all students.

This study aims to investigate the impact of academic supervision on teacher performance in educational research using a bibliometric analysis approach from 2014 to 2023. This research will identify key words in the literature, analyze their frequency over time, and investigate topic patterns and developments using tools such as topic trends and thematic evolution. The aim is to provide a better understanding of how academic supervision affects teacher teaching practices and student learning outcomes.

The research will use visualization techniques such as wordcloud to identify common research focuses and trends. The word frequency over time method will help identify trends in research, such as increased interest in a particular topic or a change in research focus over time. Topic trends and thematic evolution will be used to analyze the evolution of a particular topic in academic supervision and teacher performance over time.

The study will also identify research gaps and develop recommendations for further research. These findings will contribute significantly to our understanding of how academic supervision can be an effective tool in improving teacher performance and student learning outcomes. These findings will help improve the overall quality of education and contribute to the field of academic supervision.

2. Methods

The study utilized Scopus as a data source for a bibliometric analysis of the impact of academic supervision on teacher performance in educational research. The Scopus database, containing thousands of journals, provided a rich and representative data set for exploring trends and patterns in the scientific literature. The data was filtered based on inclusion criteria and analyzed using RStudio, a bibliometric analysis package. The analysis included data cleaning and processing, bibliometric analysis packages, and collaboration network analysis to understand patterns of partnerships and networks in research on academic supervision and teacher performance.

The research leveraged the Scopus database, an extensive resource with more than 70 million sources across a wide range of fields (Baas et al. 2020; Miranda-González et al. 2020), to search relevant literature on academic supervision and teacher performance . The PRISMA method is used (Fahd et al. 2022; Liebowitz and Porter 2019), (Figure 2) to identify relevant literature. Scopus' broader topics and multidisciplinary scope make it an ideal resource for this research.

The main steps in this method include using the Scopus database as the primary data source, filtering the data into documents published in the last 10 years, and focusing on journals and conference proceedings. Using RStudio, WordCloud analysis will be performed to visualize keywords that commonly appear in a particular document, helping to identify key concepts widely discussed in the literature regarding the impact of academic supervision on teacher performance. Word frequency analysis over time will observe trends in keyword usage related to the research topic from 2014 to 2023, providing insight into changes and developments in the research topic throughout the time studied.

Topic trend analysis will identify patterns of change and focus research on the impact of academic supervision on teacher performance using theme modeling

techniques such as Latent Dirichlet Allocation (LDA). Thematic evolution analysis will trace the development of concepts and research focuses related to the impact of academic supervision on teacher performance, providing an in-depth understanding of how understanding the relationship between academic supervision and teacher performance has developed in educational literature over the years. studied period of time.

Figure 2. PRISMA chart for literature search and filtering
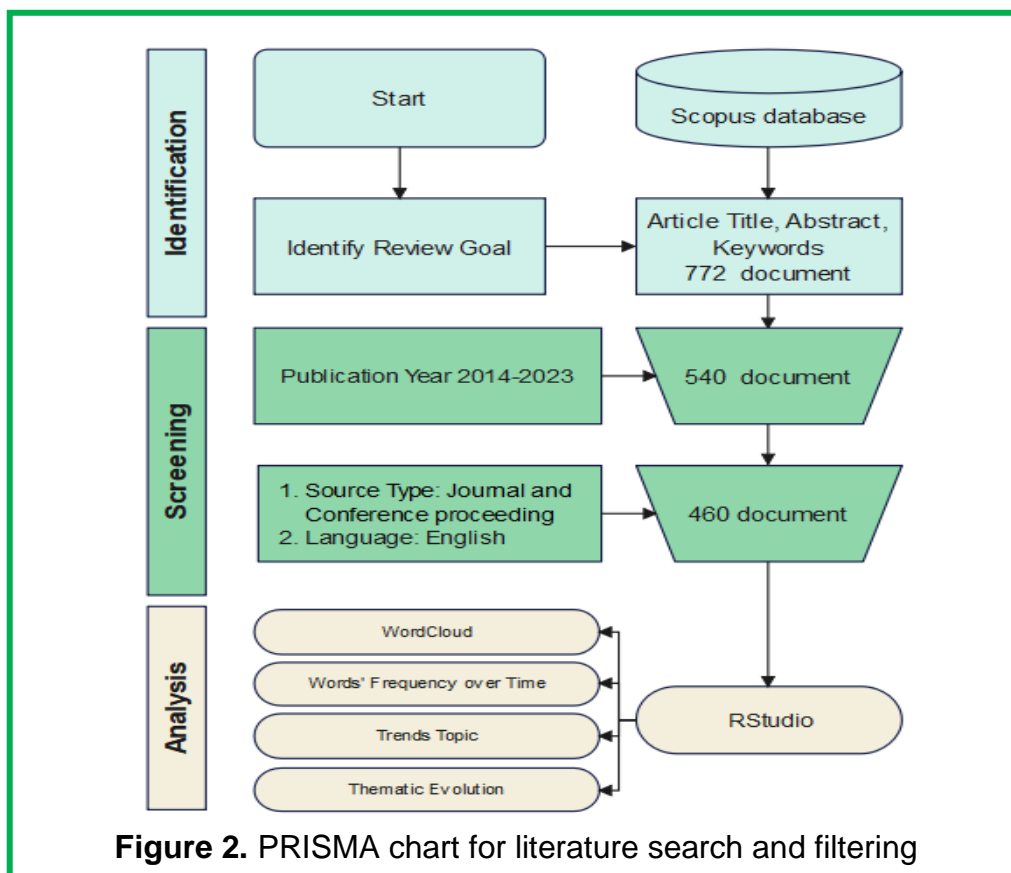
3. Findings and Discussions

The study analyzed bibliometric data from 2014 to 2023 to understand the impact of academic supervision on teacher performance in educational research (as in Figure 2). Data was collected from 310 sources, including journals and conferences, as well as 460 documents. The study found an annual growth rate of 21.59%, indicating increased interest in the topic. The average age of documents was 3.53 years, and the average citations per document was 9.8, reflecting the recognition and use of relevant works in literature. There are 18134 references, with 2485 additional keywords and 1280 author keywords, highlighting the diversity of topics covered. The majority of documents are articles, followed by conference papers, reviews, notes, and short surveys. Data visualization is performed using RStudio to understand the evolution of topics and trends in literature. This analysis will provide valuable insights into how research on academic supervision and teacher performance progressed over the study period.

Figure 3. Main Information
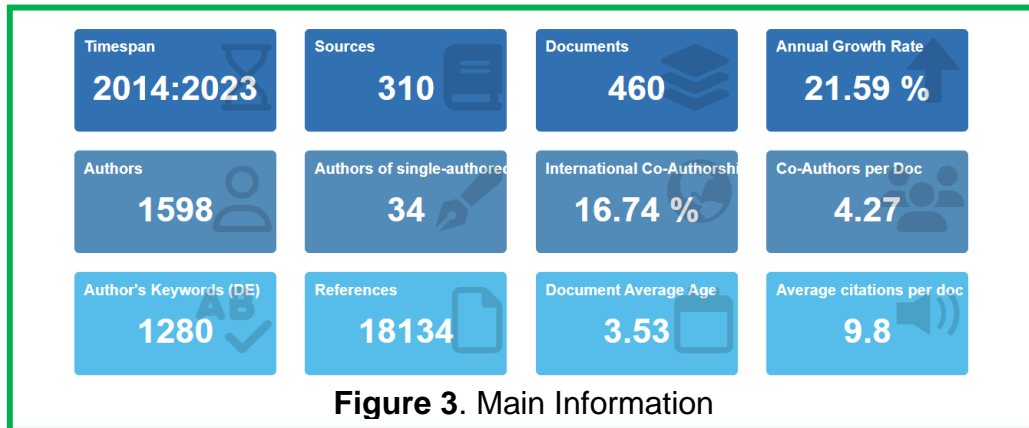
3.1 Findings

Trends in the emergence of WordCloud in previous studies

The research on the impact of academic supervision on teacher performance in educational contexts reveals a complex and multidimensional pattern. The most frequently used keywords (Figure 4) are "students" and "teachers'," indicating a focus on interactions between students and teachers. The keywords "teaching" and "teacher" are also important, confirming the role of teachers and the teaching process. The term "knowledge distillation" is significant, indicating the development and transfer of knowledge in academic supervision. Learning-related terms like "deep learning" and "learning systems" are used to understand how teachers can improve their performance through deep and systematic learning approaches.

Figure 4. WordCloud
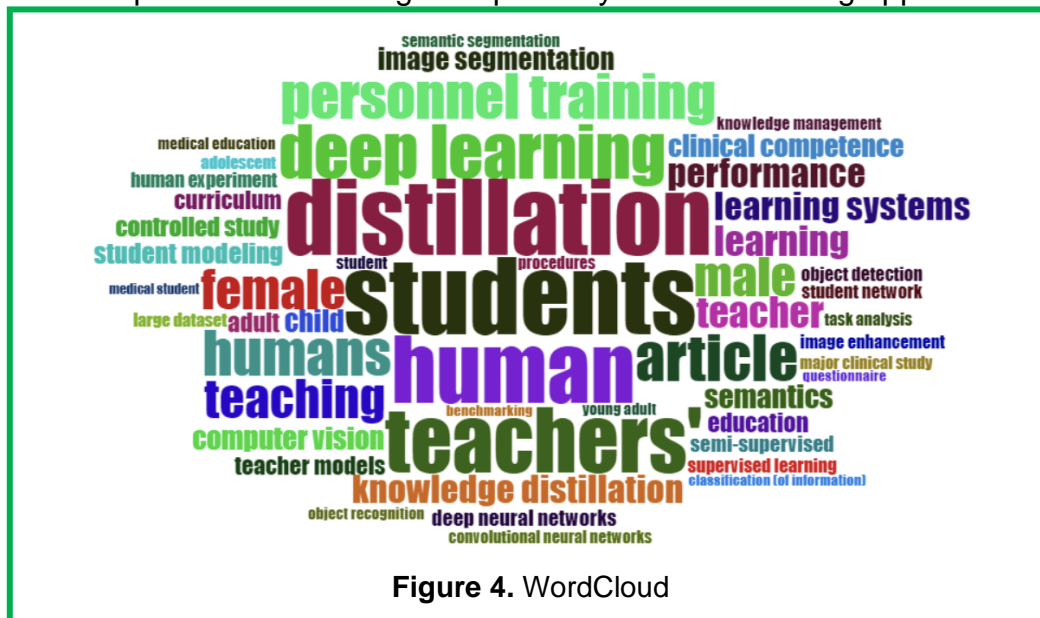
The keyword "performance" emphasizes the importance of evaluating teacher performance in the context of academic supervision. Technical and scientific terms like "computer vision" and "convolutional neural networks" indicate the adoption of technology in academic supervision and improving teacher performance. Gender differences in research approaches are also evident, with "female" and "male" appearing significantly. These results highlight the complexity and multidimensionality of the topic of academic supervision on teacher performance in educational research.

Supervision theories play a crucial role in understanding the impact of academic supervision on employee performance, particularly teachers. These theories provide a foundation for understanding how interactions between supervisors and employees can influence their performance and professional development (Gibson, Hardy, and Buckley 2014). Concepts like feedback, reflection, and support are key elements in supervision theories that have been proven to improve employee performance.

Trend of Words' Frequency over Time

RStudio's Trend of Words' Frequency over Time analysis is a crucial tool for understanding the evolution of key concepts and trends in a given field. This analysis involves collecting data on the frequency of key words from various publications over time, calculating their frequency in each defined time period. This method provides insight into the development of ideas, research trends, and shifts in focus within a discipline. Thus, RStudio's Trend of Words' Frequency over Time analysis is a vital tool for understanding scientific literature changes over time.
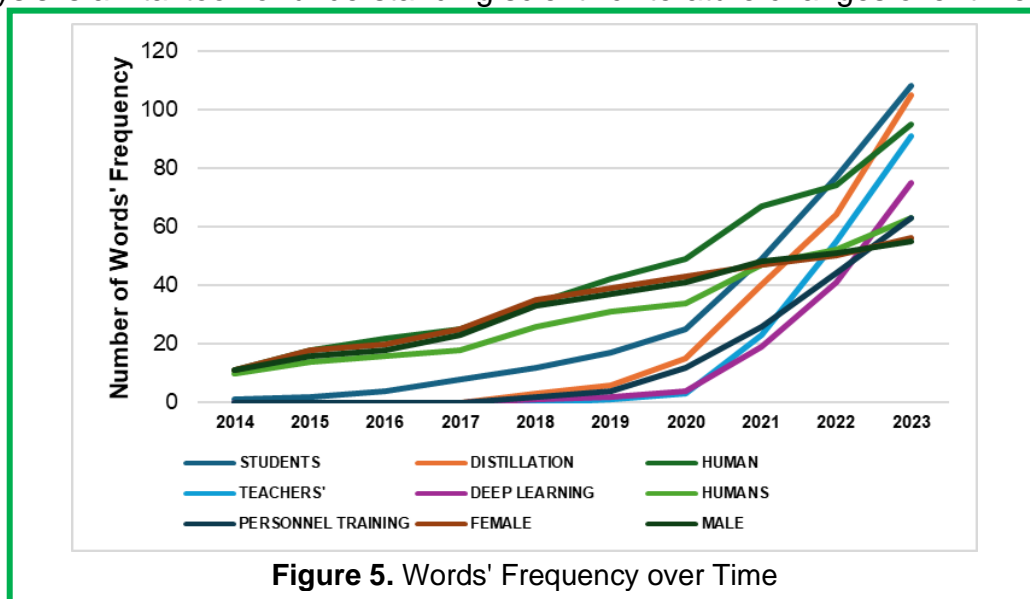

Figure 5. Words' Frequency over Time

The Figure 5 shows the changing trends in key words related to research on the impact of academic supervision on teacher performance in educational research from 2014 to 2023. The frequency of key words such as "students", "distillation", "human", "teachers' deep learning", "humans", "personnel training", "female", and "male" shows a significant increase over the years, indicating a greater focus on students' experiences and needs. The term "human" showed a steady upward trend from 2014 to 2021, while "humans" experienced greater fluctuations.

The keyword "teachers' deep learning" showed a steady upward trend from 2018 to 2023, highlighting the growing interest in deep understanding of teacher learning and professional development through academic supervision. The frequency of the words "personnel training", "female", and "male" also shows an upward trend, indicating a steadily increasing interest in educational personnel training and gender-based analysis in the context of teacher performance and academic supervision. The trends in key words indicate a gradual shift from a focus on students and teachers towards a deeper understanding of academic

supervision processes, teacher learning, and other factors influencing teacher performance in educational contexts.

Trends Topic of the Impact of Academic Supervision on Teacher Performance in Educational Research

RStudio was used in this study to analyze topic trends in research on the impact of academic supervision on teacher performance. This approach helps researchers identify dominant themes and patterns in the literature, such as effective supervision methods, teacher professional development strategies, and challenges in implementing academic supervision in diverse educational contexts. Techniques such as keyword analysis, topic modeling, and document clustering algorithms can help identify these themes. By understanding Topic Trends, researchers can identify knowledge gaps, determine future research priorities, and develop strategies to improve educational practice and teacher professional development.
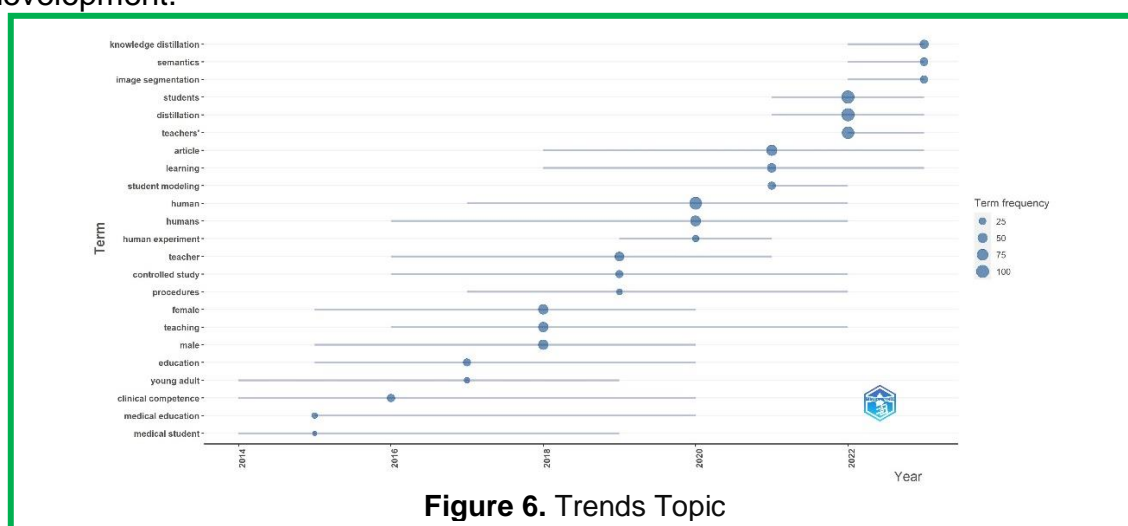

Figure 6. Trends Topic

The bibliometric analysis in Figure 6 highlights several trending topics in research on the impact of academic supervision on teacher performance in an educational context. One prominent trend is the equal participation of women and men in the study of the roles of women and men in academic supervision and teacher performance. This research focuses on teaching and teachers, with a strong interest in understanding the relationship between academic supervision and teaching practice and teacher performance. The topic "clinical competence" also stands out, indicating an interest in understanding clinical competence in the context of academic supervision.

Research on the impact of academic supervision is not limited to the general education environment but also to specific disciplines such as medicine. The use of the "controlled study" method is noteworthy because it provides a solid scientific basis for policy recommendations and best practices in optimizing academic supervision. The topics "young adults" and "medical students" show interest in understanding the effect of academic supervision on young individual performance in educational contexts, highlighting the importance of academic supervision in developing the performance of established teachers and shaping competencies and performance. young individuals who are learning.

Thematic Evolution of the Impact of Academic Supervision on Teacher Performance in Educational Research

RStudio is a tool used to study the evolution of major themes in scientific literature. It helps researchers identify trends and shifts in the field, allowing them to set future research priorities, identify knowledge gaps, and design strategies to address new challenges. The evolution of research themes can be explored through bibliometric analysis, text analysis, topic modeling, and document clustering. Techniques like Latent Dirichlet Allocation (LDA) help identify key themes and track changes in their prevalence and relevance over time. Topic network analysis allows researchers to map the relationships between different topics, identifying patterns of change in research focus and direction of development.

Figure 7. Thematic Evolution
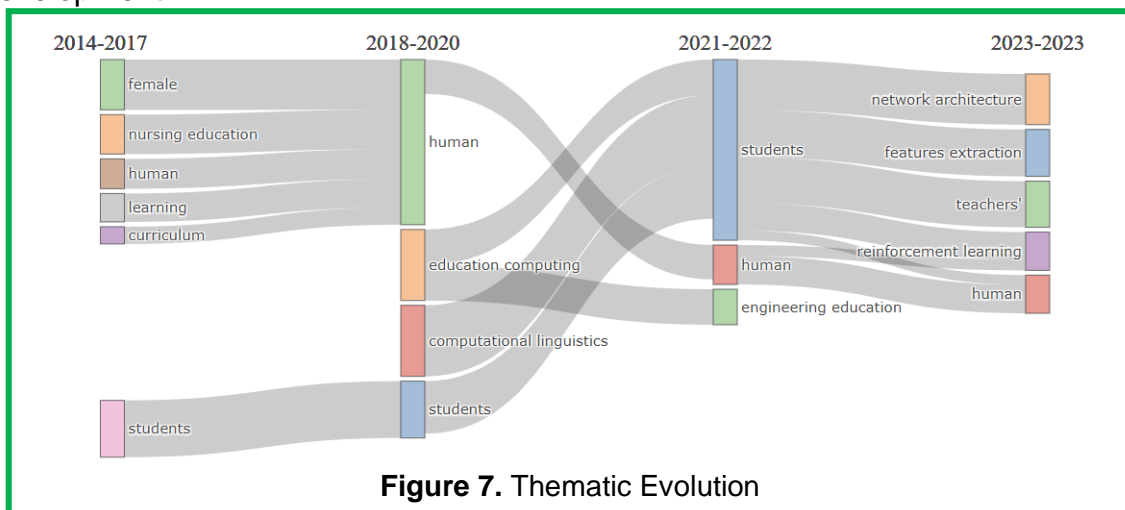
Research themes such as those in Figure 7 show the impact of academic supervision on teacher performance in educational research has evolved over the years. In 2014-2017, the themes raised focused on gender, nursing education, learning, curriculum, and student affairs. This shift reflects researchers' interest in understanding how academic supervision affects teacher performance in specialized areas. In 2018-2020, the theme shifted to computational technology and linguistics, focusing on educational computing and computational linguistics. This shift reflects the integration of technology and language analysis in academic supervision research.

In 2021-2022, the theme was raised back to education with a focus on students and engineering education. In 2023, the theme shifts to technology and learning methods, focusing on network architecture, feature extraction, reinforcement learning, and humans. This shift reflects a shift toward more technical research and the use of technology in supporting academic supervision and improving teacher performance. Thematic evolution in this study shows that diversification in understanding the impact of academic supervision on teacher performance in educational research.

3.2 Discussions

The concept of employee performance, particularly teacher performance in the educational context, is an important focus point in this research. Measuring teacher performance through indicators such as student academic progress, use of

technology in learning (Moulding, Stewart, and Dunmeyer 2014), and classroom management is essential for understanding the impact of academic supervision (Khan and Ghosh 2021). Performance management theories can also provide insight into how academic supervision can influence the achievement of predetermined performance goals.

The use of supervision theories and concepts is essential in developing a framework to explain and understand the relationship between academic supervision and teacher performance (Borders and Brown 2022; Khan and Ghosh 2021). These theories also guide educational practitioners in designing and implementing effective supervision programs to improve teaching and learning in schools. Integrating supervision theory with employee performance is crucial for improving education quality through more effective academic supervision practices (Kristiawan et al. 2020).

This research explores the impact of academic supervision on teacher performance. It provides a comprehensive understanding of the dynamics of academic supervision and its influence on teacher performance. It uses detailed analysis of supervision theories and employee performance concepts to offer new insights into best practices in teacher professional development. The research also strengthens empirical evidence on the relationship between academic supervision and teacher performance, using bibliometric data to explore trends and patterns in related literature. This helps refine our understanding of the extent to which academic supervision can significantly improve teacher performance.

The research also offers new insights for educational policy development. By understanding how academic supervision affects teacher performance, policymakers can design more effective and sustainable supervision programs (Derrington and Campbell 2015), which can positively impact the overall quality of education. The research also serves as a basis for further research in the field of academic supervision and teacher performance, identifying knowledge gaps and areas of research that remain unexplored.

Words' frequency over time data showed a significant increase in student engagement in research on the impact of academic supervision on teacher performance, indicating increased interest in this topic. This could be due to increased awareness of the importance of academic supervision in improving teacher performance. Distillation variables also showed an upward trend, showing improvements in data processing and presentation, strengthening the validity and reliability of research results.

In addition, Human variables, such as interviews or direct observation, experienced significant growth, which suggests the need for more in-depth and quality analysis of the impact of academic supervision on teacher performance. Comparison variables between the performance of female and male teachers also showed a steady improvement, suggesting a tendency to explore differences in performance between genders in the context of academic supervision (Guarino and Borden 2017). This research continues to develop to provide deeper and more diverse insights into efforts to improve the quality of education through academic supervision.

Research on the impact of academic supervision on teacher performance in education relies on the theories and concepts of supervision and employee

performance. Supervision theory provides a framework for understanding the dynamics of interaction between supervisors and teachers, as well as effective strategies for improving teacher performance (Boehe 2016). Concepts such as coaching, feedback, modeling, and reflection are often analyzed to understand how supervision can affect teacher performance through a variety of mechanisms (Kraft, Blazar, and Hogan 2018).

The concept of employee performance, especially teacher performance, helps measure the impact of academic supervision. It covers aspects such as teaching effectiveness, student engagement, material understanding, and student academic progress (Kahu and Nelson 2018; Lam et al. 2016). By assessing these aspects, researchers can identify areas where oversight requires improvement or adjustment.

This research shows significant growth in student engagement and human data collection methods, making it more comprehensive in documenting the impact of academic supervision on teacher performance. The results can form the basis for developing more effective surveillance policies and practices at the education level. Comparing the performance of female and male teachers also provides valuable insights into the factors that influence teacher performance (Mashhadlou and Izadpanah 2021; Nkrumah 2018), which can help monitor more inclusive and targeted development strategies.

The evolution of research themes related to the impact of academic supervision on teacher performance in educational research is marked by a shift from the traditional focus on curriculum and learning to the integration of technology and language analysis. This shift is influenced by developments in education and technology. Research from 2014-2017 focused on essential aspects of education, such as curriculum, learning, and the role of students in the influence of academic supervision on teacher performance. The theoretical contributions of this period are rooted in learning theory and educational psychology, as well as the influence of gender and nursing education (Li and Hasson 2020).

The next period (2018-2020) focuses on technology integration and language analysis, exploring how technology can be leveraged to strengthen academic supervision and improve teacher performance. Theoretical contributions involve theory in computational education and computational linguistics, as well as innovative approaches in technology-based learning (Meurers and Dickinson 2017; Yang et al. 2018). In the period 2021-2022, research turned to fundamental aspects of education with a focus on student education and engineering. Theoretical contributions related to higher education theory and learning theory in the context of engineering education.

In 2023, research shifts to more technical research, exploring topics such as network architecture and machine learning. Theoretical contributions involve the theory of computer science and machine learning (Lawelai, Iswanto, and Raharja 2023), as well as innovative approaches in the development of educational technologies. This evolution reflects a response to educational and technological developments, aiming to better understand how academic supervision can be strengthened to improve teacher performance in a variety of educational contexts.

4. Conclusion

This research explores the impact of academic supervision on teacher performance in educational contexts, using supervision theories and concepts to understand the dynamics of interaction between supervisors and teachers. It offers insights for educational policy development, as understanding how academic supervision affects teacher performance can lead to more effective and sustainable supervision programs. The research shows a significant growth in student engagement and human data collection methods, making it more comprehensive in documenting the impact of academic supervision on teacher performance. Comparing the performance of female and male teachers provides valuable insights into the factors influencing teacher performance. Research themes related to the impact of academic supervision on teacher performance have evolved from traditional curriculum and learning to the integration of technology and language analysis. In 2021-2022, research focused on fundamental aspects of education, such as student education and engineering, and in 2023, more technical research explored such issues as network architecture and machine learning.

The research integrates supervision theory and employee performance concepts to provide a strong framework for understanding the relationship between academic supervision and teacher performance. This approach helps deepen our understanding of the mechanisms by which supervision influences teacher performance and the factors that influence it. The practical implications of this research are relevant to education practitioners and policymakers, as they can help design more effective and sustainable surveillance programmes.

The theoretical implications of this study contribute to our understanding of academic supervision as a phenomenon involving interactions between different aspects of the education system. By enriching existing theoretical frameworks, this research helps deepen our understanding of the dynamics of academic supervision and teacher performance and provides a foundation for further research in this area.

However, this study has limitations, such as the scope of bibliometric data that may not cover all important aspects of research on academic supervision and teacher performance, and focus on literature in a particular language, resulting in linguistic bias in the analysis. Future research should broaden the scope of bibliometric data and apply cross-lingual approaches to ensure a broader and inclusive representation of relevant literature. In addition, exploring the effect of academic supervision on teacher performance in special education contexts such as inclusive education can provide deeper insights for education practitioners and policymakers.

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