

A BIBLIOMETRIC STUDY ON THE USE OF CHATGPT IN EDUCATION USING RESEARCH RABBIT

*Kajian bibliometrik tentang penggunaan chatgpt dalam pendidikan
menggunakan Research Rabbit*

*Masyitah Abu¹, Shamine Moganathan²

¹Pusat Teknologi Pengajaran dan Multimedia
Universiti Sains Malaysia
11800 USM, Penang, Malaysia.

²Faculty of Engineering and Computer Technology
AIMST University
Batu 3 ½, Jalan Bukit Air Nasi, 08100 Bedong, Kedah, Malaysia.

*Corresponding author's email: masyitah_abu@usm.my

Submitted:	Accepted:	Revised:	Published:
12-Aug-2025	20-Aug-2025	16-Apr-2026	30-Jun-2026

Abstract

It has becoming increasingly essential to comprehend how academic research addressed the role of tools like ChatGPT as artificial intelligence continues to transform the educational landscape. This study used Research Rabbit as a bibliometric mapping tool to examine current trends in educational research on ChatGPT, referencing sources like Semantic Scholar and Crossref. Finding popular research issues, well-known writers, and new areas of interest in this expanding field using Research Rabbit platform is the major goal. Through keyword analysis and networks from related research, the paper has described how educational research on ChatGPT has changed since its launch. The study has pointed to several important themes, such as individualized learning experiences, ethical issues in AI use, academic writing support, and AI-supported learning. These outcomes provided information about how academics and educators were reacting to the use of generative AI in the classroom. The paper has emphasized how crucial it is to adapt instructional strategies and curriculum creation to the rapid advancements in technology. Institutions need to prepare students for the difficulties of a world that is becoming more digital and dynamic by using ChatGPT to better comprehend global academic engagement. This research has contributed to the discussion on how educational systems can continue to be inclusive, progressive, and relevant in the face of ongoing innovation.

Keywords: Bibliometric, Artificial Intelligence, ChatGPT, Research Rabbit

Abstrak

Penggunaan kecerdasan buatan seperti ChatGPT yang semakin berkembang dalam landskap pendidikan menjadikan pemahaman terhadap peranan alat ini dalam penyelidikan akademik semakin penting. Kajian ini menggunakan Research Rabbit sebagai alat pemetaan bibliometrik untuk meneliti trend semasa dalam penyelidikan pendidikan berkaitan ChatGPT, dengan merujuk kepada sumber seperti Semantic Scholar dan Crossref. Matlamat utama kajian ini adalah untuk mengenal pasti isu penyelidikan yang popular, penulis yang berpengaruh, dan bidang minat baharu dalam bidang yang sedang berkembang ini dengan menggunakan platform Research Rabbit. Melalui analisis kata kunci dan rangkaian penyelidikan yang berkaitan, kajian ini telah menggambarkan bagaimana penyelidikan pendidikan mengenai ChatGPT telah berkembang sejak ia diperkenalkan. Kajian ini turut mengenal pasti beberapa tema penting seperti pengalaman pembelajaran yang diperibadikan, isu etika dalam

penggunaan AI, sokongan penulisan akademik, dan pembelajaran yang dibantu AI. Hasil ini memberikan gambaran tentang bagaimana ahli akademik dan pendidik memberi respons terhadap penggunaan AI generatif dalam bilik darjah. Kajian ini menekankan betapa pentingnya menyesuaikan strategi pengajaran dan pembangunan kurikulum dengan kemajuan teknologi yang pesat. Institusi perlu mempersiapkan pelajar untuk menghadapi cabaran dalam dunia yang semakin digital dan dinamik dengan menggunakan ChatGPT bagi memahami keterlibatan akademik global dengan lebih baik. Kajian ini menyumbang kepada perbincangan tentang bagaimana sistem pendidikan boleh terus inklusif, progresif, dan relevan dalam menghadapi inovasi yang berterusan.

Kata kunci: Bibliometrik, Kecerdasan Buatan, ChatGPT, Research Rabbit

1.0 INTRODUCTION.

Many facets of society were being profoundly altered by the quick development of artificial intelligence (AI) (Fütterer et al., 2023) technologies, with education being one of the areas most impacted. The advent of large language models (LLMs), such ChatGPT (Fütterer et al., 2023; Kasneci et al., 2023; Sallam, 2023; Xiao et al., 2023; Yang et al., 2024), created by OpenAI, was one recent invention that has significantly altered teaching and learning methods. In academic settings, ChatGPT, a generative AI tool that processes and produces language that resembles a human being in response to input prompts, is widely being used for jobs ranging from content creation and tutoring to administrative help and student support (de Winter et al., 2023). As per the researcher (de Winter et al., 2023), it is essential to understand how academic research is responding to this technological shift, as these AI systems are becoming more integrated into educational ecosystems.

AI integration has been investigated to an increasing extent by educational institutions in an effort to boost personalized learning, improve learning outcomes, and assist teachers in controlling classroom dynamics (Ngo, 2023). Particularly, ChatGPT has been used in a number of educational contexts, such as tutoring support, idea generation, automated feedback, and writing help. These features have spurred discussions about their educational usefulness, moral complications, and the dangers of relying too heavily on AI tools. While some academics warn against the possible deterioration of critical thinking abilities and the abuse of AI for academic dishonesty [4], others contend that ChatGPT can democratize access to knowledge and offer fair learning opportunities for students with different requirements (Ngo, 2023).

Even with its increasing popularity, there was still a lack of comprehensive knowledge about how ChatGPT is being addressed, assessed, and studied in scholarly publications. A bibliometric review, which looked at research themes, citation patterns, authorship patterns, and publishing trends, offered a useful quantitative way to investigate this terrain. By using bibliometric analysis, scholars can map knowledge domains, find influential works, and track the development of academic interest in a particular subject (Albadarin et al., 2024; Montenegro-Rueda et al., 2023; Sallam, 2023). By With the bibliometric techniques like Research Rabbit (Research Rabbit, 2025) and data from reputable databases like Semantic Scholar and Crossref, this study sought to identify the extent, organization, and trajectory of existing research on ChatGPT in education (Joyner, 2023).

Generative AI adoption in education is part of larger digital transformation initiatives that are changing the way information is produced, disseminated, and evaluated. This change was hastened by the COVID-19 pandemic, which forced teachers all throughout the world to embrace digital tools and reconsider conventional teaching approaches (Albadarin et al., 2024; Hosseini et al., 2023). In In

this regard, ChatGPT and other AI tools have become more than just novelty items as they have the potential to become vital elements of online learning environments. The academic community was still split, though, on how much these tools help or hurt real-world learning opportunities. For instance, some researchers have highlighted the risk of decreased involvement and the outsourcing of intellectual labor (Xiao et al., 2023), while others have suggested that ChatGPT can scaffold student understanding and enhance language development (Chen et al., 2020; Jia et al., 2012; Xiao et al., 2023).

The increasing usage of ChatGPT in education also grows in parallel with trends seen internationally. Latest articles from Bernama write by Shazlin in 2026, mention that AI no longer a distant innovation but an essential ingredient in the education (Shazlin Niza Ab Razak, 2026) but some policy need to be created to make sure the usage of AI is ethical in education and others field also. Some previous study has done some study on the impact of ChatGPT in Malaysia Institution and the researchs have a given a positive feedback toward Malaysian education but there also some issue that still need to encounter to ensure AI can be used ethically (Madiyah and Abu Samah 2025; Selvanathan and Narayanan 2024).

Furthermore, ethical issues are a major topic of discussion in the scholarly community regarding ChatGPT. Transparency, algorithmic bias, data privacy, and the effect on academic integrity were the important concerns as per (Yang et al., 2024). Now, universities and educational policymakers must develop policies that strike a balance between the opportunities presented by AI and the need to uphold educational standards and equity. The necessity for methodical research and evidence-based recommendations is further highlighted by the lack of agreement amongst institutions regarding the best way to include ChatGPT into learning environments (Alves de Castro, 2023; Hosseini et al., 2023). By performing a bibliometric analysis of scholarly works that discussed the pedagogical use of ChatGPT, our study has filled this gap. This study is limited to Research Rabbit platform process to do the bibliometric analysis and the databased is focusing on what Research Rabbit can filtered. Precisely, the platform is aimed to determine:

- a) Publication volume and growth over time.
- b) Keyword-based topic trend.
- c) Research Rabbit searches for related, subsequent, and earlier work from ChatGPT in education.

The study has offered a thorough picture of how the academic community is using ChatGPT as a teaching tool by examining these trends. The outcomes of this study have applications for scholars, educators, and legislators. Institutions can detect policy or teacher training needs, connect their curricula with current advances, and support the evidence-based integration of AI tools in the classroom by having a better understanding of the trajectory of academic interest. Bibliometric insights provided the academics with a road map of high-impact research, cooperative networks, and new fields that are just waiting to be explored.

The information can help policymakers to create national strategies, institutional policies, and ethical frameworks that guarantee the proper use of AI in education. In the long run, the academic community must keep up with the rapid advancements in generative AI technologies to assess their effects. Even though ChatGPT is a significant advancement in natural language comprehension, its application in education needs to be closely examined to make sure it enhances rather than detracts from human learning. This study enhanced the attempt by delivering a data-driven overview of the scholarly environment around ChatGPT in education and insights into how academics are influencing the conversation about

artificial intelligence's role in classrooms of the future (Lachheb et al., 2025; Saufi S, 2025).

2.0 LITERATURE REVIEW.

The amount of research on ChatGPT in education has increased significantly since it was made public, leading academics to use bibliometric and systematic review studies to evaluate the structure and development of this new subject. Thematic cluster detection, collaborative network mapping, and the growth of scholarly interest have all been aided by bibliometric research. Conversely, systematic reviews have provided a more in-depth understanding of the use, assessment, and discussion of ChatGPT in educational settings. Several bibliometric assessments have reported a substantial surge in publications focusing on ChatGPT across multiple disciplines, with education continuously placing among the top domains of interest.

By conducting a bibliometric analysis of 212 Scopus-indexed articles, Polat et al. (2024) examined the developing field of ChatGPT research in education and emphasized the expanding use of AI in instructional support and personalized learning. The overview has highlighted important trends, authors, and cooperative networks, with particular attention to fields including academic writing, medical education, and language acquisition. Although ChatGPT has the potential to improve writing productivity, adaptive learning, and decision assistance, it still has limits in terms of language comprehension, data reliability, and the possibility of plagiarism or false information. Performance metrics and science mapping approaches were used in the analysis, which looks at important journals, papers, authors, and conceptual themes using programmes like Bibliometrix and RStudio (Polat et al., 2024).

Intelligent systems, human-centered learning, computational education, conversational AI, and decision support systems are some of the main topic clusters. Most of the research is focused on higher education and healthcare settings. Monash University is one of the top universities in the United States and the United Kingdom, which have made significant contributions. Even though research has grown significantly between 2022 and 2023, there were still gaps in understudied fields, including gamification, commerce, and transdisciplinary applications. The paper has recommended that future investigations investigate the ethical and practical complications of including ChatGPT in education, expand database sources, and carry out longitudinal tracking (Polat et al., 2024).

According to Anthony & Sharma's (2025) research, there was a notable increase in educational publications about ChatGPT between 2019 and 2024, which has reflected the growing interest of scholars in this new area. The quick growth rate of 170.19% highlighted on how quickly research was progressing due to broad acceptance and interest in AI's potential uses in education. Important ethical issues about using ChatGPT in academic settings were also brought to light by the analysis, mainly those pertaining to data reliability, authorship, and integrity. Strong international and interdisciplinary interaction is demonstrated by the average of 3.6 co-authors per publication, which was indicative of collaborative research. Countries including the USA, UK, Australia, and China have made significant contributions, demonstrating a global research effort to investigate ChatGPT's educational potential (Anthony & Sharma, 2025).

In addition, Zheltukhina et al. (2024) have examined 82 publications on ChatGPT in educational research, indicating a growing scholarly interest in its use in a variety of learning situations. The contributions made by scholars from 42 different

nations showed that how international and cooperative this new discipline is. A sizable amount of the literature highlighted the potential of ChatGPT in specialized instructional contexts and concentrated on its application in medical and nursing education. Five unique clusters of study themes were found through thematic analysis, indicating a variety of topics for investigation, including pedagogy, technological integration, and ethical issues. Overall, the results indicated that interest in ChatGPT's function in educational settings was growing (Zheltukhina et al., 2024).

On the other side of coin, an analysis of 93 articles on ChatGPT in education published since 2022 by Pradana et al. (2023) showed a notable rise in scholarly output between 2022 and 2023. This increase was a result of rising scholarly interest in incorporating ChatGPT and other AI techniques into educational settings. Keyword research, however, showed that terms like "challenge," "teaching," and "knowledge" were still understudied and need more research. Although the results showed that AI has a great deal of promise to improve teaching methods, they also have pointed out that more research and validation were required to guarantee its responsible and successful application (Pradana et al., 2023).

Researchers JWang and Fan (2025) discovered that ChatGPT somewhat enhanced students' perceptions of their learning ($g = 0.456$), fostered a higher-order thinking skills ($g = 0.457$), and dramatically increased the learning performance with a large effect size ($g = 0.867$). According to these results, ChatGPT might be a useful tool for encouraging more cognitive engagement and improved academic performance. ChatGPT's influence was context-dependent, as evidenced by the fact that its efficacy changed based on the type of course and the learning model used. Notably, mixed-role ChatGPT implementations were not included in the analysis due to a lack of data, indicating that more research in more intricate educational contexts is necessary (Wang and Fan 2025).

The use of ChatGPT in Malaysia has increased significantly over the past year. A survey conducted by Madiyah and Abu Samah in 2025, found that 82.9% of 41 higher education students reported using ChatGPT and experienced positive outcomes in their studies. Similarly, a study by Selvanathan and Narayanan in 2024, examined the impact of ChatGPT in Malaysian higher education and concluded that it has significantly influenced the sector, particularly with the growth of online learning and the increasing demand for personalized learning experiences. Latest study on satisfaction of chatGPT usage in private university in Malaysia done by Zakaria et al. (2026) found that the possibility of ChatGPT to improve academic buoyancy and self-regulation, but more research is desired to discover its long-term effects on student learning, confidence, and overall academic outcomes.

This paper has critiqued the state of AI research in higher education and described on how AI might be used to address ethical issues, inclusivity, and educational inequities. It has highlighted equity-centered themes and identified popular research subjects, providing transferrable insights rather than generalizable assertions. One of the drawbacks of using Scopus as the only data source was that it can leave out pertinent research from other databases. Therefore, Research Rabbit is used since its databased combine previous paper and journal from many sources.

In order to allow for more detailed qualitative analysis, the methodology used topic modelling based on article abstracts rather than complete texts, which might have reduced contextual depth. Nevertheless, the full articles were later assessed. The contribution of the study included the outlining of important themes on how AI affected inclusivity and suggested a framework for the fair implementation of AI in higher education. The authors advised that adding full-text analysis and comparison studies to future research will give the benefits which were to improving validity and enriching findings.

In order to sum up, bibliometric and systematic reviews offered an organized, fact-based perspective on how the function of ChatGPT in education has changed over time. These studies have highlighted that prevailing research themes, validating the growing scholarly interest, and provided insight into the advantages and disadvantages of ChatGPT in educational settings.

However, the discipline needed more inclusive global participation, wider disciplinary representation, and deeper empirical engagement. Future studies must critically assess the use of ChatGPT, its effects, and ethical complications in order to direct its appropriate and successful integration as it continued to influence educational practice. Table 1 summarizes the analysis derived from the reviewed papers.

Table 1. Analysis on Literature Review

Study	Main Focus / Findings	Limitations / Gaps Identified	Critical Analysis / Research Implications
Polat et al. (2024)	Bibliometric analysis of 212 Scopus-indexed articles on ChatGPT in education; identified growth trends, key themes, authors, and collaboration networks.	Limited to Scopus database; focused mainly on publication trends rather than empirical educational outcomes.	Provides macro-level mapping of the field but lacks pedagogical depth. Future work should integrate bibliometric findings with classroom-based empirical validation.
Polat et al. (2024)	Found dominant themes in academic writing, medical education, and language learning; highlighted AI's potential in adaptive learning.	Underrepresentation of gamification, commerce, and interdisciplinary educational applications.	Indicates research concentration in narrow domains, suggesting the need to diversify ChatGPT educational applications across disciplines and contexts.
Anthony & Sharma (2025)	Reported rapid publication growth (170.19%) from 2019–2024; highlighted ethical concerns in authorship, integrity, and reliability.	Primarily descriptive trend analysis; limited exploration of intervention effectiveness.	Demonstrates strong scholarly momentum but reveals imbalance between conceptual discussion and practical implementation studies.
Zheltukhina et al. (2024)	Reviewed 82 publications from 42 countries; identified five thematic clusters including pedagogy and ethics.	Small dataset compared with broader bibliometric studies; limited longitudinal perspective.	Shows global scholarly interest but suggests the field is still fragmented and lacks long-term developmental tracking.
Pradana et al. (2023)	Analysis of 93 articles found rapid growth since 2022; identified understudied	Early-stage dataset due to recency of ChatGPT emergence; lacks deep thematic exploration.	Highlights immature research landscape with conceptual gaps in practical teaching integration and challenge mitigation.



	keywords such as "challenge," "teaching," and "knowledge."		
Wang & Fan (2025)	Meta-analysis showing ChatGPT improves learning performance, perceptions, and higher-order thinking skills.	Excluded mixed-role ChatGPT implementations; context-dependent effectiveness.	Supports positive educational impact but indicates effectiveness depends heavily on instructional design and implementation context.
Madiyah & Abu Samah (2025)	Survey of Malaysian higher education students found 82.9% use ChatGPT with positive perceived outcomes.	Small sample size (41 students); self-reported perceptions only.	Suggests strong local adoption but lacks objective measurement of academic performance impact.
Selvanathan & Narayanan (2024)	Examined ChatGPT's impact in Malaysian higher education; found significant influence on online and personalized learning.	Broad conceptual discussion with limited empirical evidence.	Reinforces local relevance of ChatGPT in Malaysia but requires more rigorous institutional-level evaluation.
Zakaria et al. (2026)	Found ChatGPT may improve academic buoyancy and self-regulation in Malaysian private universities.	Long-term effects remain unknown; limited to private university context.	Suggests psychological/behavioral benefits of ChatGPT but requires longitudinal and comparative validation.

From the table, it's demonstrated that research on ChatGPT in education has grown rapidly, encompassing bibliometric mapping, systematic reviews, meta-analyses, and localized empirical investigations. However, several critical gaps remain. Many studies emphasize publication trends and conceptual discussions rather than validation in authentic classroom settings. Additionally, most prior studies rely on traditional databases such as Scopus and WoS, despite the emergence of integrated databases and advanced bibliometric platforms. Therefore, this study highlights the performance of the Research Rabbit platform in bibliometric analysis.

3.0 RESEARCH METHODS.

The key method used in this work to map the academic papers pertaining to ChatGPT in education was bibliometric analysis (Pradana et al., 2023; Zheltukhina et al., 2024). The literature review entailed the methodical gathering of sources that support the study goals, including books, journal articles, conference proceedings, and pertinent quotes from reliable websites. Specific keywords, including "ChatGPT," "education," "learning," and "pedagogy," were used to scan the literature for publications from 2022 to 2025. Approximately 920 publications related to ChatGPT were identified in the Research Rabbit database. After applying the filtering criteria, 50 papers were selected for bibliometric analysis. The inclusion and exclusion criteria are presented in Table 2.



Table 2. Bibliometric Analysis Inclusion and Exclusion

Inclusion	Exclusion
Theme focus on ChatGPT, Education and Artificial Intelligence Publish between 2022 and 2025 English Language Full abstract	Not focus on education Publish before 2022 and after 2025 Non-English Language

Peer-reviewed publications from renowned academic databases, such as Semantic Scholar, Crossref, and other trustworthy indexing services, served as the study's primary source of data. In order to enhance subject identification and offer context, other resources were also explored, including scholarly publications, digital books, and pertinent newspaper stories. On the other hand, to guarantee alignment with the emphasis and relevance of the study, the gathered material was grouped according to research issues and emerging themes.

There are many tools can be used to create a bibliometric analysis, in this study Research Rabbit will be use to se the effectiveness of this tools and how powerfull it can help the author to do bibliometric analysis. By using the Research Rabbit programme, this strategy combined bibliometric analysis with the literature review methodology (Research Rabbit, 2025). Authorship networks, co-occurrence patterns of keywords, and publication trends were visualized using Research Rabbit. Table 3 provides an explanation of the study technique summary.

Table 3. Explanation of Research Methods

No	Research Method	Description
1.	Method Approach	Bibliometric Analysis
2.	Literature Review Approach	Collecting literature from various sources, including books, magazines, journal articles, and excerpts from newspaper articles that are relevant to the research objectives (databased of Research Rabbit). Literature searches were carried out using certain keywords. The search time limit is 2022 to 2025.
3.	Data Categorization	The literature data found is categorized based on themes or research topics to ensure relevance. The theme is ChatGPT, AI and education.
4.	Method Integration	The research creates bibliometric analysis using the Research Rabbit tool, providing comprehensive insight into the publication of "ChatGPT in Education".
5.	Search Time Range	2022 until 2025
6.	Search Keywords	"ChatGPT", "education", "learning", "pedagogy", "Artificial Intelligence"

4.0 RESULTS AND DISCUSSION.

With an emphasis on identifying the publication trends, research themes, and significant contributors in this field, a bibliometric analysis was carried out in this study to investigate the state of academic research on ChatGPT in education. In addition to literature data from Semantic Scholar and Crossref, the analysis was conducted using Research Rabbit, a visual bibliometric mapping tool. It is because of their academic credibility, relevance, and capacity to offer thorough citation metadata, these platforms were chosen.

The results of this bibliometric analysis offered a more thorough comprehension of the changes in scholarly research on ChatGPT during the past few years. According to the publication statistics, the number of scholarly publications started to rise sharply in early of 2023 after the ChatGPT was made available to the public in late 2022, which

was examined from 2022 to 2025. This trend showed that scholars were becoming more interested in investigating the pedagogical complications, difficulties, and possibilities that generative AI technologies in education offer.

By using the keyword co-occurrence analysis, a number of recurring themes emerged from the gathered publications. Personalized education, assessment integrity, academic writing help, AI-supported learning, and ethical issues were a few of these. The frequent use of these terms in several papers indicated that scholars were paying attention to the functional features of ChatGPT as well as how it has affected fundamental educational principles and practices.

Furthermore, citation network analysis identified several highly referenced papers and key writers who have made substantial contributions to the conversation surrounding ChatGPT in education. The existence of multidisciplinary partnerships, particularly amongst academics in computer science, educational technology, and ethics, demonstrated the depth and breadth of this field's research. Additionally, the Research Rabbit tool made it possible to identify publication clusters, which showed focused areas of study such as student engagement in AI-assisted environments, automated feedback systems, and language learning support.

Bibliometric insight is crucial when assessing the scholarly reaction to the incorporation of AI in education. This study would definitely help academics, educators, and policymakers in planning future research directions and creating academic regulations relevant to artificial intelligence by analyzing trends in publication volume, research themes, and author networks. In addition to documenting scholarly activity, the patterns found in this analysis have provided a foundation for critical thought on how educational systems are adjusting to the quick changes in technology.

The findings of the study have highlighted on how crucial it is to preserve a balance between educational principles and technological progress. Continuous bibliometric monitoring and evidence-based evaluation would be crucial as AI tools like ChatGPT were included into the learning settings to make sure that their use would promote fair, moral, and efficient teaching and learning methods.

4.1 Number of Publications focused on ChatGPT in Education Per Year (Last 5 Years)

A visualization of academic research on ChatGPT in the field of education is shown in Figure 1. The information demonstrated the notable increase in publications since ChatGPT's late 2022 public launch. Early articles started to appear in 2022, with a small number of preliminary researches demonstrating exploratory curiosity. The number of publications skyrocketed in 2023 as a result of the academic community's increased use of ChatGPT in a variety of educational scenarios. With current estimates and continuing manuscript activity indicating a continued rise in research output, the increasing trend was anticipated to continue into 2024 and 2025.

This trend showed how ChatGPT has become more widely acknowledged as a game-changing educational technology, which has led to research into its use in curriculum design, teaching, learning, and evaluation. The significant rise in 2023 can be attributed to both institutional interest in comprehending the pedagogical impact of the tool and the quick scholarly reactions to the tool's broad used by educators and students. The publication trend was a clear indicator of both potential and worry in the academic discourse as researchers investigate a variety of use cases, from intelligent tutoring systems to writing support.

Stakeholders might learn a lot about the rate of research advancement, new educational subjects, and the international academic response to generative AI tools by examining the trajectory of these papers. This graph facilitated the strategic decision-making in curricular innovation, faculty development, and policy design in

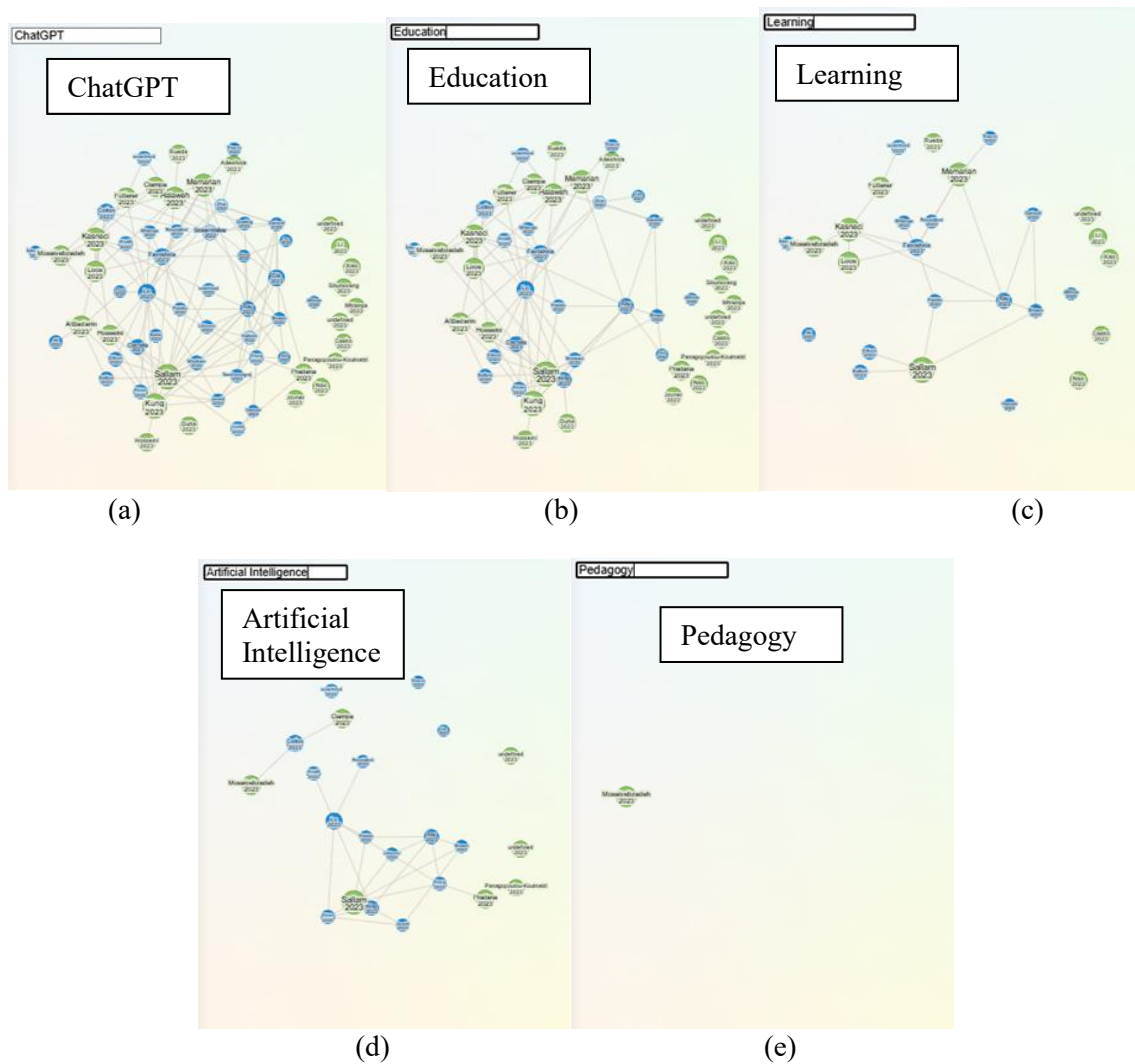


Figure 2 Topic Trend based on Keyword

4.3 Similar Work

Figure 3 illustrated the relationship between Similar Work discovered from 50 journals while using Research Rabbit to search for "ChatGPT in Education." Within the context of this bibliometric mapping, the term "Similar Work" referred to the finding and evaluation of related academic publications, especially those that deal with relevant research themes or use comparable methodology. "Similar Work" was utilized in the context of this study to track out pertinent scientific literature that focused on the use, effects, and discussions of ChatGPT in the classroom. This feature allowed academics to look at related papers and develop a more comprehensive knowledge of previous scholarly contributions by using Research Rabbit, which visually maps the citation relationships and theme linkages.

The "Similar Work" feature in this analysis was crucial in locating additional research that examined the function of generative AI tools, particularly ChatGPT, in fields including academic writing, AI literacy, student engagement, personalized learning, and ethical dilemmas in education. Comparative insight into research patterns across various areas and educational levels was provided by these connected publications, which also served to corroborate theme trends found in the main dataset.

These related publications were included to the bibliometric mapping, making it more thorough and representative of the diversity of the field. Additionally, it enabled scholars to evaluate the level of scholarly interaction using ChatGPT and

comprehend the ways in which other authors and institutions have tackled related research topics. In addition to placing the current study within the larger academic discourse, this comparative viewpoint was helpful in spotting any gaps, areas of interest overlap, or new developments that demand more research.

In summary, the utilization of "Similar Work" has enhanced the bibliometric overview and provided a more comprehensive picture of the range of techniques, methodologies, and thematic focuses that influenced the changing research environment on ChatGPT in education.

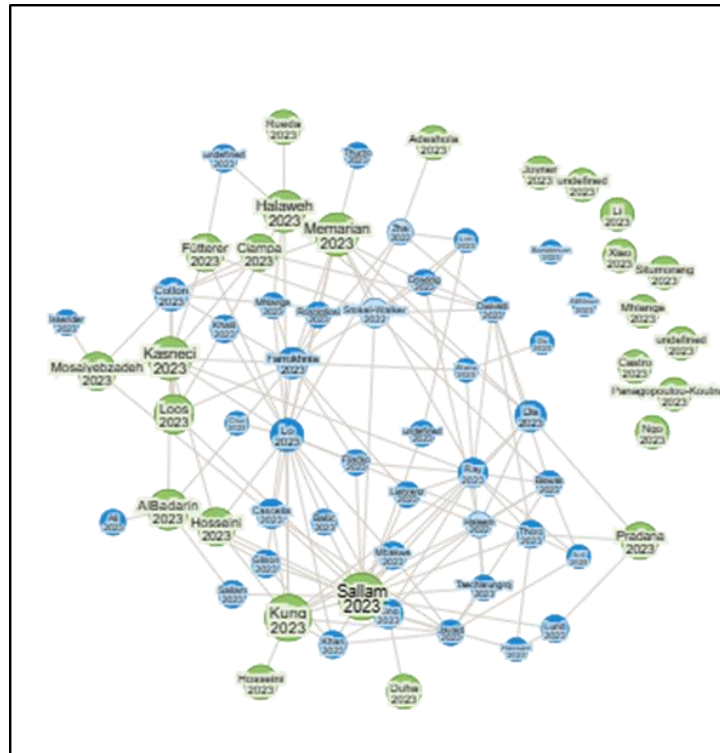


Figure 3 Similar Work

4.4 Earlier Work

Figure 4 illustrated the relationship between the "Earlier Work" that was discovered. In this study, "Earlier Work" provided the basic background and historical context required to support the current bibliometric analysis of educational publications connected to ChatGPT. A better grasp of how scholarly research into artificial intelligence in education, specifically the application of generative AI tools like ChatGPT has changed over time is made possible by the inclusion of prior studies. This study was able to track significant advancements, emphasize methodological advancements, and pinpoint changes in the field's thematic focus by referencing earlier research.

The literature review was the most common method that earlier work that has been presented in the context of literature mapping. It served to provide a theoretical framework and compare previous findings with current trends. For example, intelligent tutoring, automated grading, and adaptive learning systems were major topics in the early conversations about AI in education (Zawacki-Richter et al., 2019). More contemporary investigations into natural language processing and human-AI cooperation, which currently dominate the ChatGPT conversation, were made possible by these pioneering experiments.

By incorporating these historical viewpoints, the current study highlighted the uniqueness of ChatGPT and the pedagogical issues it posed in addition to placing

itself within the broader research timeline. Previous research also aided in identifying gaps that the current analysis seeks to fill, such as the lack of visual mapping to depict collaborative networks and subject evolution or the lack of bibliometric evaluations tailored to generative AI in educational settings.

As a result, citing prior research is crucial for confirming the originality and relevance of the study as well as for relating the findings to more general scholarly discussions and directing the course of future research. It has created an academic continuity that raised the caliber and legitimacy of the ongoing research.

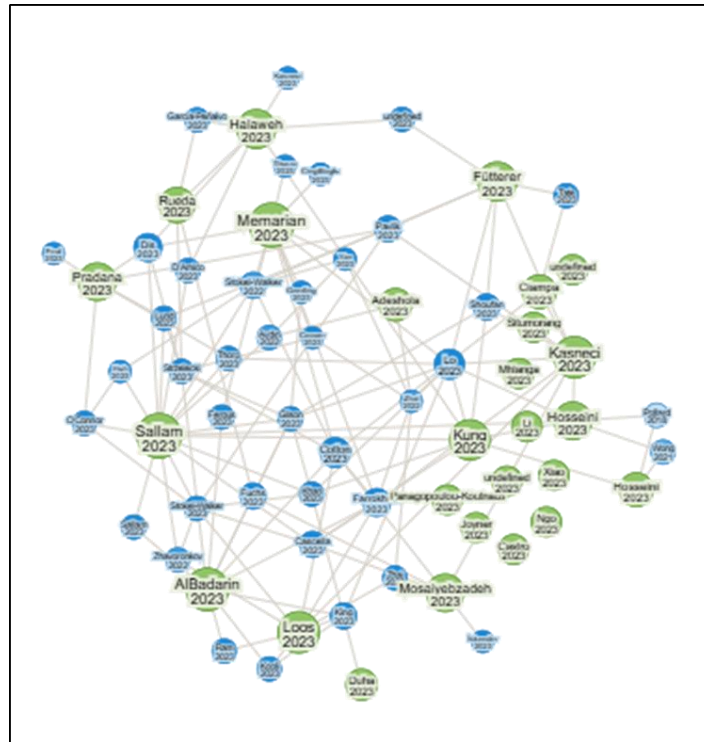


Figure 4 Earlier Work

4.5 Later Work

The relationship between "Later Work" and this study has been illustrated in Figure 5. In this study, "Later Work" referred to scientific publications and current research initiatives that have surfaced after the first wave of literature on ChatGPT in education, especially those published in 2024 and later. Examining later work was crucial in bibliometric analysis because it showed how the academic discourse has developed, what new avenues have been investigated, and how early discoveries were being expanded upon, improved upon, or contested.

This study was able to identify connections between more recent contributions and earlier fundamental studies by using studies Rabbit. This mapping showed how several themes such as student-AI interaction, academic integrity, and AI-supported assessment, have changed over time, with subsequent research showing a move away from conceptual talks and towards more empirical, application-focused investigations. For example, more recent studies were starting to offer data-driven evaluations, such as student performance comparisons, AI prompt engineering in curriculum, and institutional responses to ChatGPT use, whereas earlier publications frequently focused on the theoretical possibilities of using ChatGPT in classrooms.

The discovery of later work also demonstrated on how academics were adjusting to the quick development of generative AI tools, demonstrating the area's rapid innovation and academic response. Furthermore, it facilitated a more thorough

research focus. For stakeholders looking to match faculty development, funding, and research planning with continuing advancements in educational technology, this dynamic trend provided insightful information.

In summary, this study has established the groundwork for further investigation, assessment, and cooperation in addition to offering a glimpse of the state of scholarly use of ChatGPT in the classroom. This bibliometric mapping can help researchers, educators, and politicians make strategic decisions by highlighting important contributors, issue clusters, and developing areas of interest. In the end, comprehending these trends would aid in the creation of more knowledgeable, accountable, and creative methods for incorporating AI into education, assisting establishments in staying flexible, progressive, and pedagogically sound in a digital environment that is changing quickly.

However, this study is subject to several limitations due to the use of Research Rabbit as the primary bibliometric analysis tool. While Research Rabbit provides an accessible and user-friendly platform for literature mapping, its free version offers limited analytical depth, restricted export functions, and fewer customization options compared to more advanced bibliometric tools. In addition, the platform may provide less comprehensive metric analysis and visualization flexibility, which can affect the granularity of network interpretation and citation analysis. Future studies may consider employing more advanced bibliometric software such as Bibliometrix/Biblioshiny in R, Connected Papers, or other specialized scientometric tools to generate deeper and more robust bibliometric insights. The integration of multiple bibliometric platforms may also enhance the validity and comprehensiveness of future analyses.

6.0 CONFLICT OF INTEREST

This study does not contain any conflict of interest.

7.0 ACKNOWLEDGMENTS

We would like to express their sincere gratitude to our University; Universiti Sains Malaysia and AIMST University for its continuous support, academic resources, and research environment that made this study possible. The authors would like to express their heartfelt appreciation to the researchers and institutions whose work underpins this study. Special thanks are extended to the developers of the Research Rabbit platform for providing an intuitive and powerful tool for exploring literature networks and identifying key research trends. Lastly, we acknowledge the wider academic community whose work on ChatGPT and AI in education has laid the foundation for this research.

8.0 AUTHOR CONTRIBUTIONS

Concept, original idea, data collection and production of draft manuscript, Masyitah Abu. Literature review analysis, and methodology, Masyitah Abu and Shamine Moganathan. Language style review and compilation of reference sources, Shamine Moganathan. All authors have read and agreed to the published version of the manuscript.

9.0 REFERENCES

- Alves de Castro, C. (2023). A Discussion about the Impact of ChatGPT in Education: Benefits and Concerns. *Journal of Business Theory and Practice*, 11(2), p28. <https://doi.org/10.22158/jbtp.v11n2p28>
- Anthony, A., & Sharma, S. (2025). Ethics in the Era of ChatGPT: A Bibliometric Analysis of the Transformative Trajectory of Emerging Trends in Artificial Intelligence in Academic Research. *Journal of Educational Technology Systems*. <https://doi.org/10.1177/00472395251356520>
- Bakialekshmi Selvanathan, & Narayanan, S. (2024). Chatgpt in Higher Education Malaysia: An Opportunity or Threat to The Education System? *International Journal of Academic Research in Progressive Education and Development*, 13(3). <https://doi.org/10.6007/ijarped/v13-i3/21455>
- Chen, L., Chen, P., & Lin, Z. (2020). Artificial Intelligence in Education: a Review. *IEEE Access*, 8(8), 75264–75278. <https://doi.org/10.1109/ACCESS.2020.2988510>
- Fütterer, T., Fischer, C., Alekseeva, A., Chen, X., Tate, T., Warschauer, M., & Gerjets, P. (2023). ChatGPT in education: global reactions to AI innovations. *Scientific Reports*, 13(1), 15310. <https://doi.org/10.1038/s41598-023-42227-6>
- Hosseini, M., Gao, C. A., Liebovitz, D. M., Carvalho, A. M., Ahmad, F. S., Luo, Y., MacDonald, N., Holmes, K. L., & Kho, A. (2023). An exploratory survey about using ChatGPT in education, healthcare, and research. *MedRxiv: The Preprint Server for Health Sciences*, 2023.03.31.23287979. <https://doi.org/10.1101/2023.03.31.23287979>
- Jia, J., Chen, Y., Ding, Z., & Ruan, M. (2012). Effects of a vocabulary acquisition and assessment system on students' performance in a blended learning class for English subject. *Computers & Education*, 58(1), 63–76. <https://doi.org/10.1016/j.compedu.2011.08.002>
- Joyner, D. A. (2023). ChatGPT in Education: Partner or Pariah? *XRDS: Crossroads, the ACM Magazine for Students*, 29(3), 48–51. <https://doi.org/10.1145/3589651>
- Kasneci, E., Sessler, K., Küchemann, S., Bannert, M., Dementieva, D., Fischer, F., Gasser, U., Groh, G., Günemann, S., Hüllermeier, E., Krusche, S., Kutyniok, G., Michaeli, T., Nerdel, C., Pfeffer, J., Poquet, O., Sailer, M., Schmidt, A., Seidel, T., & Stadler, M. (2023). ChatGPT for good? on Opportunities and Challenges of Large Language Models for Education. *Learning and Individual Differences*, 103(102274). <https://doi.org/10.1016/j.lindif.2023.102274>
- Lachheb, A., Leung, J., Abramenka-Lachheb, V., & Rajagopal Sankaranarayanan. (2025). AI in higher education: A bibliometric analysis, synthesis, and a critique of research. *The Internet and Higher Education*, 101021–101021. <https://doi.org/10.1016/j.iheduc.2025.101021>
- Mahir Pradana, Hanifah Putri Elisa, & Wang, L. (2023). Discussing ChatGPT in education: A literature review and bibliometric analysis. *Cogent Education*, 10(2). <https://doi.org/10.1080/2331186x.2023.2243134>
- Mawar Madiah, & Abu, R. (2025). Exploring the Relationship Between Academic Achievement and ChatGPT Usage: A Survey of Higher Education Students in Malaysia. *Journal of Informatics and Web Engineering*, 4(2), 275–302. <https://doi.org/10.33093/jiwe.2025.4.2.18>
- Montenegro-Rueda, M., Fernández-Cerero, J., Fernández-Batanero, J. M., & López-Meneses, E. (2023). Impact of the Implementation of ChatGPT in Education: A Systematic Review. *Computers*, 12(8), 153. <https://doi.org/10.3390/computers12080153>

- Ngo, T. T. A. (2023). The Perception by University Students of the Use of ChatGPT in Education. *International Journal of Emerging Technologies in Learning (IJET)*, 18(17), 4–19. <https://doi.org/10.3991/ijet.v18i17.39019>
- Polat, H., Topuz, A. C., Yıldız, M., Taşlıbeyaz, E., & Kurşun, E. (2024). A Bibliometric Analysis of Research on ChatGPT in Education. *International Journal of Technology in Education*, 7(1), 59–85. <https://doi.org/10.46328/ijte.606>
- Research Rabbit. (2025). <https://www.researchrabbit.ai/>
- Sallam, M. (2023). ChatGPT Utility in Healthcare Education, Research, and Practice: Systematic Review on the Promising Perspectives and Valid Concerns. *Healthcare*, 11(6), 887. <https://doi.org/10.3390/healthcare11060887>
- Saufi S. (2025). "From Traditional Classrooms to Digital Learning: Exploring Research Trends in Contemporary E-Learning Challenges Education." *SunText Review of Arts & Social Sciences* 6(1):186. <https://doi.org/10.51737/2766-4600.2025.086>
- Shazlin Niza Ab Razak. (2026). "Make AI Literacy The Essential Ingredient Of Our Education". <https://www.malaymail.com/news/what-you-think/2026/01/03/make-ai-literacy-the-essential-ingredient-of-our-education-shazlin-niza-ab-razak/204124>
- Wang, Jin, and Wenxiang Fan. (2025). "The Effect of ChatGPT on Students' Learning Performance, Learning Perception, and Higher-Order Thinking: Insights from a Meta-Analysis." *Humanities and Social Sciences Communications* 12(1). <https://doi.org/10.1057/s41599-025-04787-y>
- Winter, Dimitra Dodou, & Arno. (2023). ChatGPT in Education: Empowering Educators through Methods for Recognition and Assessment. *Informatics (Basel)*, 10(4), 87–87. <https://doi.org/10.3390/informatics10040087>
- Xiao, Changrong, Sean Xin Xu, Kunpeng Zhang, Yufang Wang, and Lei Xia. (2023). Evaluating Reading Comprehension Exercises Generated by LLMs: A Showcase of ChatGPT in Education Applications. <https://openai.com/blog/chatgpt>
- Yang, S., Dong, Y., & Zhong Gen Yu. (2024). ChatGPT in Education. *International Journal of Information and Communication Technology Education*, 20(1), 1–19. <https://doi.org/10.4018/ijicte.346826>
- Yazid Albadarin, Saqr, M., Pope, N., & Markku Tukiainen. (2024). A systematic literature review of empirical research on ChatGPT in education. *Discover Education*, 3(1). <https://doi.org/10.1007/s44217-024-00138-2>
- Zakaria, S. K., Sani, R. M., Rahman, A., Daud, M. N., & Saro, N. (2026). ChatGPT Satisfaction in Higher Education: Survey in a Private University in Malaysia. *Studies in Systems, Decision and Control*, 653–662. https://doi.org/10.1007/978-3-032-10016-0_51
- Zawacki-Richter, O., Marín, V.I., Bond, M. et al. Systematic review of research on artificial intelligence applications in higher education – where are the educators? *Int J Educ Technol High Educ* 16, 39 (2019). <https://doi.org/10.1186/s41239-019-0171-0>
- Zheltukhina, M. R., Sergeeva, O. V., Masalimova, A. R., Budkevich, R. L., Kosarenko, N. N., & Nesterov, G. V. (2024). A bibliometric analysis of publications on ChatGPT in education: Research patterns and topics. *Online Journal of Communication and Media Technologies*, 14(1), e202405–e202405. <https://doi.org/10.30935/ojcm/14103>