



Bibliometric Analysis of Generation Z's Dependence on Artificial Intelligence (AI)

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Abstract: This study aims to analyze trends and patterns in scientific publications related to Generation Z's dependence on artificial intelligence (AI) in completing academic tasks. The study uses a descriptive quantitative approach with bibliometric analysis methods. Data were obtained from Google Scholar through the Publish or Perish application for the period 2020–2024, then analyzed using VOSviewer software to map the relationships between topics, keyword frequency, and author and institutional collaboration. The results showed that there were 199 articles relevant to the trend of significant increase in publications, especially after the development of generative AI technologies such as ChatGPT. Bibliometric mapping produced seven main clusters with central terms including Generation Z, artificial intelligence, and education. These findings indicate that Generation Z's dependence on AI is becoming an increasing academic concern, particularly in the context of academic ethics, digital literacy, and independent learning. This study provides an initial overview of the direction of research development and can serve as a basis for further research related to the behavior of young people's use of AI in education.

Keywords: bibliometric analysis; Generation Z; artificial intelligence; AI dependency; VOSviewer

INTRODUCTION

The rapid development of information and communication technology in recent decades has given rise to various innovations, one of which is artificial intelligence (Prasetyo & Khairullah, 2024). AI technology has now become an integral part of everyday life, including in the world of education (Kurniasari et al., 2024). Its presence brings convenience in accessing information, composing texts, solving problems, and even producing visual and academic works (Rizky et al., 2025).

Generation Z, individuals born between 1997 and 2012, are a group that is very familiar with and quick to adapt to advances in digital technology, including the use of AI (Al Hamidi et al., 2024). This generation tends to prioritize efficiency, speed, and convenience in completing various tasks, which then makes AI one of their main tools in learning activities (Rony et al., 2024).

The phenomenon of Generation Z's dependence on AI raises a number of critical questions, particularly regarding the development of critical thinking, creativity, and originality in completing tasks (Prasetya & Santosa, 2023). On the one hand, AI can increase productivity and provide broad access to knowledge (Andriani & Fitria, 2022).

However, on the other hand, if used excessively and without good digital literacy, AI can pose risks of dependency and cognitive decline (Susanti et al., 2024). Therefore, it is important to understand the extent to which this phenomenon has been addressed in scientific literature and how research trends related to Generation Z's dependence on AI have developed over time.

This study aims to bibliometrically analyze trends in scientific publications discussing Generation Z's dependence on AI in the context of task completion (Kurniasari et al., 2024). Through a bibliometric approach, this study will identify publication patterns, the most productive authors and institutions, the most influential journals or sources, frequently used keywords, and a map of scientific collaboration networks formed in this topic (Prasetyo & Khairullah, 2024).

Thus, this study not only provides a quantitative overview of the development of the topic but also serves as a basis for identifying research gaps that remain open. Several previous studies have discussed the use of technology in education. A study by Maulana (2022) shows that ChatGPT can help improve the quality of students' academic writing by providing quick feedback. However, the study focuses more on the potential of technology as a learning tool. Meanwhile, other studies, such as that by Fitria (2020), touched on ethical issues in the use of AI in academia but did not specifically examine students' dependence on AI.

A study by Rakhmawati et al. (2025) shows that ChatGPT and AI chatbot applications can provide quick feedback and help improve the quality of students' academic writing through the development of writing structure and understanding of academic principles. Meanwhile, other studies, such as those by Salsabila & Sohidin (2025), touch on ethical issues in the use of AI in academia but have not specifically examined students' dependence on AI.

Thus, this study complements and deepens previous studies by emphasizing the psychological and behavioral aspects of users, particularly Gen Z in higher education in Indonesia. The novelty of this study lies in its specific focus on examining the relationship between Generation Z, dependence on AI, and task completion through a bibliometric approach.

In addition, this research will also identify current keywords and trending topics that can be used as a reference for further research. Theoretically, this research is based on the concepts of digital literacy, generational theory, and

technology dependence theory, which form the basis for understanding the interaction between young users and artificial intelligence-based technology.

This study uses a descriptive quantitative approach with bibliometric analysis methods to examine trends in scientific publications related to Generation Z's dependence on artificial intelligence in completing academic tasks. The research targets scientific articles discussing Generation Z and artificial intelligence in education published between 2020 and 2024. The research population included all articles indexed in Google Scholar with the keywords "Generation Z" and "Artificial Intelligence," while the sample was determined using purposive sampling based on topic relevance and year of publication, resulting in 199 articles being analyzed. The research procedure began with data collection using the Publish or Perish application, followed by article selection based on titles and abstracts, as well as data cleaning to avoid duplication and irrelevant keywords. The bibliographic data was then exported in .ris and .csv formats for analysis using VOSviewer software. Data analysis was conducted through keyword co-occurrence mapping, author collaboration, and network, overlay, and density visualization to identify patterns, main topic clusters, and research developments regarding Generation Z's dependence on artificial intelligence in the field of education.

METHOD

This study uses a descriptive quantitative approach with bibliometric analysis methods to examine trends in scientific publications related to Generation Z's dependence on artificial intelligence in completing academic tasks. The research targets scientific articles discussing Generation Z and artificial intelligence in education published between 2020 and 2024. The research population included all articles indexed in Google Scholar with the keywords "Generation Z" and "Artificial Intelligence," while the sample was determined using purposive sampling based on topic relevance and year of publication, resulting in 199 articles being analyzed. The research procedure began with data collection using the Publish or Perish application, followed by article selection based on titles and abstracts, as well as data cleaning to avoid duplication and irrelevant keywords. The bibliographic data was then exported in .ris and .csv formats for analysis using VOSviewer software. Data analysis was conducted through keyword co-occurrence mapping, author collaboration, and network, overlay, and density visualization to identify patterns, main topic clusters, and research developments regarding Generation Z's dependence on artificial intelligence in the field of education.

RESULT AND DISCUSSION

Result of Research Procedure

Based on search data conducted using the Publish or Perish application with the keywords "Generation Z" and "Artificial Intelligence" through the Google Scholar database, 199 articles were found that were relevant and in line with the study topic regarding Generation Z's dependence on artificial

intelligence (AI) in completing academic tasks. These articles were published between 2020 and 2024. The total number of citations from the collected articles reached 4,211 citations, with an average of 842.2 citations per year and 21.16 citations per article. The cumulative h-index value of these articles is 31, while the g-index value reaches 45, indicating that the level of influence and quality of publications in this study is quite high in the fields of educational technology and digital behavior.

Table 1 in this document displays a list of selected articles that were used as the basis for bibliometric analysis. These articles were then analyzed using VOSviewer software to map the relationships between topics, keyword frequencies, and collaborations between authors and institutions.

Research Development Generation Z's Dependence on AI The development of research on Generation Z's dependence on Artificial Intelligence (AI) is shown in Table 2, which records that 199 articles have been published during the period 2020 to 2024, with an average annual publication of 39.8 articles. The lowest number of publications was recorded in 2021 with 11 articles, while the peak of publications occurred in 2024 with 124 articles. This shows a significant increase in researchers' interest in this topic in recent years.

Based on this data, it can be seen that scientific publications on Gen Z's dependence on AI show a dynamic pattern. At the beginning of the period (2020–2021), the number of publications was relatively low and stable. However, starting in 2022, the number of publications began to increase, followed by a significant surge in 2023, reaching its peak in 2024. This increase can be linked to the growing popularity of generative AI technologies such as ChatGPT, which began to be used extensively by university and school students as a tool to help them complete their academic assignments.

Figure 1 illustrates a non-linear trend with a temporary decline in 2021, followed by exponential growth in subsequent years. This phenomenon reflects the growing concern among the academic community about the social and educational impact of AI use by Generation Z. Overall, this publication trend shows that the topic of Gen Z's dependence on AI has become an important focus in the world of research, particularly in the fields of education, digital psychology, and technological literacy.

Table 1. Data on Generation Z's Dependence on Artificial Intelligence (AI)

No	Author	Title	Year	Number of Citations
1	AB Mahmoud et al.	"We aren't your reincarnation!" workplace motivation across X, Y and Z generations	2021	545
2	M Hernandez de-Menendez et al.	Educational experiences with Generation Z	2020	400

3	NA Windasari et al.	Digital-only banking experience: Insights from gen Y and gen Z	2022	310
4	D Gould et al.	Coaching generation Z athletes	2020	184
5	CC Stahl & I Literat	GenZ on TikTok: the collective online self-portrait of the social media generation	2023	173
6	SPS Ho & MYC Chow	The role of artificial intelligence in consumers' brand preference for retail banks in Hong Kong	2023	135
7	V Vitezić & M Perić	Artificial intelligence acceptance in services: connecting with Generation Z	2021	129
8	MA Ribeiro et al.	Determinants of generation Z pro environmental travel behaviour: the moderating role of green consumption values	2023	115
9	M Saxena & DK Mishra	Gamification and gen Z in higher education: A systematic review of literature	2021	108
10	GP Mahapatra et al.	Gen Z: An emerging phenomenon	2022	105
11	H Yu et al.	Robots can't take my job: antecedents and outcomes of gen Z employees' service robot risk awareness	2022	102
12	MRH Polas et al.	Customer's revisit intention: Empirical evidence on Gen-Z from Bangladesh towards halal restaurants	2022	96
13	S Seyfi et al.	How does digital media engagement influence sustainability-driven political consumerism among Gen Z tourists?	2023	91
14	RP Schlee et al.	From Millennials to Gen Z: Changes in student attitudes about group projects	2020	89
15	W Guo & Q Luo	Investigating the impact of intelligent personal assistants on the purchase intentions of Generation Z consumers: The moderating role of brand credibility	2023	82

Table 2. Development of Research on Generation Z's Dependence on Artificial Intelligence (AI)

Year	Number of Publications
2020	12
2021	11
2022	18
2023	34
2024	124
Number	199
Average	39,8

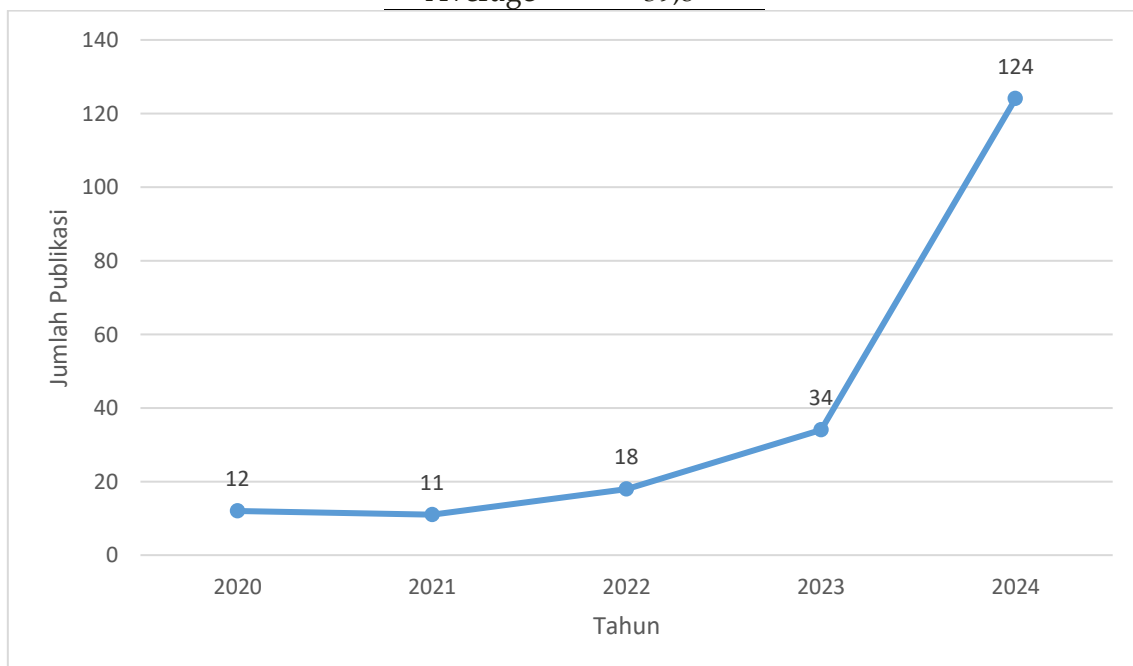


Figure 1. Development of Research on Generation Z's Dependence on Artificial Intelligence (AI)

Visualization of Topic Areas Generation Z's Dependence on Artificial Intelligence (AI) using VOSviewer

Computational mapping visualization based on articles collected through Publish or Perish and analyzed using VOSviewer software produced three main forms of visualization: network visualization, overlay visualization, and density visualization. These mapping results provide a comprehensive overview of the relationships between terms that frequently appear in publications, as well as the development of topics over time.

Network visualization (Figure 2) shows several main clusters formed based on the interrelationships between terms. Each cluster is marked with a different color and illustrates a specific thematic focus in the literature. In this study, the visualization produced more than 100 terms grouped into several clusters. For example, there is a cluster that dominates terms such as "Generation Z," "Artificial Intelligence," "Education," "Learning Behavior," and "Technology





Figure 2 shows the relationship between terms in the form of a network visualization that are interconnected and form clusters. From Figure 2, it can be seen that related terms are grouped into several clusters according to the thematic connections in the analyzed literature. The closer the position between terms, the stronger the relationship or connection between the topics (Nugraha, 2022). This visualization shows that terms such as “Generation Z,” “Artificial Intelligence,”

and 'Education' are at the center of the research network and have strong connections with other terms such as "digital literacy," "student behavior," and "academic performance."

Figure 3 shows an overlay visualization of terms in research on Generation Z's dependence on AI. This visualization illustrates the novelty or year of emergence of terms in the scientific literature studied. From this visualization, it can be seen that terms such as "ChatGPT," "AI dependency," and "instant learning" appear in bright yellow, indicating that these topics are relatively new areas of study, especially in the period from 2023 to 2024. This indicates an increased focus of research on the increasingly instant and massive use of AI by Generation Z in academic activities.

Figure 4 shows a density visualization, which illustrates the intensity of the appearance of terms in the literature. The brighter the yellow color and the larger the diameter of the circle, the more frequently the term appears. Based on Figure 4, it can be seen that terms such as "Generation Z," "Artificial Intelligence," "Education," and "student behavior" have a high density. This indicates that these terms are the main focus of the most studied research in related scientific literature, illustrating that the topic of Generation Z's dependence on AI is an important issue that has been developing intensively in recent years.

CONCLUSION

This study aims to analyze trends in scientific publications regarding Generation Z's dependence on Artificial Intelligence (AI) in completing tasks, using a bibliometric approach. Data was obtained from Google Scholar through the Publish or Perish application and analyzed using VOSviewer to generate visualizations of relationships between topics, keyword trends, and collaborations between authors and institutions. From the analysis of 199 articles published between 2020 and 2024, it was found that there was a significant increase in the number of publications, especially after the emergence of generative AI technologies such as ChatGPT. Bibliometric visualizations show that there are seven main clusters that dominate the topics, including topics such as AI dependency, digital literacy, academic integrity, and student behavior. The terms "Generation Z," "Artificial Intelligence," and "Education" occupy central positions in the network of interrelated terms.

This study shows that scientific attention to the use of AI by Generation Z is increasing, along with concerns about its impact on learning independence and academic ethics. Therefore, researchers and educators need to develop critical digital literacy strategies and instill ethical awareness in the use of AI. For further research, it is recommended to use a combined quantitative and qualitative approach, as well as expand the data from other international databases such as Scopus or Web of Science so that the results obtained are more comprehensive and global.

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