

From Global Landscapes to Local Contexts: A Bibliometric Analysis of Artificial Intelligence and Student Behavior

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Abstract: The development of artificial intelligence (AI) applications has profound implications for higher education, including student behaviors, engagement, and productivity in learning. While academic literature addressing the implications of AI applications is on the rise, its relevance for fields of economics, business, and the social sciences remains disparate and localized. In this regard, this paper analyzes the bibliometric landscape of AI research using a set of indicators that include keyword co-occurrence, time and research density, and emerging research fronts using VOSviewer, and the search was limited to Scopus-indexed journal articles (2000-2025). A descriptive analysis was done based on three sets of documents, namely the global baseline, the discipline-specific body of work, and a local Malaysian dataset. The global dataset has produced a mature and integrated network with a primary emphasis on educational data mining and learning analytics. Nevertheless, temporal overlay visualization analysis reveals a sharp transition to the human and ethical factors surrounding generative artificial intelligence, including academic integrity and frameworks for evaluating teacher acceptance of disruptive technologies. In contrast, the Malaysian dataset was found to have a sparsely connected network, suggesting the growing nature of local research. Indeed, studies pertaining to Malaysia appear to focus on the interactions between students and ChatGPT and lack psychological theories in any of the included works. This study has identified the fundamental disconnect between regional and international research practices. As such, it can serve as the foundation for future studies that seek to understand the effects of artificial intelligence on the emotional, social, and academic development of students in developed digital economies.

Keywords: *Artificial Intelligence; Student Behavior; Bibliometric Analysis; VOSviewer; Generative AI.*

1. Introduction

The introduction of artificial intelligence (AI) in higher education has caused substantial disruptions to traditional pedagogical models across the disciplines of economics, business, and the social sciences. Within the educational sector, AI has introduced sophisticated tools and algorithms that facilitate learning processes, offering interactive platforms, intelligent tutoring systems, and automated feedback mechanisms that adapt to the needs and progress of each student (Adu & Adebayo, 2023). The convenience of adaptive learning systems, virtual assistants, and AI-enhanced learning platforms allows students to learn at their own pace and receive customized support based on their unique learning patterns and needs (Chen & Liu, 2024).

As a new and quickly developing technology, AI is transforming students' studying habits, performance, and conduct in the classroom. Although AI is beneficial to the learning process and encourages digital empowerment, differences in technology acceptance and behavioral intention toward using AI in education exist worldwide (Ma et al., 2024; Ayanwale et al., 2024). Therefore, it is vital to understand how new learning technologies influence behavioral patterns and conduct in general.

Other than changing academic workflows, the integration of AI introduces complex behavioral and psychological implications for students. Studies have shown that the tendency of students to rely on AI chatbots and tools for social and academic support has adverse effects, including loss of social connection and increased levels of exhaustion, which, in turn, affect students' academic performance negatively (Crawford et al., 2024; Klimova & Pikhart, 2025). The growth in research publications and the diversity of themes highlight AI's potential as a transformative tool in education. Therefore, it becomes pertinent to keep track of how academic literature is responding to these behavioral shifts to understand how the dynamics of student behavior are being influenced by those tools. Moreover, understanding student behaviors in AI-based learning systems can support the development of ethical frameworks and guidelines to ensure that AI applications in education are used responsibly and equitably, preserving student privacy and autonomy (Alam & Raza, 2022; Mahendra et

al., 2023; Mureşan, 2023)

Therefore, this study utilizes VOSviewer to conduct a comprehensive bibliometric analysis with three primary objectives:

- To identify the current research landscape of artificial intelligence and student behavior within the disciplines of economics, econometrics and finance, business, management, accounting, and social science.
- To discover the potential and future research paths of artificial intelligence and student behavior within the disciplines of economics, econometrics and finance, business, management, accounting, and social science.
- To evaluate the current and potential research focus on artificial intelligence and student behaviour in Malaysia.

2. Methodology

This study adopted a quantitative bibliometric analysis design to systematically map the research landscape of artificial intelligence and student behaviour. By evaluating metadata from published literature, bibliometrics allows for an objective, macro-level synthesis of research trends, structural keyword networks, and geographic focus areas across multiple academic disciplines.

Database and Eligibility Criteria

The Scopus database was used as the search source due to its recognized quality, as it includes thousands of peer-reviewed sources on social sciences, business, and economics. The time frame of the search was set to the last 25 years (2000-2025) to ensure the relevance and breadth of the topic. The inclusion and exclusion criteria were set as follows:

Search string: ("artificial intelligence" OR "AI" OR "machine Learning" OR "deep learning" OR "learning system") AND ("behavior in education" OR "student behavior" OR "learner behavior")

Language: English; to avoid biases for language incompetence

Index: Scopus; Journal articles and conference proceedings

Subject Areas: Limited to *Economics, Econometrics and Finance, Social Sciences, and Business, Management and Accounting* for the second and third dataset.

Data Collection and Dataset Breakdown

To meet the requirements of the research objectives, three sets of data were obtained. The first set (dataset 1) was based on a broad search using the mentioned search string in 2.1. The terms were used in the search engine to retrieve articles discussing the role of artificial intelligence in education on a global scale. The second set of data (dataset 2) included the articles that had the same terms with a specific focus on Education, Economics, Econometrics & Finance, Social Sciences, and Business, Management & Accounting. Finally, the third set (dataset 3) was obtained with a restriction to a country: Malaysia.

Bibliometric Mapping using VOSviewer

The extracted bibliographic data in CSV format were uploaded into VOSviewer (version 1.6.21) for network and cluster visualization and analysis. Following that, the software's options were set according to the research objectives listed below:

Type and unit of analysis: A co-occurrence analysis was conducted by selecting all keywords (both author and index keywords) as the unit of analysis.

Counting method: The Full Counting method was selected. By using the full counting method, every co-occurrence of a keyword pair in a document is given an equal weight. As such, it provides an accurate measurement of the link strength and connection density within the literature network.

Visualization modes: A network visualization map and an overlay visualization map were generated for:

Network map: Identifying clusters and key hubs and spokes (responding to research objective 1).

Overlay map: Enabling the interpretation of temporal trends by identifying nodes with the nearest average year, as well as future fronts of innovation (responding to research objective 2).

Additionally, a comparable cluster map from Dataset 3 is compared to the corresponding cluster map in Dataset 2 to determine the areas of research gaps or specializations in Malaysia (responding to research objective 3).

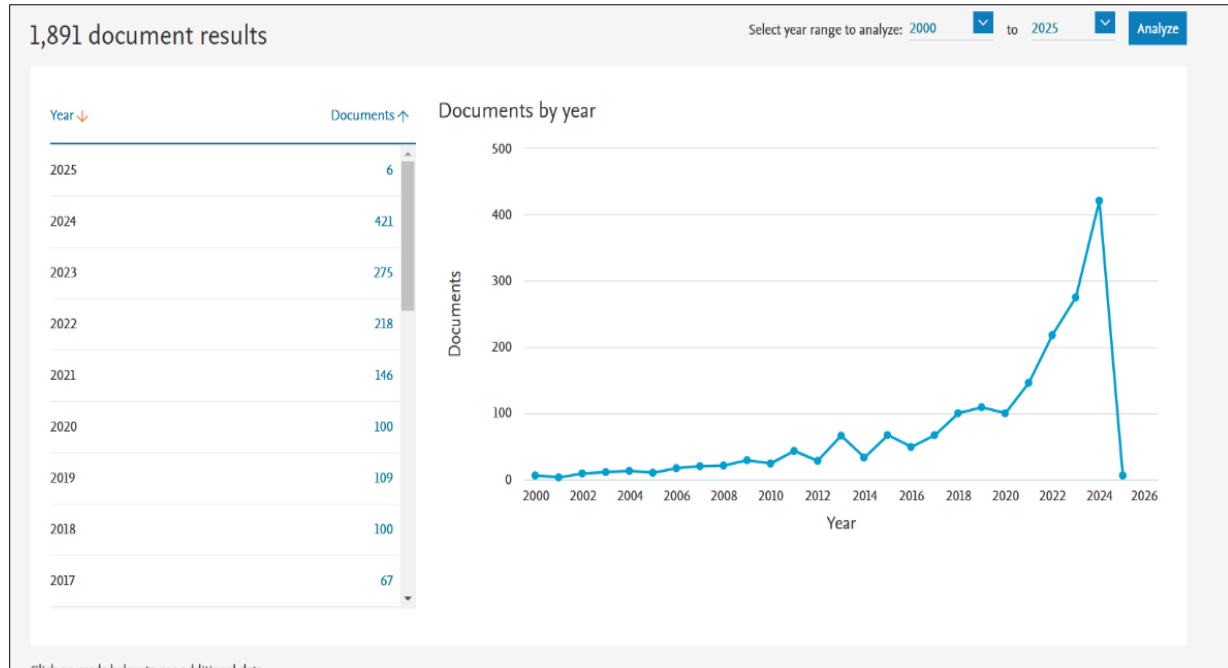
3. Analysis and Results

Global Research Landscape of Artificial Intelligence and Student Behavior

Data on Artificial Intelligence and Student Behavior were extracted from the Scopus database. According to the results, 1,891 documents were published from 2000 to 2025. The following sections present the analysis to identify the current research landscape of artificial intelligence and student behavior.

Trend Analysis by Year

Figure 1: Publications on AI and Student Behavior (2000-2025)



The line graph in Figure 1 clearly indicates a steady rise in the number of publications on AI and student behavior since 2010, with a significant spike in recent years. The information illustrated in the graph implies that researchers have become interested in understanding how the world around them can be harnessed to influence education and better comprehend behaviors in a classroom or laboratory setting.

In particular, the graph demonstrates that the number of documents on the topic rose sharply in 2020 and peaked in 2024 with 421 papers. The sudden increase in 2020 can probably be attributed to the COVID-19 pandemic, during which the need for virtual learning tools became more pressing than ever. Perhaps the implications of the pandemic made people realize the importance of AI in education.

Indeed, it appears that the medical field is driving the growth in publications on AI and education. Moreover, there is a possibility that the graph reflects the fact that researchers from other areas, including psychology and computer science, are now engaging in collaborative research to find out how best to use the world around them to advance education and transform behaviors in a physical or digital laboratory.

Trends in Research Contributions by Country or Territory and Affiliation

Figure 2: Top Contributing Countries and Institutional Affiliations in AI and Student Behavior Research (2000–2025)

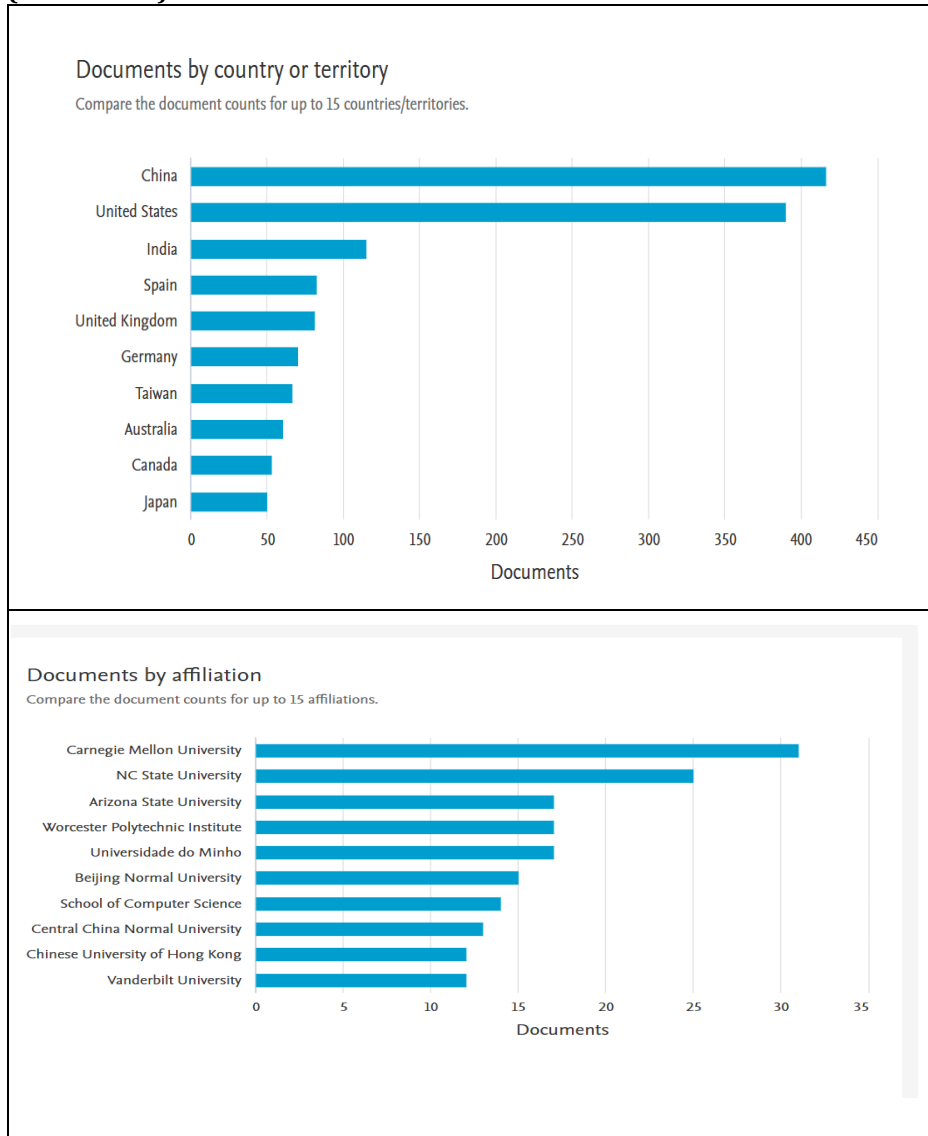


Figure 2 shows that the research on AI and student behaviors is led by China and the United States, reflecting strong national investments in AI-enhanced educational technologies. China focuses on large-scale adaptive learning systems, while the U.S. innovates in personalized learning, and India is third on the list, which implies a tendency to explore scalable AI-based educational solutions.

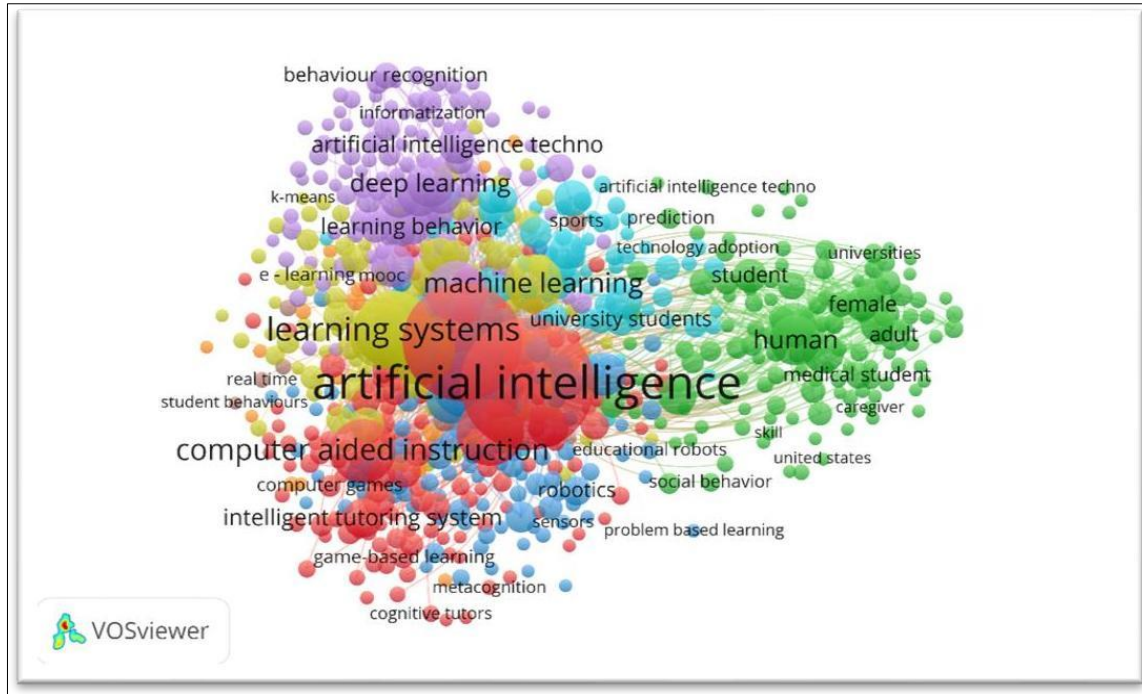
Countries like Spain, the United Kingdom, and Germany, which are members of the European Union, have a share in the research field, and they focus on AI-based inclusive education, which fits in with the EU's policy. This can be seen from the number of organizations, which include universities and companies, and their contribution to the field. For instance, the universities that are the most represented in the field of study of AI and student behaviors are Carnegie Mellon University and NC State University, with 31 and 25 documents, respectively. This fits in with the universities' reputation for excellence in computer science and education.

The countries represented in the list of the most productive organizations include the U.S., European countries

like Spain, the United Kingdom, and Germany, and Asian countries like China, India, and Japan. The Universities of Minho (Portugal), Beijing Normal University (China), Chinese University of Hong Kong (China), and others are involved in the research field of AI and student behaviors, which implies a tendency to collaborate internationally and multidisciplinary.

Network Visualization

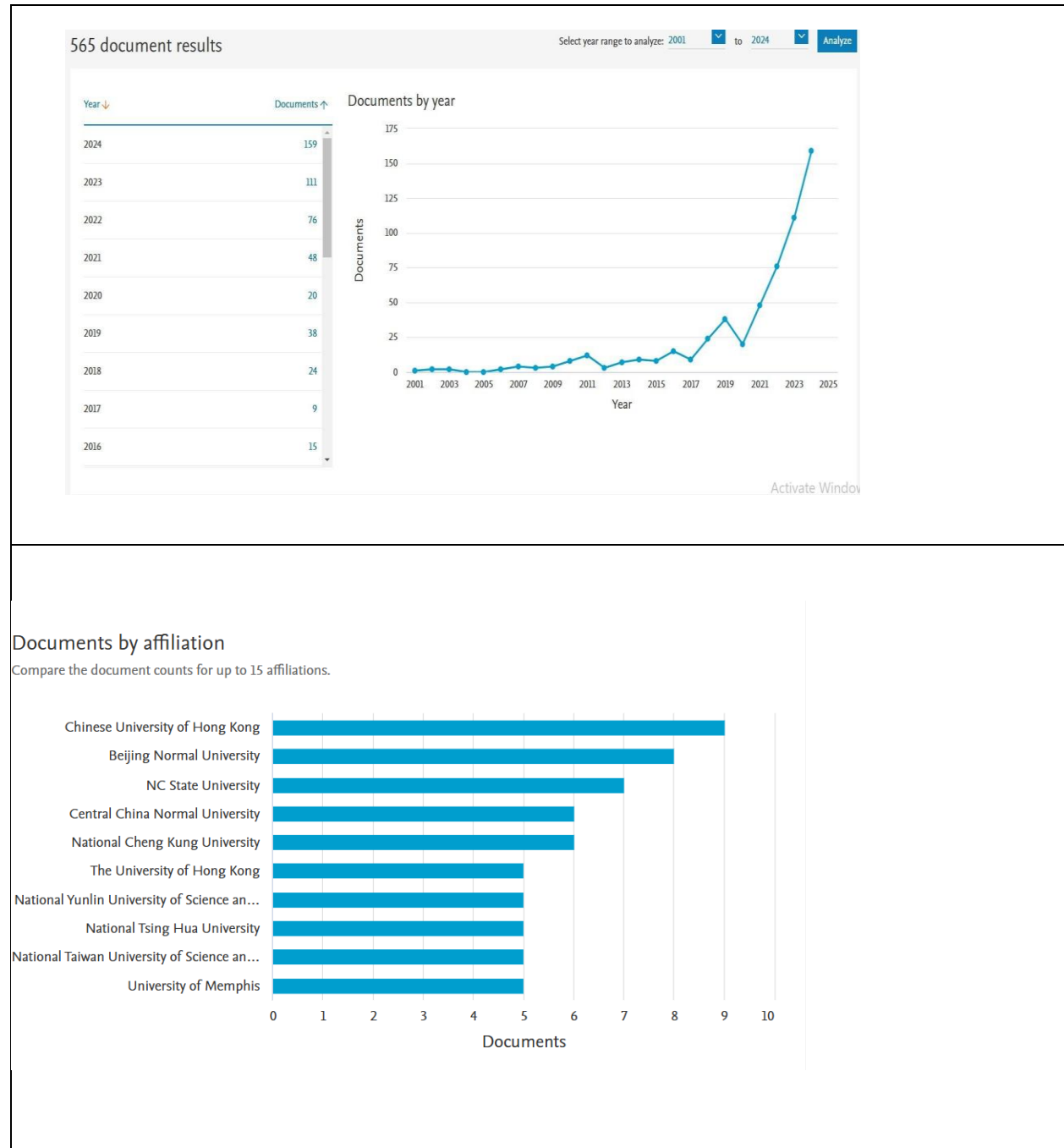
Figure 3: Network Visualization of Artificial Intelligence and Student Behavior



The co-occurrence network map created with the software VOSviewer based on the dataset “artificial intelligence and student behavior” is presented in Figure 3. As can be seen on the map, the search was not narrowed down to specific fields or regions. Thus, the map covers a wide range of topics related to the influence of artificial intelligence on education. In this map, the number of occurrences was set to 5, and there are 694 keywords. The main keyword in the network is artificial intelligence, which can be seen from the size of the node. The keyword is the most widespread in the articles included in the search. It can also be observed that most other keywords in the network are related to artificial intelligence in education contexts. The topics covered by the network include learning systems, machine learning, deep learning, and others.

The network map was built based on the co-occurrence of words. For the identification of topics covered by the dataset, the keywords with the highest frequency were taken into consideration. As a result, the main topics covered by the articles included in the search are artificial intelligence, learning systems, machine learning, and deep learning. This shows that the research heavily relies on advanced algorithms to analyze the behavior within digital platforms. On the other hand, the demographic clusters like “female”, “adult”, “student,” and “medical student” show that the user-focused demographic studies operate independently from the algorithmic research.

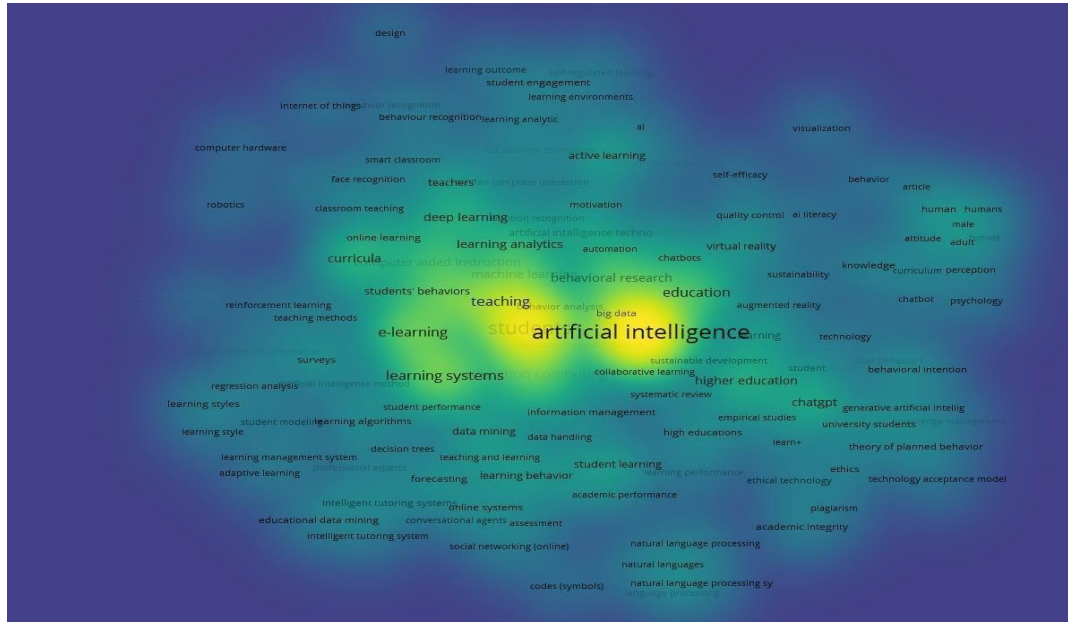
Figure 5: Top Contributing Countries and Institutional Affiliations in AI and Student Behavior in Economics, Econometrics and Finance, Social Sciences, Business, Management and Accounting



The researchers in Hong Kong and China have the highest number of publications on AI and student behavior in economics and social sciences. However, the universities in the U.S., including such contributors as NC State and the University of Memphis, participate in the research field as well. Therefore, the tendency appears to be global, and the role of AI in studying and influencing student behaviors in economics and social sciences is recognized worldwide.

Density Visualization within Target Disciplines

Figure 7: Density Visualization of Artificial Intelligence and Student Behavior in Economics, Econometrics and Finance, Social Sciences, Business, Management and Accounting



The most densely populated keywords are "artificial intelligence," "education," "students," and "teaching." These terms, located in the central yellow area, indicate that a significant portion of research is dedicated to examining how AI can enhance educational practices and understand student behaviors within educational settings. This central focus suggests a foundational interest in the role of AI as a transformative tool for education, emphasizing its potential for personalized learning and adaptive teaching methods.

AI and Student Behavior in the Malaysian Setting

Data for Artificial Intelligence and Student Behavior in Malaysia were extracted from the Scopus database. As a result, 565 documents were published from 2000 to 2025. The analysis of this data was conducted to evaluate the current and potential research focus on artificial intelligence and student behaviour in Malaysia.

Trend Analysis by Year and Affiliation in Malaysia

Research on the topic of artificial intelligence and student behaviors in Malaysia has experienced gradual development, with few publications between 2008 and 2018 but a significant increase since 2019. There was a sudden upsurge of interest in 2023 and 2024, which appears to be associated with a growing recognition of the importance and value of digital learning and technologies, including AI, in education, especially after the COVID-19 pandemic (Mohsin et al., 2024; Madiyah et al., 2025; Chieh & Teik Aun, 2025). Therefore, there is a visible trend that Malaysia is turning its attention towards exploring how AI might be applied in education to promote engagement and learning. In the future, it is expected that research efforts will be dedicated to advancing comprehension of various methods and techniques used to stimulate students using artificial intelligence.

According to the graph in Figure 8, the universities that make the biggest contributions to the research field of artificial intelligence and student behaviors in Malaysia are Universiti Utara Malaysia, Universiti Putra Malaysia, and Universiti Malaya. Overall, the three universities appear to produce a comparably high number of research works on the subject. In addition, other institutions such as Multimedia University and Universiti Sains Malaysia generate a considerable amount of research works on the topic under consideration. Thus, there is a visible tendency that multiple organizations engage in education-related artificial intelligence research in the country.

Figure 8: Top Contributing Institutional Affiliations in AI and Student Behavior Research in Malaysia

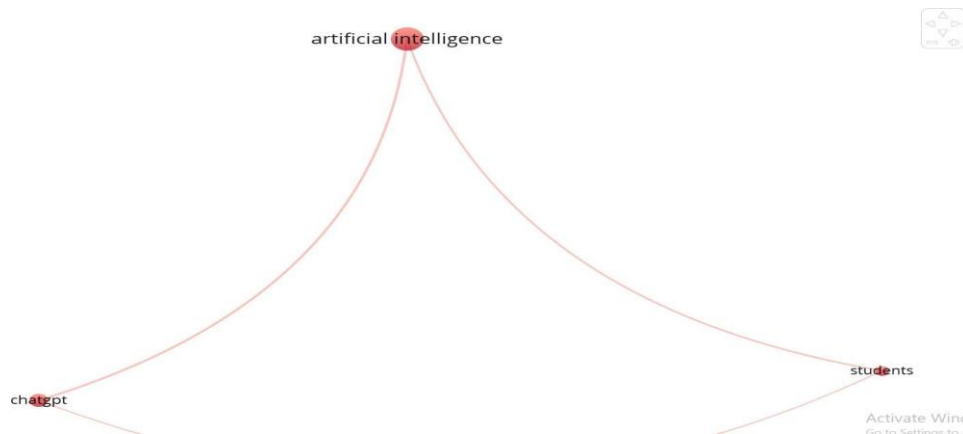


VOSviewer Network Analysis

Figure 9 shows that the VOSviewer analysis of the dataset related to Malaysia resulted in a network with only three nodes: 'artificial intelligence,' 'students,' and 'ChatGPT.' The fact that only three keywords appear prominently in a network related to Malaysia indicates that the country's research area is underdeveloped and lacks a considerable number of topics. Indeed, based on the analysis, it can be concluded that the study of artificial intelligence and students' conduct is the major research area in Malaysia, and it has been attracting only a small amount of attention.

The center of the network is taken by the term 'artificial intelligence,' which means that the country's scholars are interested in AI and its implications for education and society in general. In most cases, such studies are driven by the assumption that AI will profoundly alter the way people operate; hence, it is essential to approach the phenomenon with due care and attention.

Figure 9: Network Analysis of AI and Student Behavior Research in Malaysia

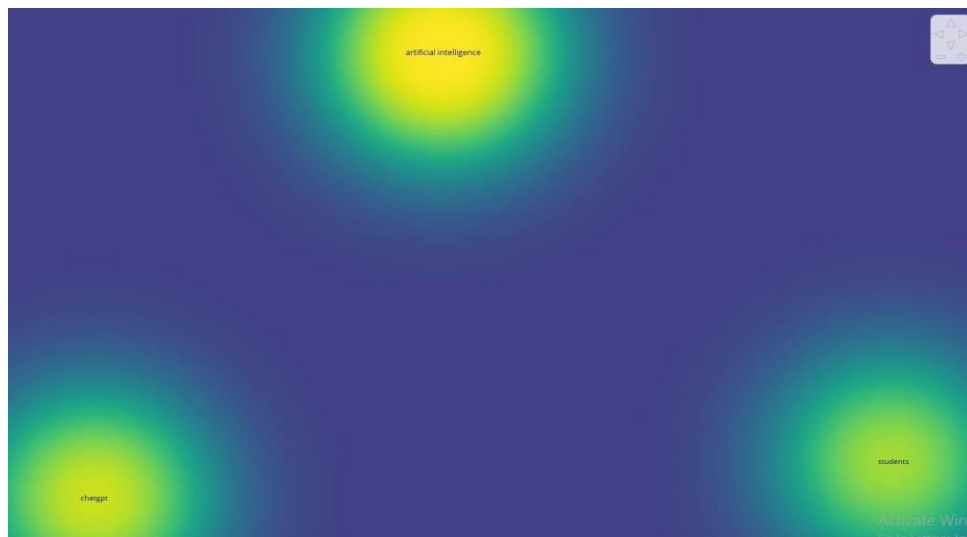


The way in which the term 'students' relates to 'artificial intelligence' implies that researchers are interested in AI's impact on students' behaviors. Such studies can be motivated by the intention to identify the ways AI can be integrated into a broader educational setting to make the process of acquiring knowledge more effective and efficient.

As for the relation between 'students' and 'ChatGPT,' it can be assumed that Malaysian scholars are also interested in the ways ChatGPT and other similar AI chatbots can benefit students. It seems reasonable given that such technologies can offer students a wide range of solutions to help them succeed in their studies without spending too much time doing so.

Density Visualization and Regional Research Gaps

Figure 10: Density Visualization of Artificial Intelligence and Student Behavior in Malaysia



Based on the density visualization in Figure 10, it can be inferred that, in the case of Malaysia, contemporary research into artificial intelligence, students, and ChatGPT is fragmented and disjointed. There is not much overlap between the three areas of study, which can be deemed as evidence of the lack of attention that research into AI in the setting of education attracts. Therefore, there is a great number of potential research topics related to artificial intelligence and students in Malaysia. Further studies should be aimed at unifying the three research areas to integrate AI and ChatGPT into the existing educational framework in the country.

4. Discussion

The primary objective of this bibliometric analysis was to map the intellectual structure of artificial intelligence and student behavior across global and localized contexts within the social sciences and business disciplines. By comparing global outputs (Datasets 1 and 2) with the Malaysian context (Dataset 3), this study reveals a profound disconnect between global research maturity and regional research infancy.

Global Maturity vs. Regional Infancy

Globally, literature has evolved from foundational, technically driven topics such as educational data mining and learning management systems into highly complex, human-centric investigations. The global overlay visualizations indicate that current frontier research is urgently addressing the psychological and moral dimensions of AI adoption. Current discussion emphasizes the ethical considerations of Generative AI integration, noting its potential to disrupt traditional assessment practices and raise concerns around academic integrity and the authenticity of student work (Francis et al., 2025).

Conversely, the Malaysian research network is remarkably disconnected. The localized data reveals a hyper-focus on the triadic relationship between artificial intelligence, ChatGPT, and students. The total absence of behavioral constructs (e.g., motivation, cognitive load, emotional well-being) and pedagogical frameworks indicates that regional research is still reacting to the initial disruption of generative AI.

A Framework for Future Research

To bridge this gap, future research, especially in the Malaysian context and other developing digital economies, should go beyond descriptive technology adoption studies. Given the 'cold spots' in the density maps, further research could focus on:

Exploring Behavioral Theories: Future studies should incorporate established behavioral theories, such as the Unified Theory of Acceptance and Use of Technology (UTAUT) or the TPB, to understand the underlying reasons why business and social science students misapply or correctly apply generative AI. Applying the UTAUT model is an appropriate theoretical framework to examine students' voluntary adoption of novel technologies like ChatGPT (Budhathoki et al., 2024). Further elucidating this theoretical model, particularly in the context of student anxiety, and testing its applicability in the Malaysian higher-education institutional setting, would yield valuable cross-cultural insights into technology-adoption behavior and intention to adopt (Budhathoki et al., 2024).

Ethics and Academic Integrity: Empirical studies are needed to explore the ethical implications of the use of AI, plagiarism, and policy compliance among university students. GenAI presents a significant challenge to academic integrity since its disruptive potential undermines the authenticity of student work (Francis et al., 2025). Future studies should focus on the responsible application of GenAI to avoid a dilution of students' essential cognitive and creative competencies (Francis et al., 2025).

Cognitive and Emotional Impacts: Researchers could explore the affective domain by investigating AI-induced anxiety, digital fatigue, and the impact of AI-dependence on students' metacognition and critical thinking abilities.

5. Conclusion

The research is aimed at finding out how the students' behavior may change as artificial intelligence transforms higher education. The research was conducted using the bibliometric method to determine the key trends and directions of the change in question. I used the software tool VOSviewer to visualize the trends and thus identify the research foci from 2000 to 2025. According to the findings, the field appears to shift from a local regional level to a global one. In particular, the attention to the topic in different regions is growing, yet the current research practice is fragmented, with a focus on basic mechanisms of interaction with generative artificial intelligence. Thus, the paper helps identify the subsequent research questions, areas, and hypotheses that would be needed to explore the change in student behaviors in relation to transformative AI.

The study has several limitations that should be considered when interpreting the results and planning future related research. Firstly, the study has utilized one database, Scopus, which may present an incomplete picture of the field. Future studies should consider employing multiple databases, including Web of Science and Google Scholar. Secondly, the field is changing rapidly, given the rise of transformative AI, meaning that the behaviors of the last few years may no longer be relevant. Therefore, there are some recent papers not included in the study that may have different findings.

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