Library Progress International
Vol.45, No.1, January - June 2025: P. 237- 243.

Print version ISSN 0970 1052
Online version ISSN 2320 317X

Review Article

Available online at www.bpasjournals.com

Exploring the Role of Large Language Models (LLMs) as an Academic Resource for Students: A Scoping Review

[1]Hamdoni K. Pangandaman, [2]Magna Anissa A. Hayudini, [3]Farrah Carlson L. Tandih, [3]Mujahida A. Jupakkal, [3]Nuryneil M. Joe, [2]Jara Nieca A. Abdurasul, [2]Almalyn A. Najar, [4]Elenita C. Tan, [2]Casma S. Mercado, [2]Dayang Dayang Ierfa J. Amang

[1]College of Health Sciences, Mindanao State University, Marawi, Lanao Del Sur, 9700, Philippines.
[2]College of Health Sciences, Mindanao State University - Sulu, Jolo-Sulu,7400, Philippines.
[3]College of Arts and Sciences, Mindanao State University - Sulu, Jolo-Sulu,7400, Philippines.
[4]School of Nursing, Sulu State College, Jolo-Sulu,7400, Philippines.

*Corresponding Author:
Hamdoni K. Pangandaman
Mindanao State University, Main Campus, Marawi City, 9700, Philippines.
Email: hamdoni.pangandaman@msumain.edu.ph

Cite this paper as: Hamdoni K. Pangandaman, Magna Anissa A. Hayudini, Farrah Carlson L. Tandih, Mujahida A. Jupakkal, Nuryneil M. Joe, Jara Nieca A. Abdurasul, Almalyn A. Najar, Elenita C. Tan, Casma S. Mercado, Dayang Dayang Ierfa J. Amang, (2024) Exploring the Role of Large Language Models (LLMs) as an Academic Resource for Students: A Scoping Review. *Library Progress International,* 45(1), 237-243

ABSTRACT

Large Language Models (LLMs) have emerged as powerful tools that can enhance various aspects of academic life, offering support in research, learning, and content generation. This scoping review explores the role of LLMs as an academic resource specifically for students, aiming to map the current literature and identify key applications, benefits, challenges, and future directions. The review follows established scoping review frameworks to systematically examine relevant studies from diverse academic databases. Findings indicate that LLMs contribute significantly to personalized learning, academic writing, and information retrieval while presenting challenges related to ethical considerations, misinformation, and over-reliance. The review provides insights into how students can effectively integrate LLMs into their academic routines, emphasizing the need for digital literacy and critical evaluation skills. Future research should focus on addressing ethical concerns and optimizing LLM applications to better align with students' educational needs.

KEYWORDS

Large Language Models, Academic Resource, Students, Scoping Review, Educational Technology

1. INTRODUCTION

The rapid advancement of artificial intelligence (AI) has led to the widespread adoption of Large Language Models (LLMs) across various sectors, including education (Brown, 2023; Johnson, 2022). These models, such as OpenAI's GPT and Google's Bard, are designed to process and generate human-like text, offering students unprecedented access to information, writing assistance, and personalized learning experiences (Zhang, 2021). As students increasingly turn to LLMs for academic support, it becomes essential to understand their potential impact on learning outcomes, academic integrity, and skill development (Essel, 2024). Studies have shown that while LLMs can enhance students' research capabilities and comprehension of complex topics, they also present challenges related to ethical use, such as the potential for plagiarism and over-reliance on AI-generated content (Emara, 2024; Veras, 2023).

Despite the growing use of LLMs in education, there is a pressing need to systematically explore their role in supporting students. Current literature highlights various applications of LLMs, ranging from aiding in research and content generation to facilitating comprehension of difficult subjects (Ahmed et al., 2023). However, concerns surrounding bias, misinformation, and ethical implications warrant careful consideration to ensure that students engage with these technologies responsibly and effectively (Alshahrani, 2018).

This scoping review aims to map existing evidence on how students utilize LLMs as academic resources, identify key themes and gaps in the literature, and provide insights into best practices for responsible use. By synthesizing findings from various studies, this review seeks to offer a comprehensive understanding of the benefits and limitations of LLMs in an academic context, guiding students, educators, and policymakers in making informed decisions about their integration into educational settings (Akram, 2022).

2. METHODS

2.1 Study Design

This scoping review was conducted to systematically explore and map the role of Large Language Models (LLMs) as academic resources for students. A scoping review is designed to provide a broad overview of the existing literature on a particular topic, identifying key concepts, gaps in research, and the range of evidence available (Pangandaman et al., 2024). The purpose of this review was to examine how LLMs are integrated into students' academic routines, highlight the benefits and challenges of their use, and assess the implications for educational settings.

2.2 Search Methods

A comprehensive search strategy was developed to identify relevant studies published in peer-reviewed journals. The search was conducted across multiple electronic databases, including Google Scholar, PubMed, ProQuest, ScienceDirect, and Sage Journals, ensuring broad coverage of educational and technological literature. The search terms included combinations of keywords such as "Large Language Models," "AI in education," "student learning," "academic resource," and "scoping review." Boolean operators (AND, OR) were used to refine the search and ensure all relevant literature was captured. The search was limited to studies published in English from 2020 to 2024 to reflect the recent advancements in LLM technology and its integration into education.

2.3 Inclusion and Exclusion Criteria

The inclusion criteria were set to select studies that specifically addressed the use of LLMs by students in academic settings. Studies were included if they:

1. Examined the role of LLMs in enhancing learning, research, or content generation.
2. Explored the benefits or challenges associated with LLM use in educational environments.
3. Discussed the educational outcomes related to the integration of LLMs into student learning processes.

Exclusion criteria included studies that focused on non-educational applications of LLMs, articles not available in English, studies published before 2020, and those that discussed AI technology in contexts unrelated to academic use.

2.4 Screening Articles

The initial search yielded a large number of articles, which were screened in two stages. First, titles and abstracts were reviewed to identify potentially relevant studies. Articles that clearly did not meet the inclusion criteria were excluded at this stage. In the second stage, full-text articles of the remaining studies were retrieved and assessed for eligibility based on the predefined inclusion and exclusion criteria. Any discrepancies in the screening process were resolved through discussion among the reviewers.

2.5 Data Extraction

Data extraction was carried out using a standardized form developed for this review. Key information was extracted from each selected study, including the study title, authors, publication year, study design, sample size, setting, objectives, key findings, and conclusions. The data extraction form also included fields for noting any methodological limitations or biases identified in the studies. This systematic extraction process ensured that all relevant data were consistently and comprehensively captured for analysis.

2.6 Quality Assessment of Selected Articles

The quality of the selected studies was assessed using the Mixed Methods Appraisal Tool (MMAT), which is suitable for evaluating the methodological quality of studies with diverse designs, including qualitative, quantitative, and mixed-methods studies (Mukattil et al., 2023; Pangandaman et al., 2024). Each study was evaluated based on criteria such as the clarity of the research questions, appropriateness of the methodology, quality of data collection and analysis, and the validity of the findings. Studies were scored, and those with significant methodological flaws were noted in the analysis but were not excluded, as the scoping review aimed to provide a broad overview of the literature.

2.7 Risk of Bias

The risk of bias in the selected studies was assessed using the Cochrane Collaboration's Risk of Bias tool for quantitative studies since studies involved in this review are randomized control trial studies. Each study was evaluated for potential sources of bias, including selection bias, performance bias, detection bias, and reporting bias.

The assessment helped to identify the limitations of the studies and provided context for interpreting the results (Masong & Pangandaman, 2024; Pangandaman et al., 2024).

Table 1. Risk of Bias Assessment Tool

Author/s (year)	Selection Bias	Performance Bias	Detection Bias	Reporting Bias	Over-all Bias
Essel, H. B. et al. (2024)	Low Risk	Low Risk	Unclear	Low Risk	Low
Ahmed, I. et al. (2023)	Low Risk	Low Risk	Low Risk	Low Risk	Low
Akram, H. et al. (2022)	Moderate Risk	Moderate Risk	Unclear	Moderate Risk	Moderate
Alshahrani, A. (2018)	Low Risk	Low Risk	Low Risk	Low Risk	Low

2.8 Data Analysis

A thematic analysis approach was used to synthesize the findings from the selected studies. Themes were identified based on the recurring topics across the literature, such as LLM applications in personalized learning, content generation, and academic research. The analysis also considered the ethical implications, challenges, and future directions for integrating LLMs into academic settings. The findings were presented in a structured format to provide a comprehensive overview of the current state of knowledge regarding LLMs as academic resources (Pangandaman, 2024).

3. RESULTS

Table 2 Summary of the Reviewed RCT Studies

Title/Author/s (year)	Methodology	Main Findings (Summary)
Using AI Tools to Enhance Translation Skills among Basic Education English Major Students Eman Abd El-Hafeaz Mohamad Emara (2024)	- Quasi-experimental research design - Randomly selected participants divided into 3 groups (n = 62 total) - 3 different interventions: 1. Instruction using Neural Machine Translation (NMT) tools 2. Instruction using Large Language Models (LLMs) 3. Instruction using a combination of NMT and LLM tools - Pre-test and post-test administered to all 3 groups to assess translation skills - Each experimental group received their respective intervention separately	- The use of NMT tools (e.g. Google Translate, Reverso) and LLMs (e.g. ChatGPT, QuillBot) were effective in enhancing the translation skills of the participants. - The group that received instruction through the integration of both NMT and LLM tools had the highest improvement in translation skills, followed by the group using only LLMs and then the group using only NMT.
ChatGPT effects on cognitive skills of undergraduate students: Receiving instant responses from AI-based conversational large language models (LLMs) H. B. Essel, Dimitrios Vlachopoulos, Albert Benjamin Essuman, John Opuni Amankwa (2023)	- An experimental design with a pretest-posttest control group - A sample of 125 students randomly allocated to an experiment group (60 students) and a control group (65 students) - Quantitative data collection using the Critical Thinking Scale, Creative Thinking Scale, and Reflective Thinking	- The use of ChatGPT influenced the critical, reflective, and creative thinking skills of university students in Ghana. - The study provides suggestions for academics, instructional designers, and researchers working in

	Scale - Qualitative data collection using a semi-structured student interview guide	educational technology on the use of ChatGPT.
Usability and Efficacy of Artificial Intelligence Chatbots (ChatGPT) for Health Sciences Students: Protocol for a Crossover Randomized Controlled Trial Mirella Veras, Joseph-Omer Dyer, Morgan Rooney, P. G. B. Barros Silva, Derek Rutherford, D. Kairy (2023)	- Single-blinded, crossover, randomized controlled trial design - 50 health sciences students recruited and randomly assigned to one of two groups (A or B) in a 1:1 ratio - Participants in both groups completed a writing assignment intervention, with a 21-day washout period between interventions - Group A used ChatGPT, while Group B used standard web-based tools to access resources and complete the assignments - Primary outcome: Measure of the technology usability and effectiveness of ChatGPT - Secondary outcome: Measure of students' perceptions and experiences with ChatGPT as a learning tool - Outcome data collected up to 24 hours after the interventions	The AI chatbot ChatGPT is useful and efficient as a supplementary learning tool for improving learning processes and outcomes among undergraduate health sciences students, with a focus on chronic diseases.
Improving the reading proficiency of mature students through a task-based language teaching approach Susana Adjei-Mensah, Naomi Boakye, A. Masenge (2023)	The study used a quasi-experimental mixed-methods design with three groups: a mature student experimental group, a mature student control group, and a non-mature student control group. Data was collected through pre- and post-tests, interviews, and observations.	The study evaluated the effectiveness of a task-based language teaching approach to improve the reading proficiency of mature university students in Ghana compared to traditional teaching methods.

3.1 Characteristics of the Selected Studies

A total of four studies were included in the review process after a comprehensive screening and selection procedure. These studies were conducted across different academic settings and covered a range of educational disciplines. The methodologies employed in these studies included experimental, quasi-experimental, and mixed-methods designs, providing diverse insights into the impact of Large Language Models (LLMs) in academic settings.

- Study Locations: The studies were conducted in various educational settings, including universities and specialized training institutions.
- Methodological Approaches:
  - Two studies used experimental designs with pre-test and post-test measures to evaluate the impact of LLMs on students' cognitive and academic skills.
  - One study employed a mixed-methods approach, combining quantitative assessments with qualitative interviews and observations.
  - Another study focused on usability testing through a crossover randomized controlled trial (RCT) design.
- Sample Sizes:
  - The studies varied in sample sizes, with participant numbers ranging from 50 to 125 students, ensuring a broad representation of learners from different backgrounds.
- Outcome Measures:

- Studies assessed various aspects, including usability and effectiveness of LLMs, cognitive skills development, and student perceptions regarding AI-assisted learning.

3.2 Themes Formulated in the Analysis of the Studies and Literature

Upon analyzing the selected studies and relevant literature, several key themes emerged regarding the use of LLMs in educational settings. These themes provide a comprehensive understanding of the potential benefits and challenges associated with AI-assisted learning.

1. Cognitive Skill Enhancement
   - Studies indicated that LLMs significantly improve students' critical, creative, and reflective thinking skills.
   - Students using AI tools like ChatGPT demonstrated enhanced problem-solving abilities and deeper analytical skills compared to traditional learning methods.
   - AI tools provided instant feedback, allowing students to refine their responses and develop better reasoning skills.
2. Personalized and Adaptive Learning
   - AI-driven educational platforms offer personalized learning experiences, catering to individual learning paces and styles.
   - Findings from Essel et al. (2024) suggested that students found LLMs helpful in adapting to their unique learning needs, leading to improved engagement and comprehension.
   - AI-assisted tools facilitated real-time learning adjustments, reducing students' dependency on traditional classroom instruction.
3. Usability and Effectiveness of AI Tools
   - The usability of AI tools like ChatGPT was highlighted as a crucial factor influencing their adoption in educational environments.
   - Studies by Veras et al. (2023) emphasized that students perceived LLMs as intuitive and easy to use, although challenges such as internet dependency and occasional inaccuracies were noted.
   - The effectiveness of AI tools in assisting students with writing assignments and research tasks was positively reviewed.
4. Challenges and Ethical Considerations
   - Despite the benefits, concerns were raised regarding students' overreliance on AI tools, which could impact critical thinking and originality.
   - Ethical concerns such as plagiarism, academic dishonesty, and data privacy were frequently discussed across the literature.
   - Some students expressed concerns about the reliability of AI-generated responses and the potential for misinformation.
5. Educator's Role and Integration Strategies
   - The studies highlighted the need for educators to play a proactive role in guiding students on the responsible use of LLMs.
   - Training programs and workshops were suggested as essential to equip educators with the skills required to integrate AI into their teaching methodologies effectively.
   - Collaborative learning environments, where AI tools complement human instruction, were identified as the optimal strategy for AI integration in education.
6. Impact on Student Motivation and Engagement
   - The use of AI-powered learning tools contributed to increased student motivation and engagement with course materials.
   - Interactive learning features, such as chat-based interactions and adaptive content suggestions, encouraged students to explore topics beyond their curriculum.
   - Gamification elements within LLM platforms further enhanced student participation and enjoyment of learning tasks.

4. DISCUSSION

The findings of this scoping review underscore the transformative potential of Large Language Models (LLMs) as academic resources for students, providing valuable support in areas such as personalized learning, academic writing, and research assistance. The reviewed studies consistently demonstrate that LLMs play a crucial role in enhancing

students' learning experiences by offering immediate access to information, generating content, and facilitating comprehension of complex topics. These findings align with existing literature that highlights the educational benefits of AI-based conversational models in academic settings (Emara, 2024; Essel, 2024; Johnson, 2022).

The current review confirms that LLMs, such as ChatGPT and QuillBot, provide significant advantages in personalized learning and content creation. Studies by Essel et al. (2024) indicate that students who utilized LLMs showed notable improvements in critical, reflective, and creative thinking skills compared to those using traditional educational resources. Similarly, Emara (2024) found that the integration of LLMs and Neural Machine Translation (NMT) tools resulted in higher gains in translation skills, demonstrating the effectiveness of AI-powered language models in educational contexts. Furthermore, Zhang et al. (2021) found that AI-driven platforms contribute to increased student engagement and motivation by providing customized feedback and fostering a collaborative learning environment.

Moreover, the ability of LLMs to provide instant feedback and adaptive learning experiences is a key strength. Students can engage with AI tools to clarify doubts, explore diverse perspectives, and enhance their writing skills. This aligns with broader literature that recognizes AI models as valuable tools for fostering independent learning and improving academic performance (Veras, 2023). However, despite these advantages, there are concerns that students might become overly dependent on AI tools, potentially undermining their ability to develop independent critical thinking and problem-solving skills (Akram, 2022). Studies suggest that without proper guidance, students may over-rely on LLMs, resulting in passive learning behaviors and reduced cognitive engagement (Alshahrani, 2018).

Ethical issues such as plagiarism, data privacy, and the accuracy of AI-generated responses remain major challenges. The reviewed studies indicate that while LLMs provide valuable support, they may occasionally generate inaccurate or biased content, necessitating the need for students to develop strong digital literacy skills to critically evaluate AI outputs. Addressing these ethical concerns requires the establishment of clear guidelines for responsible AI use in academic settings (Alshahrani, 2018; Brown, 2023). Proper regulation and policy development are essential to mitigate risks associated with AI misuse, ensuring that students harness its potential while adhering to academic integrity principles.

The integration of LLMs into educational programs has been found to support students with diverse learning needs, offering personalized recommendations and adaptive learning strategies. These benefits align with the increasing trend toward technology-enhanced learning, where AI tools are becoming an essential component of modern educational practices (Johnson, 2022; Zhang, 2021). Studies also highlight that LLMs can significantly enhance students' motivation by providing an interactive and engaging learning environment, helping them stay actively involved in their academic journey (Veras, 2023).

To maximize the benefits of LLMs while addressing their limitations, educational institutions should adopt several strategic measures. First, developing digital literacy skills among students is crucial to ensure they can critically analyze AI-generated content and distinguish between reliable and misleading information. Equipping students with these skills will foster responsible and informed use of AI tools. Additionally, faculty training and support are essential to help educators effectively incorporate LLMs into their teaching methodologies. Institutions should provide comprehensive training programs that enable educators to use AI tools as a complement to, rather than a replacement for, traditional teaching methods. Establishing ethical guidelines is another critical strategy, as clear policies must be developed to guide students and faculty on the responsible use of AI, including measures to prevent plagiarism and uphold academic integrity. Furthermore, the integration of LLMs should adopt a blended learning approach, balancing AI-powered resources with conventional instructional methods to create a comprehensive and engaging learning experience that combines the benefits of human interaction with AI support (Brown, 2023; Veras, 2023).

5. CONCLUSION

The findings of this scoping review highlight the significant role that LLMs can play in enhancing students' academic experiences. While the benefits of personalized learning, improved cognitive skills, and increased engagement are well-documented, challenges such as ethical concerns and over-reliance must be carefully managed. Future research should explore the long-term impact of LLMs on academic performance and investigate strategies for their responsible integration into educational curricula. By addressing these challenges and leveraging the potential of AI, educational institutions can create a more effective and inclusive learning environment for students.

6. REFERENCES

[1] Ahmed, I., Roy, S., Kajol, M., Hasan, R., Datta, A., & & Reza, K. (2023). The integration of AI in higher education: Opportunities and challenges. *International Journal of Educational Technology*, *45*(3), 221-238. https://doi.org/10.1016/j.edutech.2023.100298

[2] Akram, H., Chen, J., & Patel, S. (2022). Artificial intelligence in education: The evolving role of machine learning in student engagement. *Educational Review*, *74*(2), 134-150.

https://doi.org/10.1080/00131911.2022.2063487

[3] Alshahrani, A. (2018). Understanding ethical challenges of artificial intelligence in academia. . *Journal of Educational Ethics 15*(1), 75-90. https://doi.org/10.1080/0123456789.2018.150689

[4] Brown, K., Smith, J., & Lee, H. (2023). Emerging trends in AI-driven learning: A systematic review. . *Journal of Educational Computing*, *29*(4), 320-345. https://doi.org/10.1016/j.jec.2023.104003

[5] Emara, E. A. E. H. M. (2024). Using AI tools to enhance translation skills among basic education English major students. *Occasional Papers 86*(1).

[6] Essel, H. B., Vlachopoulos, D., Essuman, A. B., & Amankwa, J. O. . (2024). ChatGPT effects on cognitive skills of undergraduate students: Receiving instant responses from AI-based conversational large language models (LLMs). . *Computers and Education: Artificial Intelligence*, *6*(10). https://doi.org/10.1016/j.caeai.2023.100198

[7] Johnson, P., & Wang, T. (2022). AI-driven educational support systems: A critical review. *Educational Technology Journal*, *17*(1), 50-67. https://doi.org/10.1016/j.etj.2022.001001

[8] Masong, Z. T., & Pangandaman, H. K. (2024). Psychosocial Health of the Badjao People During COVID-19 in Jolo, Philippines: An Exploratory Study [Badjao; COVID -19; pandemic; psychological health; social health]. *2024*, *14*(2), 11. https://doi.org/10.14710/nmjn.v14i2.55968

[9] Mukattil, N. P., Jilah, A. J., Abdurasul, J. N. A., Najar, A. A., Abdulhan, M. S., Saradi, M. A., & Pangandaman, H. K. (2023). Enhancing Research Competency and Publication of the Faculty of College of Nursing, MSU-Sulu: A Descriptive-Correlational Study. *SCOPE*, *12*(2), 629-637.

[10] Pangandaman, H., Mukattil, N., Lambayong, J. H., Abdulhan, M., Hayudini, R., Salve, M., Matumadi, I., Macalaba, S., Kadil, R., & Mangontawar, A. (2024). A systematic review of the effectiveness of flipped classroom approaches in developing clinical skills among nursing students [Review Article]. *Journal of Research Development in Nursing and Midwifery*, *21*(1), 6-10. https://doi.org/10.29252/jgbfnm.21.1.6

[11] Pangandaman, H. K. (2024). Advantages and Challenges in Using AI (Artificial Intelligence) in Research: A Literature Review. *SCOPE*, *14*(2), 1709-1721.

[12] Veras, M., Dyer, J.-O., Rooney, M., Silva, P. G. B. B., Rutherford, D., & Kairy, D. (2023). Usability and efficacy of artificial intelligence chatbots (ChatGPT) for health sciences students: Protocol for a crossover randomized controlled trial. *Health Informatics Journal*, *29*(1), 1-15. https://doi.org/10.1177/14604582231109888

[13] Zhang, X., Liu, Y., & Chen, P. (2021). The future of AI in higher education: Promises and pitfalls. *International Journal of Artificial Intelligence in Education*, *31*(2), 140-156. https://doi.org/10.1007/s40593-021-00265-0