Awareness of Artificial Intelligence for Research Activities among Postgraduate Business Education Students in Tertiary Institutions in North-East, Nigeria.

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Abstract

This study determined the awareness of Artificial Intelligence (AI) for research activities among postgraduate business education students in tertiary institutions in North-east Nigeria. Specifically, the study examined students' perception, comprehension, and projection of AI's potential impacts among postgraduate business education students in the study area. Three research questions and three hypotheses guided the study. The study adopted a survey research design, involving the total population of 97 postgraduate students (MSc and PhD) from Modibbo Adama University, Yola, and Abubakar Tafawa Balewa University, Bauchi. Data were collected using a structured questionnaire and were analysed using descriptive statistics (mean and standard deviation) and inferential statistics (z-test). The findings revealed that students' perception of AI, projection of its potential impacts and comprehension was high. It was also found that no statistical significant differences between Masters and PhD students across all variables, leading to the failure to reject all the null hypotheses. The study concluded that while postgraduate students have strong awareness and positive perceptions of AI, highlighting the importance of sustained practical engagement, continuous skill development and institutional support. The study recommends the integration of AI training into postgraduate research programs, enhanced access to AI tools, and increased practical exposure to AI use to improve research efficiency and quality.

Keywords: Awareness, Artificial intelligence, perception, comprehension, projection, postgraduate business education students, research activities and North-east Nigeria.

Introduction

Education remains the cornerstone of societal progress and national development. It is through structured educational systems that individuals acquire the requisite knowledge, skills, values, and dispositions necessary for effective citizenship and economic engagement (United Nations Educational, Scientific and Cultural Organization [UNESCO], 2021). In today's rapidly evolving digital landscape, traditional educational paradigms are undergoing significant transformation, largely driven by technological advancements. Educational innovation offers personalized learning experiences, enabling adaptive assessments, and providing intelligent tutoring systems (Strielkowski, 2025). There is currently no

universally accepted definition of Artificial Intelligence (AI), as scholars interpret it from varying viewpoints (Calo, 2017). Nonetheless, many agree on its core concept. AI is often envisioned as a highly advanced computer system equipped with numerous capabilities and sensors. At its core, AI involves the emulation of human cognitive functions by machines, particularly computers. This includes abilities such as learning, reasoning, perception, and understanding language (McCarthy et al., as cited in Brunner, 2023). Similarly, Marsh (2023) describes AI as a field within computer science focused on developing systems that can perform functions traditionally requiring human intelligence.

Artificial Intelligence, generally understood as the simulation of human cognitive functions by machines, includes technologies such as deep learning, neural networks, and computational linguistics. These innovations are increasingly integrated into academic contexts to enhance instruction, streamline administrative processes, and support rigorous research efforts (Baker & Smith, 2019). In postgraduate business education, where analytical thinking and data manipulation are central, AI offers specific advantages. Tools like ChatGPT, Grammarly, Quillbot, Scholarcy and many others support critical academic tasks such as summarizing literature, refining academic language, and interpreting datasets (Minimo & David, 2024). In determining the students' awareness of AI tools and platform, this study used the three constructs of situation awareness theory proposed by Micah Endsley in 1980 which include; perception, comprehension and projection.

Perception have been defined as the totality of our attitudes toward ourselves or things; a set of beliefs that one holds about things, beliefs that are relatively difficult to modify (Ibrahim, 2014). It is the recognition and interpretation of the messages that the brain receives from the sense organs, as it involves identification. According to Wohlwill (2017), perception is influenced by behavioral and central determinants, which include values, rewards, experiences, and needs. The idea of how people feel about artificial intelligence has recently come into focus and grown in significance. The perceptions of AI and the variables influencing them are increasingly having interest (Schepman & Rodway 2022).

Comprehension involves a deep understanding of AI's potentials, limitations, and applicability. Students with a strong grasp of AI are better positioned to use these tools to enhance their research quality and efficiency (Olagunju & Yusuf, 2023). Understanding AI includes knowing how to apply machine learning for predictive analytics, leveraging natural language processing for content summarization, and utilizing AI-driven survey tools for data collection (Nguyen et al., 2023). In business education research, comprehension of AI allows students to address complex issues such as analysing data, forecasting economic trends, and evaluating the impact of government policies on entrepreneurship. For instance, tools like IBM Watson can analyse financial reports, helping researchers uncover patterns and insights that would otherwise remain hidden (Saini et al., 2025).

Projection refers to the anticipation of AI's future roles and impacts on research. Globally, AI is expected to redefine academic research by automating repetitive tasks, enabling more complex data analysis, and improving interdisciplinary collaborations (Johnson & Lee, 2022). Students are poised to benefit significantly from advancements in AI, which will make research processes faster, more accurate, and more impactful. In business education, future AI applications may include customized research tools tailored to

specific business challenges, such as AI platforms that can automatically analyse market trends and predict economic outcomes based on real-time data. AI is also expected to facilitate the development of advanced models for financial forecasting, supply chain management, and entrepreneurial decision-making (Kumar & Mishra, 2022). These projections highlight AI's potential to not only enhance research but also align academic findings with real-world applications. Moreover, projections indicate that AI could democratize access to research tools, making them more affordable and accessible to students in low-resource settings (Nguyen et al., 2023) such as North-east region of Nigeria.

Meanwhile, while there is growing consensus on the potential of AI, its practical awareness necessary for research activities among postgraduate business education students in Nigerian tertiary institutions, particularly in the North-east region, is not well-documented. Given the importance of business education in driving economic growth and the need for evidence-based decision-making in the digital age, it becomes crucial to investigate the level of awareness of AI tools and platforms by students in this field.

Research Questions

The following Research questions were formulated to guide the study:

    i. What is the level of perception of postgraduate business education students in tertiary institutions in North-east Nigeria towards AI usage for research activities?

    ii. What is the level of comprehension of AI for research activities among postgraduate business education students' in tertiary institutions in North-east Nigeria?

    iii. To what extent do postgraduate business education students in tertiary institutions in North-east Nigeria project the potential impacts of AI for research activities?

Research Hypotheses

In line with the research questions, the following hypotheses were formulated to guide the study and were tested at 0.05 level of significance:

    i. **H0$_1$:** Significant difference does not exist in the level of perception of AI usage for research activities between Masters and PhD postgraduate business education students in tertiary institution in North-east, Nigeria.

    ii. **H0$_2$:** Significant difference does not exist in the level of comprehension of AI for research activities between Masters and PhD postgraduate business education students in tertiary institutions in North-east, Nigeria.

    iii. **H0$_3$:** Significant difference does not exist in the projection of the potential impacts of AI for research activities between Masters and PhD postgraduate business education students in tertiary institution in North-east, Nigeria.

Literature Review

Artificial Intelligence (AI) in Education is rapidly transforming teaching and learning. AI technology encompasses a variety of tools, such as machine learning, natural language processing, and Intelligent Tutoring Systems (ITS), that are designed to improve educational outcomes. Personalized learning, which is one of the key areas of Artificial Intelligence in education, allows for the customization of content according to individual student needs, learning styles, and progress (Luckin et al., 2016). AI-driven systems analyse student data to adapt and recommend learning materials, promoting more effective and engaging learning experiences. (Strielkowski et al, 2025).

Business education, with its focus on problem-solving, strategic decision-making, and data analysis, greatly benefits from AI-driven tools. Davenport and Ronanki (2018) suggest that AI, such as predictive analytics and intelligent tutoring systems, are increasingly incorporated into the curriculum to foster practical skills. For instance, AI can be used to simulate business environments, allowing students to apply theoretical knowledge in real-world scenarios. AI-driven simulations in financial forecasting, supply chain management and customer relationship management (CRM) have become key components of modern business programs.

Artificial Intelligence awareness is crucial for students as it prepares them for the evolving job market and equips them with the knowledge and skills necessary to navigate a technology-driven world. In higher education, students are increasingly expected to engage with AI concepts and tools. According to Suen (2018), students in fields like business, engineering, and computer science are particularly exposed to AI topics due to the growing relevance of automation, data analytics, and machine learning in these areas. Developing AI awareness goes beyond just understanding the theoretical aspects; it includes recognizing how AI is used in real-world applications. For instance, in business education, students must be aware of how AI drives innovations in customer service, financial management, and supply chain optimization (Davenport & Ronanki, 2018). In this context, awareness includes familiarity with AI-powered systems such as predictive analytics, natural language processing, and machine learning algorithms.

Educational Psychologists and Researchers in the field of education have defined perception in many ways, such as the totality of our attitudes toward ourselves or things; a set of beliefs that one holds about things, beliefs that are relatively difficult to modify (Ibrahim, 2014). It is the recognition and interpretation of the messages that the brain receives from the sense organs, as it involves identification. According to Wohlwill (2017), perception is influenced by behavioral and central determinants, which include values, rewards, experiences, and needs. Since these traits abound differently in individuals, differential perception arises from them. In terms of item information processing, all information around an individual cannot all be used at a time.

The idea of how people feel about artificial intelligence has recently come into focus and grown in significance. The perceptions of AI and the variables influencing them are of increasing interest (Schepman & Rodway 2022). Neudert et al. (2020) showed that many people worry about the hazards of utilizing AI

after conducting extensive studies including 142 nations and 154,195 participants. In the same vein, Zhang and Dafoe (2019) conducted a survey involving 2000 American individuals and discovered that a sizable fraction of the participants (41%) favoured the development of AI while another 22% were opposed to it. The majority of people have a favourable perception towards AI, according to a large-scale study that included 27,901 individuals from several European nations (European Commission & Directorate-General for Communications Networks, Content & Technology 2017). It was also emphasized that perceptions are mostly a function of knowledge: higher levels of education and Internet usage were linked to perceptions that were more favourable towards AI.

Comprehension involves a deep understanding of AI's potential, limitations, and applicability. Students with a strong grasp of AI are better positioned to use these tools to enhance their research quality and efficiency (Olagunju & Yusuf, 2023). Understanding AI includes knowing how to apply machine learning for predictive analytics, leveraging natural language processing for content summarization, and utilizing AI-driven survey tools for data collection (Nguyen et al., 2023). In business education research, comprehension of AI allows students to address complex issues such as analysing data, forecasting economic trends, and evaluating the impact of government policies on entrepreneurship. For instance, tools like IBM Watson can analyse financial reports, helping researchers uncover patterns and insights that would otherwise remain hidden (Saini et al., 2025).

However, comprehension of AI among postgraduate business education students in North-east Nigeria is often limited by a lack of tailored AI training programs, inadequate exposure to advanced tools, and the digital divide. A study by Olayemi et al. (2023) found that most students in the region only have superficial knowledge of AI, using it primarily for basic tasks like referencing or grammar checks. Enhancing comprehension requires integrating AI-focused courses into the curriculum, conducting regular workshops, and encouraging interdisciplinary collaborations that expose students to the diverse applications of AI (Olayemi et al., 2023). Good understanding of AI will help students particularly those in to research activities to become more aware about artificial intelligence.

Projection refers to the anticipation of AI's future roles and impacts on research. Globally, AI is expected to redefine academic research by automating repetitive tasks, enabling more complex data analysis, and improving interdisciplinary collaborations (Johnson & Lee, 2022). Students are poised to benefit significantly from advancements in AI, which will make research processes faster, more accurate, and more impactful. In business education, future AI applications may include customized research tools tailored to specific business challenges, such as AI platforms that can automatically analyse market trends and predict economic outcomes based on real-time data. AI is also expected to facilitate the development of advanced models for financial forecasting, supply chain management, and entrepreneurial decision-making (Kumar & Mishra, 2022). These projections highlight AI's potential to not only enhance research but also align academic findings with real-world applications.

For postgraduate students in North-east Nigeria, the projection of AI's impact is particularly promising but requires strategic interventions. While the adoption of AI in developed regions is rapidly advancing, students in the region face barriers such as limited access to state-of-the-art tools, low bandwidth internet, and financial constraints (Nguyen et al., 2023). However, initiatives to establish AI resource hubs within universities, coupled with partnerships between academia and technology firms, could significantly bridge these gaps. Such interventions would empower students to foresee and harness AI's future potential in tackling local and global business challenges (Abdullahi et al., 2023).

Methodology

A survey research design was adopted for this study. This research was carried out in North-eastern Nigeria. North-eastern Nigeria is one of the six geopolitical zones in Nigeria. It is the largest zone which comprises: Adamawa, Bauchi, Borno, Gombe, Taraba and Yobe State. The population of the study consists of 97 postgraduate students of business education for 2022/2023 academic session (both MSc and PhD) in North-east Nigerian universities offering business education. This study employed a total population sampling technique, where the entire population of 97 postgraduate business education students from Modibbo Adama University, Yola (MAU), and Abubakar Tafawa Balewa University (ATBU), Bauchi was used as respondents. Total population sampling is considered appropriate for this study because of the relatively small population of MSc and PhD students from both institutions.

The instrument for data collection was structured close-ended questionnaire titled: Awareness and Application of AI in Research Questionnaire (AAARQ) with five-point rating scale. The instrument was validated by three experts from the Department of Vocational Education in the Faculty of Education at Modibbo Adama University, Yola. To ensure the reliability of the instrument, a pilot study was conducted at Ahmadu Bello University Zaria, Kaduna State using a sample of 21 postgraduate students of business education who share similar characteristics with the target population. The researcher used an online Google form in collecting data from the respondents. The researcher administered the questionnaire link to the respondents through their respective WhatsApp groups. Since response rates in electronic surveys can sometimes be low, an active follow-up strategy was implemented. Data collected from the respondents was subjected to statistical analysis using SPSS version 23. The research questions were analysed using mean and standard deviation, while z-test statistics was employed to test the hypotheses of the study

Findings of the Study

The findings of the study are presented based on research questions and hypotheses.

Research Question One: What is the level of perception of postgraduate business education students in tertiary institutions in North-east Nigeria towards AI usage for research activities?

Table 1: Perception of Postgraduate Business Education Students in Tertiary Institutions in North-east Nigeria towards the Use of AI in Research Activities

S/N	Items	x̄	SD	Remark
1	AI is a valuable tool for enhancing my research efficiency.	4.09	.80	HL
2	The use of AI improves the quality of my research work.	4.09	.84	HL
3	AI helps in reducing the time required for literature review.	4.18	.83	HL
4	AI tools provide me accurate research support.	3.72	.96	HL
5	AI can replace some aspects of traditional research methods.	3.94	.92	HL
6	The AI makes research more accessible to students.	4.06	.89	HL
7	AI reduces human errors in research activities.	3.78	.89	HL
8	AI-generated content is as credible as manually researched content.	3.56	.99	HL
9	AI improves my ability to analyse complex research data.	3.89	.79	HL
10	I feel confident using AI tools in my research work.	3.75	.87	HL
11	AI improves critical thinking skills in research.	3.68	.97	HL
12	AI tools create ethical problems that researchers need to carefully think about and address.	3.67	.97	HL
13	The AI-generated references are reliable.	3.29	1.23	ML
14	The integration of AI in research is necessary for academic success.	3.74	.97	HL
15	AI makes research work more flexible.	4.01	.81	HL
	Grand Mean	**3.83**		

x̄ = Mean   SD = Standard Deviation   HL = High Level   ML=Moderate Level

Data presented in Table 1 revealed that, the grand mean of all the 15 items is 3.83. This falls within high level on the real limit of 5-points scale (3.50-4.49). Generally, this shows that postgraduate students of business education have a high perception of AI as a useful tool for research activities. Additionally, the table also shows that the standard deviation of the items ranged from (SD = 0.80- 1.23), this indicates that the responses of the respondents were not far from the mean and from the level of perception of postgraduate business education students towards the use of AI for research activities.

Research Question Two: What is the level of comprehension of AI for research activities among postgraduate business education students in tertiary institutions in North-east Nigeria?

Table 2: Comprehension of AI in Research Activities among Postgraduate Business Education Students in Tertiary Institutions in North-east Nigeria

S/N	Items	x̄	SD	Remark
1	I can describe different AI tools available for research.	3.77	.87	HL
2	I can distinguish between AI-generated and human-written contents.	3.74	.92	HL
3	I can discuss the ethical implications of using AI in research.	3.67	.83	HL
4	I can use AI for literature review.	3.70	.94	HL
5	I am familiar with the limitations of AI in research.	3.52	.93	HL
6	I can explore with AI-driven research software such as ChatGPT, Grammarly, and Poe AI very well.	3.72	.92	HL
7	I know how AI assists in analysing research data.	3.55	1.01	HL
8	I can expound how AI generates citations.	3.48	.99	ML
9	I can evaluate the credibility of AI-generated research findings.	3.47	.99	ML
10	I can shed light on how AI can assist me in formulating research questions.	3.87	.87	HL

11	AI can be used to improve the quality of research methodology.	3.79	.88	HL
12	I can explain how AI will improve academic writing.	3.83	.85	HL
13	I am familiar with AI applications in research Review.	3.59	.97	HL
14	AI is useful in generating research hypotheses.	3.81	.80	HL
15	AI assists in arranging a research paper.	3.75	.85	HL
	Grand Mean	**3.68**		

x̄ = Mean   SD = Standard Deviation   HL =High Level   ML=   Moderate Level

Data presented in Table 2 revealed that the grand mean of all the 15 items is 3.68. This value falls within the high level on the real limit of the 5-point scale (3.50–4.49). Generally, this indicates that postgraduate Business Education students in tertiary institutions in North-east Nigeria have a high level of comprehension of the use of Artificial Intelligence (AI) for research activities. Furthermore, the table revealed that the standard deviation values ranged from (SD = 0.80-1.01) indicating that the responses of the respondents were relatively homogeneous and clustered around the mean. This suggests consistency in the level of comprehension of AI for research activities among postgraduate business education students in tertiary institutions in North-east Nigeria.

Research Question Three: To what extent do postgraduate business education students in tertiary institutions in North-east Nigeria project the potential impacts of AI for research activities?

Table 3: Projection of Postgraduate Business Education Students in Tertiary Institutions in North-east Nigeria on the Potential Impacts of AI for Research Activities

S/N	Items	x̄	SD	Remark
1	AI transforms how research is done.	4.14	.70	HE
2	AI helps in reducing workload for researchers.	4.25	.73	HE
3	AI helps in improving research accuracy.	3.91	.89	HE
4	AI minimizes plagiarism in academic writing.	3.61	1.06	HE
5	AI enhances access to research resources easily.	3.98	.79	HE
6	AI improves how students conduct new literature reviews.	3.72	.89	HE
7	AI creates more efficient ways of analysing research data.	3.75	.82	HE
8	AI improves collaboration in research activities.	3.77	.85	HE
9	AI makes research more dependent on use of technology.	4.06	.89	HE
10	AI transforms how research findings are interpreted.	3.89	.84	HE
11	AI discourages new forms of academic dishonesty.	3.48	1.02	ME
12	AI helps postgraduate students publish research faster.	3.91	.84	HE
13	AI increases automation in research processes.	3.91	.76	HE
14	AI minimizes ethical dilemmas in research work.	3.76	.96	HE
15	AI helps in improve efficiency in academic writing skills.	3.69	1.14	HE
	Grand Mean	**3.86**		

x̄ = Mean   SD = Standard Deviation   HE = High Extent   ME=Moderate Extent

Data presented in Table 3 above revealed that the grand mean of all the fifteen items is 3.86. This value falls within the high level on the real limit of the 5-point scale (3.50–4.49). Generally, this shows that postgraduate business education students in tertiary institutions in North-east Nigeria have a high level of projection of the potential impacts of Artificial Intelligence (AI) on research activities. Furthermore, the table also showed that the standard deviation values ranged from (SD =0.70-1.14) indicating that the responses of the respondents were not far from the mean. This suggests consistency in the views of postgraduate business

education students regarding the level of their projection of the potential impacts of AI in research activities in tertiary institutions in North-east Nigeria.

Findings of Research Hypotheses

H0$_1$: Significant difference does not exist in the level of perception of AI for research activities between Masters and PhD postgraduate business education students in tertiary institutions in North-east, Nigeria.

Table 4: Z-test for mean difference in the level of perception of AI for research activities between Masters and PhD Postgraduate Business Education Students

Groups	N	Mean	Std. Deviation	df	Z	P-value	Remark
MSc Students	54	57.44	7.726	85	-0.023	0.982	Retained
PhD Students	33	57.48	8.632				

Table 4 shows that a p-value of 0.982 is greater than the alpha value of 0.05. this indicates that there was no statistical significant difference in the mean ratings of responses of Msc and Ph.D. students on the level of perception of AI usage for research activities in tertiary institutions in North-east Nigeria. Therefore, the hypothesis of no significant difference for the two groups of respondents (Msc and Ph.D students) on the level of perception of AI usage for research activities was accepted.

H0$_2$: Significant difference does not exist in the level of comprehension of AI for research activities between Masters and PhD postgraduate business education students in tertiary institutions in North-east, Nigeria.

Table 5: Z-Test for Mean Difference in the Level of Comprehension of AI for Research Activities between Masters and Ph.D Postgraduate Business Education Students

Groups	N	Mean	Std. Deviation	Df	Z	P-value	Remark
MSc Students	54	55.02	8.130	85	-0.330	0.742	Retained
PhD Students	33	55.64	9.006				

Table 5 shows a p-value of 0.742 which is greater than the alpha value of 0.05. This indicates that there was no statistical significant difference in the mean ratings of responses of Msc and Ph.D. students on the level of comprehension of AI for research activities in tertiary institutions in North-east Nigeria. Therefore, the hypothesis of no significant difference for the two groups of respondents (Msc and PhD students) on the level of comprehension of AI for research activities was accepted.

H0$_3$: Significant difference does not exist in the projection of the potential impacts of AI for research activities between Masters and PhD postgraduate business education students in tertiary institutions in North-east, Nigeria.

Table 6: Z-Test for Mean Difference in the Projection of the Potential Impacts of AI for Research Activities between Masters and Ph.D Postgraduate Business Education Students

Groups	N	Mean	Std. Deviation	Df	Z	P-value	Remark
MSc Students	54	58.22	8.121	85	0.549	0.584	Retained
PhD Students	33	57.21	8.645				

Table 6 shows a p-value of 0.584 which is greater than the alpha value of 0.05. This indicates that there was no statistical significant difference in the mean ratings of responses of Msc and Ph.D. students on the level of projection of AI for research activities in tertiary institutions in North-east Nigeria. Therefore, the hypothesis of no significant difference for the two groups of respondents (Msc and Ph.D students) on the level of projection of AI for research activities was accepted.

Discussion of Findings

Based on the data analysis for research question one, the findings of this study revealed that postgraduate business education students generally hold a high level of perception toward the use of Artificial Intelligence for research activities. This positive disposition suggests that students recognise the relevance and usefulness of AI tools in enhancing research efficiency and quality. This outcome aligns with previous empirical studies which reported that users tend to develop positive perceptions of AI when they associate it with improved productivity, ease of task completion, and academic support. This finding is in consistent with the study by Dwivedi et al. (2021) reported that students and academics demonstrate high perceptions toward AI technologies when such tools are perceived to enhance academic performance, research productivity, and decision-making processes. Similarly, the finding concurs that of Zawacki-Richter et al. (2019) who found that higher education stakeholders increasingly view AI as a valuable support mechanism for research, assessment, and knowledge generation, thereby reinforcing its acceptance and adoption in academic environments.

However, the findings from research question two showed that students' comprehension of AI for research activities was strong. This suggests that while students are aware of AI and appreciate its potential benefits, their understanding of how AI works and how it can be effectively applied across different stages of research remains high. This outcome corroborates that of Ikeh-Anayo (2024), who found that postgraduate students exhibit a generally high level of awareness and positive perception of Artificial Intelligence for research activities. Similarly, the present study revealed that students understand the relevance and benefits of AI in enhancing research efficiency. However, both studies indicate that effective application of AI remains limited due to inadequate training and institutional support. This suggests a gap between students' understanding of AI and its practical use in research.

Furthermore, the study from research question three found that postgraduate students demonstrated a forward-looking outlook regarding the future role of AI in research activities. Students generally anticipate that AI will play a more significant role in enhancing research processes, improving data analysis, and supporting innovation in business education. This finding is in agreement with studies by Chubb et al.

(2022), who projected that AI would increasingly redefine academic research through automation, predictive analytics, and interdisciplinary collaboration. The alignment of this finding with existing literature suggests that postgraduate students are not only users of current AI tools but also conscious of AI's transformative potential in future research practices.

Recommendations

Based on the findings of the study, the following recommendations were made

i. Tertiary institutions should organize training programs and workshops to further enhance postgraduate students' perception and understanding of AI for research activities.

ii. Postgraduate students should be encouraged to engage in structured AI learning and capacity-building to strengthen their comprehension of AI tools and concepts.

iii. Tertiary institutions should provide practical exposure to AI applications in research to help students accurately project and realize the potential impacts of AI in research activities.

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