

THE RELEVANCE OF ARTIFICIAL INTELLIGENCE IN BUSINESS EDUCATION PROGRAMMES FOR EFFECTIVE PERFORMANCE OF STUDENTS IN TERTIARY INSTITUTIONS IN EKITI STATE, NIGERIA

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Abstract

This study investigated the relevance of Artificial Intelligence (AI) in Business Education programs at tertiary institutions in Ekiti State, Nigeria. Specifically, it assessed student awareness, the level of AI integration into the curriculum, and its subsequent impact on academic performance. Utilizing a descriptive survey research design, the study focused on a population of students and lecturers at Ekiti State University (EKSU). A sample of 155 respondents was determined using the Taro Yamane formula. Data were collected via the "Relevance of Artificial Intelligence in Business Education Questionnaire (RAIBEQ)" and analyzed using descriptive and inferential statistics. Findings revealed a moderate level of AI awareness among students, with no significant difference based on gender. However, the results indicated a total lack of AI integration into existing Business Education programs. While a significant relationship was found between student awareness and the potential for AI integration, there was no significant relationship between AI awareness or integration and current student academic performance. The study recommends that Business Education students proactively familiarize themselves with modern AI tools. Furthermore, institutional management should provide regular professional training for lecturers and collaborate with ICT experts to develop 21st-century, learner-centered course materials. Such materials should incorporate interactive elements and immediate feedback mechanisms to effectively bridge the gap between AI awareness and academic excellence.

Keywords: Artificial Intelligence, Business Education, Academic Performance, Curriculum Integration, Tertiary Institutions.

Introduction

It is impossible to overestimate the importance of Artificial Intelligence (AI) in business education programme given its emergence as a game-changing technology in a variety of industries. Business schools and other educational institutions must incorporate AI into their curricula as companies continue to leverage AI-driven technologies and strategies to obtain a competitive edge. Future business executives need to integrate Artificial Intelligence (AI) in all ramifications, as it can completely transform the way business is done. To adequately prepare students for the changing labor market demands, post-secondary institutions must include AI in their business education curricula. The potential of AI to improve students' analytical and problem-solving skills make it relevant for

use in business education programs. Students can obtain insights into data analysis, market trends, and customer behavior by learning how to apply AI tools and technologies. This will help them make wise decisions and spur corporate success.

Artificial intelligence (AI) has affected many facets of society, from customizing adverts depending on user data to taking the place of manual labor in factories. Even if AI has shown to be useful, its use in education is still in its infancy. The use of various AI technologies, including machine learning and natural language processing, to improve student performance and engagement has been the subject of numerous studies. These developments, however, are rarely included in the widely used Learning Management Systems (LMSs) in higher education (Khan, Ahmad, Jabeur & Mahdi, 2021; Salas-Pilco & Yang, 2022). In the COVID-19 era, learning personalization, monitoring, and assessment were prioritized in higher education (Hwang, Xie, Wah & Gašević, 2020). Thanks to the development of new technical tools, artificial intelligence (AI) is currently drastically changing teaching and learning in higher education. With the aid of these AI technologies, kids are receiving targeted practice, fast feedback, and individualized education. Students can learn more quickly and comprehend the things they are learning better with this assistance, especially those studying business education (Al Ka'bi, 2023).

The ability of a computer or machine to mimic the mental processes of a human, including learning from examples and experience, object recognition, language understanding and response, decision-making, problem-solving, and combining these and other capabilities to perform tasks that a human might perform, like checking into a hotel or operating a vehicle, is known as artificial intelligence (AI) (Alagbe, 2023). Programs created with human-like intelligence and organized into computers, robots, or other machines to assist in the provision of any sort of service or tasks to enhance the social, economic, and political development of society are another way to characterize artificial intelligence. An application or program designed to do tasks with human-like intelligence is called artificial intelligence. In order to perform assignments and duties with human-like intelligence, particularly in the study of business education, it is also utilized as collection systems, packages, and applications built into digital computers or computer-controlled robots (Ogunode & Ukozor, 2023).

On the other hand, business education is that branch of Technical and Vocational Education and Training (TVET) that includes, beyond general education, the study of technologies and the acquisition of transferable skills, attitudes, knowledge, and comprehension related to careers in a range of social and economic sectors (FGN, 2013). Another course of study available in Nigerian postsecondary schools is business education. Students who complete the program will possess the knowledge, skills, values, and understanding necessary for the workplace. Integrating emerging technologies into business education programs' teaching and learning is necessary to ensure that students are prepared for the twenty-first-century workforce and beyond.

AI can also automate fundamental tasks in business education, such as grading and classification, and provide students with extra assistance based on their needs. It gives educators and students the opportunity to share their experiences in both their personal and professional lives and to offer insightful commentary to others. Artificial intelligence (AI) systems identify the study courses' weak points and aid in closing any gaps that may arise. It helps to guarantee that every student develops the same conceptual underpinnings since students receive immediate feedback that clarifies concepts and serves as a reminder of how to apply them in the future, rather than having to wait for the teacher to listen. Additionally, AI can give students access to a learning environment that is comparatively rule-free. Artificial Intelligence (AI) has the potential to empower students and teachers to select appropriate learning environments and improve their academic performance, whether in the

classroom, at home, or in other settings, provided it is effectively included in business education programme.

Artificial Intelligence (AI) has so many advantages that can improve student performance and learning outcomes, it is becoming an increasingly important part of business education programs in postsecondary educational institutions. Its significance extended to better learning environments, stronger data analytic abilities, practical applications, encouraging creativity and invention, and preparing students for the workforce of the future, among other things. By offering customized information, comments, and recommendations based on each student's unique learning preferences and advancement, AI can help students' educational experience become more personalized. Students who get this individualized instruction may comprehend difficult subjects more clearly, retain knowledge better, and maintain interest in their studies (Starenko, 2021).

Strong data analysis abilities are crucial for students to have in the data-driven business world of today. Students can make educated business decisions by analyzing massive datasets, finding patterns, and extracting useful insights with the aid of AI tools and technology (Chen & Zhang, 2021). Through the integration of AI into business education curricula, students can acquire the analytical proficiencies required to thrive in professions that revolve around data. Financing, marketing, operations, and other sectors heavily rely on AI technology like machine learning and natural language processing. Institutions can assist students in bridging the theory-practice gap and preparing for the issues they will encounter in their future jobs by exposing them to real-world applications of AI in business education programs (Nair, 2020).

Additionally, by pushing students to think creatively and unconventionally and explore new avenues, AI can foster innovation and creativity in the classroom. By means of experiential projects and simulations that utilize artificial intelligence (AI) technologies, students can enhance their problem-solving abilities, explore diverse solutions, and cooperate with their peers to produce inventive concepts. However, students must be aware of AI technologies and their possible effects on the workforce as AI continues to change the business landscape. Institutions can give students the information and abilities they need to succeed in a labor market that is changing quickly and seize new opportunities in AI-driven industries by incorporating AI into their business education programs (Rambe, Njenga & Mawaya, 2021).

It is impossible to exaggerate the importance of artificial intelligence in business education programs for successful student outcomes. Higher education institutions may provide their graduates with the necessary abilities to thrive in the competitive and dynamic business climate of the present and the future by utilizing AI technology to improve the learning experience, foster creativity, develop vital skills, and prepare students for the workforce. Furthermore, by providing individualized learning opportunities, AI can support students in gaining a deeper comprehension of challenging business ideas. Students can maximize their learning potential and advance at their own speed by utilizing AI-powered learning systems, which provide personalized feedback and recommendations based on each student's unique strengths and limitations (Nguyen, Nguyen & Dang, 2020). Additionally, exposing students to AI in business education programs can aid in the development of vital abilities including teamwork, creativity, and critical thinking. Students can refine their problem-solving skills and learn how to function well in interdisciplinary teams by working on AI-driven projects and simulations, which will prepare them for the collaborative nature of current workplaces. To sum up, incorporating AI into business school curricula is critical to equipping students for the workforce of the future. Postsecondary educational institutions can guarantee that their graduates are prepared to thrive in the competitive business environment and stimulate innovation within their respective

sectors by providing them with the necessary information and abilities to effectively utilize AI technologies.

Statement of the Problem

There is a perceived lack of thorough integration of artificial intelligence (AI) technologies into business education programs in postsecondary institutions, despite the growing significance of AI in the business sector. This disparity prevents students from learning critical AI information and abilities that are necessary for their success in the quickly changing business environment. Students may find it difficult to adjust to the demands of data-driven decision-making, creative problem-solving, and new employment opportunities in AI-driven businesses if they are not properly exposed to AI tools and applications.

Moreover, the requirement for individualized learning experiences, practical applications, and hands-on training using AI technology may not be sufficiently provided by the conventional teaching and learning approaches used in business school programs. This restriction may make it more difficult for students to acquire the technical, analytical, and creative abilities necessary to succeed in AI-related careers and make significant contributions to companies in the digital era. Furthermore, if AI is not given enough attention in business education programs, there might be a gap between industry demands and academic curricula, which would leave graduates ill-equipped to drive innovation, take advantage of AI technologies for competitive advantage, and successfully navigate the complexities of the contemporary business environment. It is in this context that the present study intends to examine the relevance of artificial intelligence in Business Education programs for students' effective performance in tertiary institutions in Ekiti State.

Purpose of the Study

The purpose of this study is to examine the relevance of artificial intelligence in the Business Education programme to students' effective performance in tertiary institutions in Ekiti State, Nigeria. Specifically, the study intends to:

1. Investigate the level of students' awareness of Artificial Intelligence for effective teaching and learning of the Business Education programme in tertiary institutions in Ekiti State;
2. Examine the level of integration of AI technologies into business education programs in tertiary institutions in Ekiti State;
3. Determine the impact of AI on the academic performance of Business Education Students in tertiary institutions in Ekiti State.
4. Find out the extent of contribution of Artificial Intelligence on Business Education programs for effective performance of students in tertiary institutions in Ekiti State.

Research Questions

This study specifically seeks to provide answers to the following research questions:

1. What is the level of Business Education students' awareness of Artificial Intelligence in tertiary institutions in Ekiti State?
2. What is the level of AI integration into business education programs in tertiary institutions in Ekiti State?
3. What are the impacts of AI on the effective performance of Business Education Students in tertiary institutions in Ekiti State?
4. What are the contributions of Artificial Intelligence on Business Education programs for effective performance of students in tertiary institutions in Ekiti State?

Research Hypotheses

The following null hypotheses were formulated to guide the study

- Ho₁ There is no significant difference in the mean rating of male and female students on the level of awareness of AI in tertiary institutions in Ekiti State;
- Ho₂ There is no significant relationship between student awareness of Artificial Intelligence and AI integration into Business Education programmes;
- Ho₃ There is no significant relationship between artificial intelligence awareness and effective performance of Business Education Students;
- Ho₄ There is no significant relationship between the integration of AI into Business Education programmes and the effective performance of Business Education students.

Methodology

The study used a survey-style descriptive research design. 247 students and 5 teachers from the Business Education Department at Ekiti State University, Ado-Ekiti (EKSU) (2022/2023 academic session) made up the study's population. The study's sample comprised 155 participants, of which 150 were Business Education students chosen through a simple random sample technique, and 5 were lecturers. The Taro Yamane formula was used to calculate the sample size. A questionnaire titled: Relevance of Artificial Intelligence in Business Education Questionnaire (RAIBEQ) was the instrument used to collect the data for the study. The instrument comprised five (5) sections A-E. Section A sought information on the bio-data or personal information of the respondents, while sections B-E consisted of information about the variables of the study. The reliability of the instrument was determined through test re-test method to obtain a reliability coefficient of 0.82, and this was adjudged reliable. The questionnaire was personally administered by the researcher to the respondents with the help of a research assistant to ensure proper monitoring and supervision. The data collected were analyzed using descriptive and inferential statistics. Descriptive statistics such as mean count and standard deviation were used to answer the research questions; hypothesis 1 was tested using t test, while hypotheses 2 and 3 were tested using Pearson product-moment correlation coefficient. All hypotheses were tested at the 0.05 level of significance.

Results

Research Question 1: What is the level of business education students' awareness of Artificial Intelligence in tertiary institutions in Ekiti State?

Table 1: Descriptive analysis showing the level of Business Education students' awareness of Artificial Intelligence

ITEMS	MEAN	SD	REMARKS
Chatbot/ChatGPT	4.04	1.33	Aware
Siri	3.74	1.69	Aware
Google Assistants	4.28	1.17	Aware
Robotic assistant	2.83	1.49	Not aware
Voice assistant	2.81	1.42	Not aware
Intelligent tutoring system	2.68	1.15	Not aware
Virtual assistants	2.12	1.33	Not aware
Data analytics tool	2.62	1.47	Not aware
Automated grading system	2.53	1.27	Not aware
Personalized learning platform	2.82	1.50	Not aware
Grand Mean	3.05	1.38	Aware

Source: Field Survey (2024)

The level of Business Education students' awareness of Artificial Intelligence in tertiary institutions was presented in Table 1. Using the criterion mean score of 3.00 as a cut-off to determine the awareness of respondents to each item, Business Education students were aware of Chatbot/ChatGPT (4.04), Siri (3.78), and Google Assistants (4.28). However, Table 1 showed that the respondents were not aware of Robotic assistants (2.83), voice assistance (2.81), intelligent tutoring systems (2.68), virtual assistants (2.12), data analytics tools (2.62), automated grading systems (2.53), and personalized learning systems. The grand mean of 3.05 implies a moderate awareness of artificial intelligence by Business Education students.

Research Question 2: What is the level of AI integration into business education programs in tertiary institutions in Ekiti State?

Table 2: Descriptive analysis showing the level of AI integration into business education programs

S/N	ITEMS	MEAN	SD	REMARKS
1	Chatbot/ChatGPT	1.83	0.82	Not integrated
2	Siri	1.19	0.43	Not integrated
3	Google Assistants	1.43	0.68	Not integrated
4	Robotic assistant	1.49	0.69	Not integrated
5	Voice assistant	1.40	0.55	Not integrated
6	Intelligent tutoring system	1.67	0.77	Not integrated
7	Virtual assistants	1.56	0.61	Not integrated
8	Data analytics tool	1.75	0.73	Not integrated
9	Automated grading system	1.79	0.71	Not integrated
10	Personalized learning platform	1.79	0.74	Not integrated
Grand Total		1.59	0.67	Not integrated

Source: Field Survey (2024)

Mean Cut Off = 2.00

The level of AI integration into business education programs in tertiary institutions in Ekiti State was presented in Table 2, using the criterion mean score of 2.00 as a cut-off to determine the affirmation of each statement. The table showed that Artificial intelligence tools were not integrated into Business Education programmes in tertiary institutions in Ekiti State.

Research Question 3: What are the impacts of AI on the effective performance of Business Education Students in tertiary institutions in Ekiti State?

Table 3: Descriptive analysis showing the impacts of AI on the effective performance of Business Education Students

S/N	ITEMS	MEAN	SD	REMARKS
1	Integration of AI technologies in Business Education courses impacts students' learning experience	3.05	1.11	Agree
2	Intelligent Tutoring Systems or Chatbots help students better understand course material and concepts in Business Education	3.01	0.95	Agree
3	AI tools influenced students' access to relevant resources and materials for studying in Business Education programs	2.63	1.01	Agree

4	Automated grading systems improved the efficiency and accuracy of feedback on students' assignments, quizzes, and exams in Business Education courses	2.02	0.92	Disagree
5	Adaptive learning systems help students to progress at an optimal pace and level of difficulty in Business Education classes	2.01	0.90	Disagree
6	AI technologies enhanced students' engagement and understanding of course content in Business Education	3.22	1.01	Agree
7	AI contributes to students overall academic performance and success in Business Education programs compared to traditional teaching methods	3.39	0.79	Agree
Grand Total		2.76	0.83	Agree

Source: Field Survey (2024)

Mean Cut Off = 2.50

The impacts of AI on the effective performance of Business Education Students in tertiary institutions in Ekiti State were presented in Table 3. Using the criterion mean score of 2.50 as cut-off to determine the affirmation of each statement, the agreed that integration of AI technologies in Business Education courses impacts students learning experience (3.05), intelligent Tutoring Systems or Chatbots helps students better understand course material and concepts in Business Education (3.01), AI tools influenced students' access to relevant resources and materials for studying in Business Education programs (2.63), AI technologies enhanced students' engagement and understanding of course content in Business Education (3.22) and AI contributes to students overall academic performance & success in Business Education programs compared to traditional teaching methods (3.39). Furthermore, respondents disagreed that automated grading systems improved the efficiency and accuracy of feedback on students' assignments, quizzes, and exams in Business Education courses (2.02) and also disagreed that adaptive learning systems help students to progress at an optimal pace and level of difficulty in Business Education classes (2.01).

Research Question 4: What are the contributions of Artificial Intelligence to Business Education programs for the effective performance of students in tertiary institutions in Ekiti State?

Table 4: Descriptive analysis showing the contribution of AI to Business Education programs for the effective performance of students

S/N	ITEMS	MEAN	SD	REMARKS
1	AI technologies improve the effectiveness of Business education programs for student performance	3.85	0.44	Agree
2	The integration of AI tools in Business education courses improves student engagement and motivation to succeed academically	3.52	0.66	Agree
3	AI-powered learning platforms influence students' retention rates and success in completing Business education programs	3.28	0.96	Agree

4	AI personalized learning experiences in Business education enhanced students' understanding of complex concepts and skills required for success in the field	3.46	0.56	Agree
5	AI technology improved the efficiency and effectiveness of teaching methods in Business education programs, leading to better student performance outcomes	3.25	0.75	Agree
6	AI provides real-time feedback and adaptive learning experiences to students in Business education courses for optimal performance	3.54	0.84	Agree
7	AI technologies have facilitated a more personalized and tailored learning experience for students in Business education programs, leading to improved academic performance	3.10	0.99	Agree
		3.43	0.74	Agree

Source: Field Survey (2024)

Mean Cut Off = 2.50

Table 4 revealed the contributions of Artificial Intelligence on Business Education programs for effective performance of students in tertiary institutions in Ekiti State. Using the criterion mean score of 2.50 as cut-off to determine the affirmation of each statement, it was revealed that respondents agreed to all the items in table 4.

Test of Hypotheses

Hypotheses One: There is no significant difference in the mean rating of male and female students on the level of awareness of AI in tertiary institutions in Ekiti State.

Table 5: T-test comparing the Level of Awareness of AI in Male and Female

Awareness	N	Mean	S.D	t	Df	Sig. (2 tailed)
Male	91	33.01	6.99	0.449	153	0.275
Female	64	33.55	7.75			

P > 0.05

The t-test in table 5 above revealed that there is no significant difference in the level of awareness of AI in tertiary institutions between male and female $t(153) = 0.449$, $p > .05$. However, there a slightly higher level of awareness in female (mean = 33.55) than in male (mean = 33.01). Therefore, hypothesis one is accepted; hence, there is no significant difference in the mean rating of male and female students on the level of awareness of AI in tertiary institutions in Ekiti State.

Hypotheses Two: There is no significant relationship between student awareness of Artificial Intelligence and AI integration into Business Education programmes.

Table 6: Pearson's Product Moment Correlation showing the Relationship between student awareness of Artificial Intelligence and AI integration into Business Education programmes

Variables	N	Mean	Standard Deviation	r-cal	P-value
Awareness	155	33.23	7.29	0.382	0.000
Integration	155	20.59	4.05		

* $P < 0.05$

Table 6 showed there a significance relationship between student awareness of Artificial Intelligence and AI integration into Business Education programmes ($p < 0.05$), with a correlation coefficient (r-cal) of 0.382, p-value = 0.000. Therefore, the hypothesis formulated which states there is no significant relationship between student awareness of Artificial Intelligence and AI integration into Business Education programmes is thereby rejected.

Hypotheses Three: There is no significant relationship between artificial intelligence awareness and effective performance of Business Education Students.

Table 7: Pearson's Product Moment Correlation showing the Relationship between artificial intelligence awareness and effective performance of Business Education Students

Variables	N	Mean	Standard Deviation	r-cal	P-value
Awareness	155	33.23	7.29	- 0.059	0.468
Effective Performance	155	23.28	3.00		

* $P < 0.05$

Table 7 showed there is no significance relationship between artificial intelligence awareness and effective performance of Business Education Students with correlation coefficient (r-cal) of -0.059, p-value = 0.468 ($p < 0.05$). Therefore, the hypothesis formulated which states that there is no significant relationship between artificial intelligence awareness and effective performance of Business Education Students is therefore accepted.

Hypotheses Four: There is no significant relationship between the integration of AI into Business Education programmes and the effective performance of Business Education students.

Table 8: Pearson's Product Moment Correlation showing the Relationship between the integration of AI into Business Education programmes and the effective performance of Business Education students

Variables	N	Mean	Standard Deviation	r-cal	P-value
Integration	155	20.59	4.05	0.042	0.601
Effective Performance	155	23.28	3.00		

* $P < 0.05$

Table 8 showed there is no significance relationship between the integration of AI into Business Education programmes and the effective performance of Business Education students with correlation coefficient (r-cal) of -0.042, p-value = 0.601 ($p < 0.05$). Therefore, the hypothesis formulated which states that there is no significance relationship between the integration of AI into Business Education programmes and the effective performance of Business Education students is therefore accepted.

Discussion

The results of the study showed that business education students in tertiary institutions had a moderate awareness of artificial intelligence. The findings may be the consequence of a number of things, particularly social media, which has substantially increased student awareness of artificial intelligence systems such as Chat GPT, Siri, Google Assistants, and chatbots. The results were consistent with research by Owolabi et al. (2022), whose study, Awareness and Readiness of Nigerian Polytechnic Students towards Adopting Artificial Intelligence in Libraries, found that students had learned about artificial intelligence during library orientation programs and were aware of its existence and use in library operations.

The study's conclusions showed that business education curricula at Ekiti State's tertiary institutions do not currently incorporate AI. This may be the result of a lack of AI resources, instructor ignorance, the expense of acquiring AI, or a failure to include AI in the Business Education curriculum. This is in line with expectations because earlier research (Chukwudi, 2018; Ukpong et al., 2019) indicates that developing nations like Nigeria would encounter difficulties using AI. These difficulties could account for the low adoption rate. Thomas et al. (2022) showed in their study that instructors at a Nigerian university hardly ever employed artificial intelligence (AI) for teaching; thus, AI was not integrated.

The findings of the study also showed that the integration of AI technologies in Business Education courses impacts students learning experience, influenced students' access to relevant resources and materials for studying in Business Education programs, enhanced students' engagement and understanding of course content in Business Education, contributes to students overall academic performance & success in Business Education programs compared to traditional teaching methods and helps students better understand course material and concepts in Business Education.

The findings of the study revealed that Artificial intelligence does not contribute to the effective performance of Business Education students in tertiary institutions in Ekiti State. This is largely due to the lack of integration of AI into Business Education programmes. This finding was consistent with that of Agbatogun (2013), who revealed that most faculty members do not utilise emerging digital technologies for teaching and learning, which hinders their contribution to students' performance.

The test of the hypothesis reveals that there is no significant difference in the level of awareness of AI in tertiary institutions between males and females. These results are consistent with those of Fakomogbon et al. (2014), who found no statistically significant difference between male and female awareness of instructional media in the state-owned College of Education. The study also revealed a significant relationship between student awareness of Artificial Intelligence and AI integration into Business Education programmes, indicating that an increase in student awareness could also result in an increase in its integration. Furthermore, there is no significant relationship between artificial intelligence awareness and effective performance of Business Education Students, and finally, there

is no significant relationship between the integration of AI into Business Education programmes and the effective performance of Business Education students.

Conclusion

The study examined the relevance of artificial intelligence in Business Education programs for the effective performance of students in tertiary institutions in Ekiti State, and in sequence to the findings obtained, it was concluded that Business Education students in tertiary institutions in Ekiti State are aware of Artificial intelligence, but there was no integration of technology into Business Education programs in tertiary institutions in Ekiti State. Furthermore, Artificial Intelligence does not contribute to the effective performance of Business Education students in tertiary institutions in Ekiti State due to a lack of its integration into the programme.

Recommendations

The study made the following recommendations:

1. Business Education students should get more familiar with Artificial Intelligence and other modern technologies.
2. The administration of tertiary institutions has to routinely plan professional, hands-on training courses and retreats for teachers to educate and use AI successfully;
3. Tertiary institutions should collaborate with experts in ICT and education to develop 21st-century learner-centred course materials with interactive elements and immediate feedback that can further strengthen the use of AI for educational purposes.
4. Artificial intelligence should be incorporated into the Business Education curriculum to help improve the effective performance of Business Education students.
5. Males and females could perform equally well if an enabling environment with adequate infrastructure is provided
6. Government should invest in the development programs to equip institutions with the necessary AI expertise and understanding of its potential applications;
7. To facilitate AI integration, government should invest in the required resources, including software, hardware and relevant datasets to ensure access to these resources and staying up to date with the latest AI advancements.

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