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BUSINESS EDUCATION ACADEMIC STAFF PROFICIENCY IN UTILIZING ARTIFICIAL INTELLIGENCE FOR RESEARCH DEVELOPMENT IN FEDERAL COLLEGE OF EDUCATION (TECHNICAL) UMUNZE, ANAMBRA STATE

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Abstract:

This study examined the proficiency of Business Education academic staff in utilizing artificial intelligence (AI) for research development at the Federal College of Education (Technical), Umunze, Anambra State. Three research questions guided the study, which employed a descriptive survey research design. The population consisted of 65 Business Education lecturers at the Federal College of Education (Technical), Umunze, Anambra State. All 65 lecturers were selected as the sample using purposive sampling. A 27-item questionnaire, developed by the researcher and structured on a 4-point scale, titled 'Business Education Academic Staff Proficiency in Utilizing Artificial Intelligence (AI) for Research Development Questionnaire' (BEASPUAIRDQ), was used for data collection. The face validity of the research instrument was confirmed by two experts from the Department of Computer Science and one expert in Measurement and Evaluation from Nnamdi Azikiwe University, Awka. The reliability of the questionnaire was established through a pilot test conducted on a sample of 15 lecturers from the Nsugbe State Colleges of Education, who were not part of the main study. Scores obtained from the pilot test were analyzed using the Cronbach Alpha method, resulting in internal consistency coefficients of 0.79, 0.73, and 0.81 for the three clusters, with an overall coefficient of 0.78, indicating that the questionnaire was reliable. Data were analyzed using mean statistics, with a cut-off point of 2.50, and standard deviation statistics. The findings revealed that the Business Education lecturers were not proficient in utilizing AI for research development at the Federal College of Education (Technical), Umunze. Based on these findings, the study recommended that the leadership and management of the Federal College of Education (Technical), Umunze, should organize regular professional development workshops and other capacity-building training programs focused on enhancing the proficiency of Business Education academic staff in utilizing AI tools. These programs should also cover essential AI-driven platforms for literature sourcing (such as Google Scholar, Semantic Scholar, and others) to improve research efficiency and the quality of academic output."

Keywords:

Business, Education, Academic staff, Proficiency, Utilizing, AI, Research, Development

Introduction

The integration of emerging technologies into the education system likewise educational practices is predominantly widespread and significant. Today, many emerging technologies are efficiently being utilizedin educational institutions to enhance administration, teaching and learning, research, consultancy services and other educational services. The utilization of such emerging technology as the Artificial Intelligence (AI), particularly, into research practices in most tertiary educational institutions has transformed the way academic staff approach research development. The Artificial Intelligence (AI) can be referred to as the simulation of human intelligence in machines that are designed to think and act like humans. This includes learning, reasoning, problem-solving, and language processing (Russell & Norvig, 2021).AI is equally a field of computer science that focuses on creating systems capable of performing tasks that typically require human intelligence, such as visual perception, speech recognition, decision-making, and language translation (Goodfellow, Bengio & Courville, 2018). AI thus, has become an essential tool in various fields, including education and research, because it enhances the efficiency of data processing, automates repetitive tasks, and improves decision-making. In academic research, AI enables faster literature searches, data analysis, and even research design, saving time and improving accuracy. Many AI-driven tools according to Salman (2020), offer significant advantages in terms of efficiency, precision, and accessibility to data, enabling researchers to streamline complex processes like literature sourcing, study design organization, and data analysis. AI has fundamentally changed how researchers access academic resources. AI-powered literature sourcing tools such as Google Scholar, Semantic Scholar, and Zotero provide automated, comprehensive search capabilities, helping researchers to discover relevant academic content quickly and efficiently (Salman, 2020). The Artificial Intelligence (AI) has equally made significant transformation and impacts in various academic fields of studies, courses and disciplines like Business Education which offers undergraduates opportunities not only for their advancement in the business world but to acquire necessary skills to tackle challenges.

Business education however, refers to the teaching of skills and knowledge required for success in business operations, management and entrepreneurship (Nwachukwu, 2020). It is equally an academic discipline that prepares students for roles in business, focusing on areas such as accounting, banking and finance, marketing, commerce, entrepreneurship, economics, office technology/practices and management (Olawale & Yusuf, 2021). Business education equips individuals with essential skills for the modern day economy. As the field evolves, incorporating AI and digital tools into both teaching and research in Business Education is crucial for staying competitive and relevant in today's technology-driven business environment. From the foregoing, it becomes necessary that academic staff in Business education effectively utilize Afro executing their teaching responsibilities including research development. In the context of this study, utilizing AI refers to how effectively Business education academic staff employ AI tools in their research. It involves the process of making practical and effective use of this resource tool, or system to accomplish educational tasks and goals (Jones & Taylor, 2020). Effective utilization of AI is key to increasing the overall quality of education, enhancing teaching methods, and improving research productivity.

Research development on the other hand, entails the systematic process of planning, conducting and refining research activities to advance knowledge in a particular field (Whitten & Cameron, 2019). It encompasses the activities and strategies used to support researchers in obtaining external funding, building collaborative relationships, and translating research findings into impactful outcomes (Day, 2021). Research development is essential in the field of Business education for advancing knowledge, generating innovations, and addressing societal challenges. Research

development is therefore, an essential aspect of academic growth, particularly in the field of Business education, where staying updated with current trends is critical. As technology continues to evolve, AI has emerged as a key facilitator of research, helping educators and researchers to perform tasks that would otherwise be time-consuming or difficult. From sourcing literature to designing studies and analyzing data, which are equally the three most focal areas in research development, AI has the potential to streamline research processes, making them more efficient and accessible (Salman, 2020). Academic staff with proficiency in AI can utilize it for more efficient literature searches, data analysis, and research design, thus improving research quality and impact. However, the effectiveness and application of AI tools in research development depends largely on the proficiency of users in navigating and utilizing them for specific research needs. Meaning that the effective use of AI tools by academic staff in Business education for research development depends on their proficiency in integrating them into their research workflows. Besides, proficiency refers to the ability to perform a task or skill with competence, skill, ability, adeptness and effectiveness, demonstrating a high level of knowledge or expertise (Oxford Dictionary, 2022). It is the state of having sufficient skill or knowledge in a particular area to perform tasks effectively and efficiently (Brown, 2021). Proficiency is crucial in business education, particularly in the context of academic staff, as it determines the quality of teaching, research, and the ability to use emerging technologies like AI effectively. High proficiency in AI tools enhances research productivity and quality in academic institutions such as the Colleges of Education (COE), popularly known for the training educators, providing programmes in pedagogy, educational theory, and specialized subject areas (Osuji, 2021).The Colleges of Education (COEs) are institutions specifically designed to train individuals to become teachers and other educational professionals (Obanya, 2020). They are vital for the preparation of future educators who will shape the learning experiences of students. These institutions must adapt to technological advancements like AI, ensuring their academic staff are proficient in utilizing these tools for enhanced teaching and research. For academic staff in the field of Business Education, proficiency in utilizing AI for research development is becoming an essential skill, particularly, in institutions like the Federal College of Education (Technical), Umunze, Anambra State.

The foundation of any research project lies in a thorough literature review, which involves identifying relevant academic sources, evaluating previous research, and establishing theoretical frameworks. AI tools have greatly enhanced the efficiency of this process, allowing academic staff to quickly find and organize relevant literature (Nguyen, 2021). In Federal College of Education (Technical) Umunze, the ability of Business education academic staff to leverage AI for literature sourcing is critical for their research success. The present study aimed to assess Business education academic staff proficiency in using AI tools to streamline literature sourcing for research development. Additionally, AI has also proven useful in the organization and development of research designs. AI is increasingly being applied to research design, providing tools that can assist in structuring research methodologies, identifying variables, and even suggesting appropriate research frameworks. Tools like IBM Watson and machine learning-based design systems or learning algorithms are capable of offering data-driven insights that enhance the quality and reproducibility of academic studies. AI-driven research platforms can assist researchers in defining study parameters, determining sampling techniques, and ensuring methodological rigor (Schmidt & Wagner, 2019). For Business education academic staff in Federal College of Education (Technical) Umunze, proficiency in these tools is vital for improving the quality and accuracy of their research designs. Despite these advancements, Business education academic staff may face challenges in adopting such AI tools, which could hinder their ability to develop rigorous study designs for their research work. This study sought to evaluate how well academic staff at Federal College of Education (Technical) Umunze utilize AI for organizing their research designs, which is crucial to their overall research development.

Additionally, one of the most transformative applications of AI in research is in data analysis. Data analysis is one of the most time-consuming and complex aspects of research development, but AI tools have significantly simplified this process. Programs such as SPSS, R, and Python, driven by AI algorithms, which offers robust data analysis capabilities that allow researchers to uncover insights, test hypotheses, and draw meaningful conclusions; have made it easier for researchers to analyze vast datasets, uncover patterns, and generate predictive models (Nguyen, 2021). These capabilities are crucial for Business education academic staff, particularly in ensuring that their research findings are based on accurate and comprehensive data analysis. Yet, proficiency in using AI-driven data analysis tools can vary widely, potentially affecting the quality of research outputs in institutions like Federal College of Education (Technical), Umunze. The proficiency of Business education academic staff in utilizing AI for data analysis can directly impact the quality of their research findings. This present study explored Business education academic staff capacity to use AI tools for effective data analysis in research development. Still in the context of Federal College of Education (Technical) Umunze, the level of proficiency of Business education academic staff in employing AI to source relevant literature, organize the study design and conduct data analysis for effective research development remains largely unexplored. Understanding this proficiency is key to enhancing research output and academic quality. Hence, the proficiency of academic staff in utilizing AI is not only a measure of technological adoption but also an indicator of how prepared an institution is for modern research challenges. And Federal College of Education (Technical), Umunze, can benefit greatly from the widespread adoption and proficient use of AI tools by its academic staff, particularly in the Business education discipline.

A few previous empirical study provided a foundation for understanding the challenges faced by academic staff in integrating and using AI into their research processes, particularly in literature sourcing, study design, and data analysis. **Oyelade, Oladipupo and Obagbuwa (2020)** conducted a study that explored the proficiency of academic staff in using AI for literature sourcing in Nigerian universities. They found that while academic staff were aware of AI-powered tools such as Google Scholar and Semantic Scholar, many lacked the technical skills required to fully utilize these platforms. Since the academic staff struggled with AI-driven literature sourcing; this situation led to inefficient literature searches and a lack of access to recent research articles. The study emphasized the need for targeted training to enhance the use of AI for literature sourcing. **Okon and Essien (2019)** conducted a study on the use of digital and AI tools for academic research in higher education institutions in Southern Nigeria. They found that academic staff often relied on manual methods for literature searches, missing out on the advantages provided by AI in terms of precision and speed. **Adeola and Ayodele (2021)** examined the role of AI in supporting research design among academic staff in Nigerian colleges of education. Their findings revealed that academic staff had limited knowledge of AI tools for structuring research frameworks and methodologies. The study noted that the lack of training on AI tools like IBM Watson led to poorly designed studies, as academic staff were unable to leverage AI's ability to suggest appropriate research methodologies based on existing data. The academic staff were found to lack proficiency in using AI for organizing study designs. **Salman and Ahmed (2020)** investigated the impact of AI on research methodologies in higher education institutions. Their research found that many academic staff were not proficient in using AI platforms for organizing their study designs, which resulted in methodological errors and in consistencies in research quality. They concluded that there was an urgent need for workshops and training sessions to bridge the knowledge gap. **Eze, Chinedu and Agwu (2021)** conducted a study on the use of AI tools for data analysis in Nigerian higher education institutions. Their study found that a significant proportion of academic staff were not proficient in using AI-driven data analysis tools such as SPSS, R, or Python. The researchers noted that academic staff often struggled with understanding

the algorithms and statistical techniques employed by these tools, leading to errors in data interpretation. **Nguyen (2021)** explored the adoption of AI in educational research and found that while AI had the potential to revolutionize data analysis, many academic researchers lacked the proficiency to use it effectively. Nguyen's study identified a knowledge gap in using AI to process large datasets, interpret patterns, and draw meaningful conclusions. **Bassey and Ekong (2020)** also identified a gap in the proficiency of academic staff in using AI for data analysis in colleges of education in Nigeria. Their study showed that while AI tools could significantly enhance the quality of data analysis, most academic staff lacked the training needed to operate these tools effectively. They recommended extensive professional development programs to help academic staff acquire the necessary skills. Since the utilization of AI for research development by Business education academic staff in Federal College of Education (Technical) Umunze is still uncertain, the researcher is motivated to conduct this present study, in order to, provide insights into the current proficiency in AI utilization among Business education academic staff and offer recommendations through the findings for improving their research capabilities. Therefore, this study investigated the proficiency of Business education academic staff in utilizing AI for key research task areas such as sourcing literature, organizing study designs, and analyzing data and to identify any existing gaps that need to be addressed to improve their research development.

Statement of the Problem

The proliferation and utilization of Artificial Intelligence (AI) in various fields of studies academic researches has provided educators and researchers with tools to optimize various aspects of their research processes, from literature sourcing and study design to data analysis. In Business Education field of study, where research plays a critical role in advancing educational practices and policies, the proficiency of academic staff in utilizing AI is essential for fostering quality research outputs. But the extent to which Business Education academic staff at Federal College of Education (Technical), Umunze, Anambra State, are proficient in using AI for research development remains largely unexplored. Several empirical studies have highlighted the potentials of AI tools towards enhancing research efficiency, particularly in literature sourcing, where AI-driven search engines can automate the retrieval of relevant academic articles. AI has also shown promise in assisting researchers in organizing their study designs, offering recommendations based on large datasets and improving the methodological accuracy of studies. Moreover, AI's capability in analyzing vast amounts of research data is well-established, enabling researchers to handle complex datasets more effectively and draw meaningful insights. Despite all these benefits, there is limited empirical evidence on how proficient Business Education academic staff are in utilizing these AI tools for their research development, particularly, within the context of Federal College of Education (Technical) Umunze. The inadequate proficiency in utilizing AI for research could lead to inefficiencies in academic research development, limiting the quality and scope of studies produced by academic staff in the COEs, especially, in the field of Business Education. Without proper use of AI tools, academic staff may struggle with time-consuming tasks like manual literature searches, improper study design, and erroneous data analysis, all of which could compromise the integrity of their research findings. While AI has been recognized for its transformative role in academic researches across various fields, there is a paucity of research specifically examining the proficiency of academic staff in Business Education at Federal Colleges of Education in utilizing AI for research purposes. Furthermore, many of the available literature addressed general technological proficiency without delving into specific areas such as AI's role in research development in areas of literature sourcing, research design organization and data analysis. This study sought to fill this gap by providing an empirical assessment of how proficient Business Education academic staff at the Federal College of Education (Technical),

Umunze, are in using AI for their research development to enhance their research capacity, ultimately contributing to the advancement of research quality within the institution. Hence, examining Business education academic staff proficiency in utilizing artificial intelligence (AI) for their research development in Federal College of Education (Technical) Umunze, Anambra State is the problem of this study.

Purpose of the Study

The purpose of this study is to assess Business education academic staff proficiency in utilizing artificial intelligence (AI) for their research development in Federal College of Education (Technical) Umunze, Anambra State. Specific objectives of the study ascertained:

1. Business education academic staff proficiency in utilizing artificial intelligence (AI) for sourcing literature for their research development in Federal College of Education (Technical) Umunze, Anambra State.

2. Business education academic staff proficiency in utilizing artificial intelligence (AI) to organize the study design for their research development in Federal College of Education (Technical) Umunze, Anambra State.

3. Business education academic staff proficiency in utilizing artificial intelligence (AI) to analyze data for their research development in Federal College of Education (Technical) Umunze, Anambra State

Research Questions

The following research questions guided the study:

1. How proficient are the Business education academic staff in utilizing artificial intelligence (AI) for sourcing literature for their research development in Federal College of Education (Technical) Umunze, Anambra State?

2. How proficient are the Business education academic staff in utilizing artificial intelligence (AI) to organize the study design for their research development in Federal College of Education (Technical) Umunze, Anambra State?

3. How proficient are the Business education academic staff in utilizing artificial intelligence (AI) to analyze data for their research development in Federal College of Education (Technical) Umunze, Anambra State?

Method

A descriptive survey research design was employed in the study. This design is appropriate because it enabled the researcher to describe and analyze the current state of AI utilization proficiency among Business education academic staff of Federal College of Education (Technical) Umunze in Anambra State. By using a survey approach, the study captured the perceptions, experiences, and proficiency levels of the academic staff in a structured manner. Population of the study comprised 65Business education lecturers of Federal College of Education (Technical) Umunze, Anambra State, in areas of economics, accounting, entrepreneurship, office technology and management, among others. The population was selected because they are directly involved in research activities and are expected to use AI tools for research development in their discipline. Sample for the study constituted

all the 65 Business education lecturers of Federal College of Education (Technical) Umunze, Anambra State, selected using the purposive sampling technique. Nworgu (2015) opined that using purposive sampling technique is based on the researcher's choice and discretion. Given the relatively small size of the academic staff in the School of Business Education at the college, it was convenient for the researcher to use and reach out to all the lecturers in the school using the purposive sampling technique, which is appropriate for selecting academic staff who consistently engage in research development. The sample size therefore, consisted of **65 lecturers** from School of Business Education. A 27-item questionnaire developed by the researcher likewise structured on a 4-point scale of Very Proficient (VP) – 4 points, Proficient (P) – 3 points, Some what Proficient (SP) – 2 points and Not Proficient (NP) – 1 point; and titled: "Business Education Academic Staff Proficiency in Utilizing Artificial Intelligence (AI) for Research Development Questionnaire" (BEASPUAIRDQ), was used for data collection. Construction of the research instrument was based on the purpose of the study and research questions. Face validity of the research instrument was done by two expects from Computer Science Department and one Measurement and Evaluation expert from Nnamdi Azikiwe University, Awka. Corrections were made by these experts on few items and language construction, which were incorporated before the final production of the questionnaire. Reliability of questionnaire was established through a pilot-test carried out on a single administration of the instrument on a sample of 15 lecturers of Nwa for Orizu Anambra State College of Education, Nsugbe, which was not part of the study. Scores obtained after the pilot test were collated and measured using Cronbach Alpha method which gave internal coefficient consistency of 0.79, 0.73 and 0.81 for the three clusters respectively, which were added up to give an overall coefficient of internal consistency of 0.78, showing that the questionnaire was reliable and trustworthy. Data were collected through the administration of a structured questionnaire. The researcher, with the assistance of two research assistants, distributed the questionnaire directly to the lecturers in the School of Business Education. These research assistants were communicated about the essence of the study and told what to do in order to retrieve the necessary information from their colleagues. Copies of the questionnaire were collected within a period of two weeks to ensure an adequate response rate and collection of all copies of the questionnaire distributed to the respondents. All the 65 copies of the questionnaire were gathered at a 100% rate of return and sent for appropriate data analysis. Data collated were equally analyzed using mean statistics rated at 2.50 and standard deviation statistics. The decision rule for taking decision was that any mean score which rated above 2.50 and above was considered as proficient; while mean score which rated at 2.49 and below was considered as not proficient.

Results

Research Question 1: How proficient are the Business education academic staff in utilizing artificial intelligence (AI) for sourcing literature for their research development in Federal College of Education (Technical) Umunze, Anambra State?

Table 1: Mean Scores and SD Ratings of Business Education Academic Staff on their Proficiency in Utilizing AI for Sourcing Literature for their Research Development in FCE (T) Umunze, Anambra State

N = 65 lecturers

S/N	Please show your agreement concerning your proficiency in utilizing AI for sourcing literature for your research development.	VP	P	SP	NP	X	SD	Decision
	Proficiency in utilizing AI for:							
1.	sourcing vast databases of academic papers based on the research topics or research queries in business education using AI-powered tools such as Google Scholar, Semantic Scholar, and Microsoft Academic	22	31	7	5	3.08	0.86	**Proficient**
2.	extracting themes and patterns from vast amounts of literature using AI tools like **Leximancer** and **Voyant**which help researchers to quickly identify relevant concepts including major discussions within a specific area of business education	2	3	43	17	1.85	0.64	**Not Proficient**
3.	conducting systematic literature reviews of previous empirical studies in business education using AI tool like ChatGPT in order to support discussion of findings	1	5	36	23	1.75	0.66	**Not Proficient**
4.	providing automatic summaries of research papers using AI tools such as **Scholarcy** and **TLDR** in order to quickly grasp the key findings including relevance of a business education paper without reading it in its entirety	1	2	38	24	1.69	0.61	**Not Proficient**
5.	sourcing relevant research papers using AI systems like **CiteSeerX** and **ResearchGate**based on your previous search history or uploaded papers	3	4	42	16	1.91	0.70	**Not Proficient**
6.	plagiarism detection using AI tools like **Turnitin**and **Grammarly which** help researchers ensure originality by cross-referencing new work against published literature in business education	5	9	29	22	1.95	0.88	**Not Proficient**
7.	cross-referencing citations in research papers using AI platforms like **Zotero** and **EndNote**, to ensure that all references in business education literature are properly cited, well-organized, making the research process more efficient	1	2	27	35	1.52	0.64	**Not Proficient**
8.	**predictive analytics using AI tool** such as **TrendMDfor literature trends in** business education which allow researchers to focus their research on current and future trends, thereby, staying ahead of evolving topics	0	7	39	19	1.82	0.60	**Not Proficient**
9.	**translation likewise accessibility of multilingual research** using AI-driven translation tools like **DeepL** and **Google Translate which** assists researchers have access to and understanding of business education research published in other languages, in order to broaden the scope of literature available for sourcing	6	8	31	20	2.00	0.89	**Not Proficient**
10.	identifying research gaps in under-researched business education areas using AI tools such as Iris.aiand Researchably that can analyze existing literature to highlight gaps in the research, enabling the formulation of relevant research questions likewise hypotheses	4	5	33	23	1.85	0.81	**Not Proficient**
	Overall Mean Score & SD =					**1.94**	**0.84**	**Not Proficient**

Analysis of data in Table 1 indicated that only item 1 was rated above 2.50 of the criterion mean score of 3.08 to show the respondents (business education lecturers) agreement with this statement on proficiency of Business education academic staff in utilizing artificial intelligence (AI) for sourcing vast databases of academic papers based on the research topics or research queries in business education using AI-powered tools such as Google Scholar, Semantic Scholar and Microsoft Academic. All the other items from 2 to 10 were rated below 2.50 of the criterion mean score to show the respondents disagreement with these statements. Their overall mean score and SD is 1.94 and 0.84 respectively, indicating closeness in their responses. This result further indicated that the Business education lecturers were not proficient in utilizing artificial intelligence (AI) for sourcing literature for their research development in Federal College of Education (Technical) Umunze, Anambra State.

Research Question 2: How proficient are the Business education academic staffs in utilizing artificial intelligence (AI) to organize the study design for their research development in Federal College of Education (Technical) Umunze, Anambra State?

Table 2:Mean Scores and SD Ratings of Business Education Academic Staff on their Proficiency in Utilizing AI to Organize the Study Design for their Research Development in FCE (T) Umunze, Anambra State

N = 65 lecturers

S/N	Please show your agreement concerning your proficiency in utilizing AI to organize your study design for your research development. Proficiency inutilizing AI for:	VP	P	SP	NP	X	SD	Decision
11.	automated data collection planning using AI-based survey tools like Qualtrics and Survey Monkey offer templates and suggestions for designing surveys or questionnaires	2	4	31	28	1.69	0.72	**Not Proficient**
12.	choosing sampling techniques likewise participant selection using AI tools like SPSS Modeler and IBM Watsonwhich optimizes sampling strategies by analyzing population data and suggesting appropriate sample sizes and selection criteria in order to ensure representative samples in business education research	0	2	40	23	1.68	0.53	**Not Proficient**
13.	research design structuring using AI-assisted platform like Design Science which help researchers in creating robust study designs by analyzing the nature of the research questions and suggesting the most appropriate research methodologies (qualitative, quantitative, or mixed methods) for a given study	0	1	38	26	1.62	0.52	**Not Proficient**
14.	survey and experiment automation using AI-driven tool like QualtricsiQwhich allows for automated survey distribution, tracking, and monitoring	0	0	30	35	1.46	0.50	**Not Proficient**
15.	ethical consideration checklists using AI-based tool like Ethics Appwhich assists in ensuring that research designs align with ethical standards	0	1	33	31	1.54	0.53	**Not Proficient**
16.	predictive modeling for study outcomes using AI tool such as RapidMinerwhich allow researchers to create predictive models for expected outcomes based on historical data, by offering insights into possible results, guiding the researcher on how to structure their study for valid findings	0	1	42	22	1.68	0.50	**Not Proficient**
17.	organizing control and treatment groups using AI-based tool like Optimizelywhich help researchers in setting up experiments by automating the assignment of participants into control and treatment groups in order to ensure that groups are balanced	0	1	15	49	1.26	0.47	**Not Proficient**
18.	visualizing study frameworks using AI-powered visualization tools like Lucidchart and Mirowhich help researchers in mapping out the structure of their studiesfor conceptual frameworks, research designs, and methodologies, aiding in clearer communication and organization of research components	0	2	34	29	1.58	0.55	**Not Proficient**
	Overall Mean Score & SD =					**1.56**	**0.56**	**Not Proficient**

Analysis of data in Table 2 indicated that none of the items from 11 to 18 was rated above 2.50 of the criterion mean score to show the respondents (business education lecturers) agreement with any of the statements. All the items were rated below 2.50 of the criterion mean score to show the respondents disagreement with these statements. Their overall mean score and SD is 1.56 and 0.56 respectively, indicating closeness in their responses. This result further indicated that the Business education lecturers were not proficient in utilizing artificial intelligence (AI) to organize the study design for their research development in Federal College of Education (Technical) Umunze, Anambra State.

Research Question 3: How proficient are the Business education academic staffs in utilizing artificial intelligence (AI) to analyze data for their research development in Federal College of Education (Technical) Umunze, Anambra State?

Table 3:Mean Scores and SD Ratings of Business Education Academic Staff on their Proficiency in Utilizing AI to Analyze Data for their Research Development in FCE (T) Umunze, Anambra State

N = 65 lecturers

S/N	Please show your agreement concerning your proficiency in utilizing AI to analyze data for your research development. Proficiency inutilizing AI for:	VP	P	SP	NP	X	SD	Decision
19.	descriptive statistical analysis using AI-powered platforms like SPSS and RapidMiner which can automatically generate descriptive statistics, such as mean, median, mode, standard deviation, and frequency distributions, helping researchers summarize likewise understand the key characteristics of their data	0	0	41	24	1.63	0.48	**Not Proficient**
20.	sentiment and text analysis using AI tools like NVivo and MonkeyLearn which analyzes qualitative data and processes large amounts of textual data (e.g. survey responses, interviews) to detect patterns, themes, and emotional tones, which are critical in understanding stakeholders' opinions in Business Education research	0	2	33	30	1.57	0.55	**Not Proficient**
21.	regression analysis using AI systems like H2O.ai and JASP that can automate regression analysis to identify relationships between independent and dependent variables, helping researchers understand how variables such as teaching methods or economic factors influence student performance or business outcomes	0	1	42	22	1.68	0.50	**Not Proficient**
22.	data cleaning and preprocessing using AI tools such as Trifacta and Data Robot which automates the data cleaning process by identifying and correcting errors, handling missing values, and standardizing datasets, in order to ensure that the data is accurate and ready for analysis, reducing the time and effort spent on manual data preparation	0	0	45	20	1.69	0.46	**Not Proficient**
23.	clustering and classification using AI algorithms such as k-means clustering or decision trees in tools like WEKAandOrange whichcan automatically group or classify data into different categories	0	0	37	28	1.57	0.50	**Not Proficient**
24.	Exploratory Factor Analysis (EFA) using AI-based tools like SPSS AmosandSmartPLS which assists in identifying the underlying relationships between variables in a dataset, helping in simplifying complex data into manageable components, which is essential for developing theoretical models in Business Education	0	0	40	25	1.62	0.49	**Not Proficient**
25.	analyzing data that involves time-based trends using AI tools like Azure ML and Prophet(by Facebook) in order to help business education researchers track trends such as student enrollment patterns or financial performance over time	0	0	47	18	1.72	0.45	**Not Proficient**
26.	Structural Equation Modeling (SEM) using AI-driven platforms likeLISRELandAMOS widely used in business education research to test hypotheses and validate theoretical frameworks	0	0	46	19	1.71	0.45	**Not Proficient**
27.	visualization of data insights using AI-powered visualization tools like Tableau and Power BI to automatically generate visual representations of data, such as graphs, heat maps, and dashboards, which help researchers to easily interpret and communicate complex data patterns and trends in business education	0	0	35	30	1.54	0.50	**Not Proficient**
	Overall Mean Score & SD =					**1.64**	**0.49**	**Not Proficient**

Analysis of data in Table 3 indicated that none of the items from 19 to 27 was rated above 2.50 of the criterion mean score to show the respondents (business education lecturers) agreement with any of the statements. All the items were rated below 2.50 of the criterion mean score to show the respondents disagreement with these statements. Their overall mean score and SD is 1.64 and 0.49 respectively, indicating closeness in their responses. This result further indicated that the Business education lecturers were not proficient in utilizing artificial intelligence (AI) to analyze data for their research development in Federal College of Education (Technical) Umunze, Anambra State.

Discussion of Findings

Findings of this study generally indicated that the Business Education lecturers were not proficient in utilizing AI for their research development in Federal College of Education (Technical) Umunze, Anambra State. It was revealed through one of the findings of this study that the Business education lecturers were not proficient in utilizing artificial intelligence (AI) for sourcing literature for their research development in Federal College of Education (Technical) Umunze, Anambra State. They were only proficient in sourcing vast databases of academic papers based on the research topics or research queries in business education using AI-powered tools such as Google Scholar, Semantic Scholar and Microsoft Academic. However, the Business education lecturers were not proficient in: extracting themes and patterns from vast amounts of literature using AI tools like **Leximancer** and **Voyant** which help researchers to quickly identify relevant concepts including major discussions within a specific area of business education; conducting systematic literature reviews of previous empirical studies in business education using AI tool like ChatGPT in order to support discussion of findings; providing automatic summaries of research papers using AI tools such as **Scholarcy** and **TLDR** in order to quickly grasp the key findings including relevance of a business education paper without reading it in its entirety; sourcing relevant research papers using AI systems like **CiteSeerX** and **ResearchGate** based on your previous search history or uploaded papers; plagiarism detection using AI tools like **Turnitin** and **Grammarly which** help researchers ensure originality by cross-referencing new work against published literature in business education; cross-referencing citations in research papers using AI platforms like **Zotero** and **EndNote**, to ensure that all references in business education literature are properly cited, well-organized, making the research process more efficient; **predictive analytics using AI tool** such as **TrendMDfor literature trends in** business education which allow researchers to focus their research on current and future trends, thereby, staying ahead of evolving topics; **translation likewise accessibility of multilingual research** using AI-driven translation tools like **DeepL** and **Google Translate which** assists researchers have access to and understanding of business education research published in other languages, in order to broaden the scope of literature available for sourcing; and in identifying research gaps in under-researched business education areas using AI tools such as Iris. Ai and Researchable that can analyze existing literature to highlight gaps in the research, enabling the formulation of relevant research questions likewise hypotheses. This finding directly aligns with the previous study of **Oyelade, Oladipupo and Obagbuwa (2020) which** found out that while academic staff were aware of AI-powered tools such as Google Scholar and Semantic Scholar, many lacked the technical skills required to fully utilize these platforms. Since the academic staff struggled with AI-driven literature sourcing; this situation led to inefficient literature searches and a lack of access to recent research articles. This finding also concurs with **Okon and Essien (2019) study which confirmed that** academic staff often relied on manual methods for literature searches, missing out on the advantages provided by AI in terms of precision and speed. However, since the Business education lecturers in Federal College of Education (Technical) Umunze, Anambra State were not proficient in utilizing artificial intelligence (AI) for sourcing literature, this situation negatively affected their research development and method of students' project supervision.

It was also found out in this study that the Business education lecturers were not proficient in utilizing artificial intelligence (AI) to organize the study design for their research development in Federal College of Education (Technical) Umunze, Anambra State. This finding included that they were not proficient in: automated data collection planning using AI-based survey tools like Qualtrics and Survey Monkey offer templates and suggestions for designing surveys or questionnaires; choosing their sampling techniques likewise participant selection using AI tools like SPSS Modeler

and IBM Watson which optimizes sampling strategies by analyzing population data and suggesting appropriate sample sizes and selection criteria in order to ensure representative samples in business education research; research design structuring using AI-assisted platform like Design Science which help researchers in creating robust study designs by analyzing the nature of the research questions and suggesting the most appropriate research methodologies (qualitative, quantitative, or mixed methods) for a given study; conducting survey and experiment automation using AI-driven tool like QualtricsiQ which allows for automated survey distribution, tracking, and monitoring; organizing ethical consideration checklists using AI-based tool like EthicsApp which assists in ensuring that research designs align with ethical standards; predictive modeling for study outcomes using AI tool such as RapidMiner which allow researchers to create predictive models for expected outcomes based on historical data, by offering insights into possible results, guiding the researcher on how to structure their study for valid findings; organizing control and treatment groups using AI-based tool like Optimizely which help researchers in setting up experiments by automating the assignment of participants into control and treatment groups in order to ensure that groups are balanced; and in visualizing study frameworks using AI-powered visualization tools like Lucidchart and Miro which help researchers in mapping out the structure of their studies for conceptual frameworks, research designs, and methodologies, aiding in clearer communication and organization of research components.

The above finding supports previous finding of **Adeola and Ayodele (2021) study which** revealed that academic staff had limited knowledge of AI tools for structuring research frameworks and methodologies. The study noted that the lack of training on AI tools like IBM Watson led to poorly designed studies, as academic staff were unable to leverage AI's ability to suggest appropriate research methodologies based on existing data. The academic staff were found to have lacked proficiency in using AI for organizing study designs. The present study finding also corroborates with **Salman and Ahmed (2020) study which** found out that many academic staff were not proficient in using AI platforms for organizing their study designs, which resulted in methodological errors and inconsistencies in research quality. Where the Business education lecturers in Federal College of Education (Technical) Umunze, Anambra State lacked the proficiency and skills in utilizing artificial intelligence (AI) to organize the study design for their research development, this situation made them not to carry out majorly empirical researches. Most of the business education lecturers engaged more in theoretical researches.

Finally, it was discovered through the finding of this study that the Business education lecturers were not proficient in utilizing artificial intelligence (AI) to analyze data for their research development in Federal College of Education (Technical) Umunze, Anambra State. They were not proficient in: conducting **descriptive statistical analysis using** AI-powered platforms like **SPSS** and **RapidMiner** which can automatically generate descriptive statistics, such as mean, median, mode, standard deviation, and frequency distributions, assisting researchers summarize likewise understand the key characteristics of their data; carrying out **sentiment and text analysis using** AI tools like **NVivo** and **MonkeyLearn** which analyzes qualitative data and processes large amounts of textual data (e.g. survey responses, interviews) to detect patterns, themes, and emotional tones, which are critical in understanding stakeholders' opinions in Business Education research; conducting **regression analysis using** AI systems like **H2O.ai** and **JASP** that can automate regression analysis to identify relationships between independent and dependent variables, helping researchers understand how variables such as teaching methods or economic factors influence student performance or business outcomes; **data cleaning and preprocessing using** AI tools such as **Trifacta** and **DataRobot** which automates the data cleaning process by identifying and correcting errors, handling

missing values, and standardizing datasets, in order to ensure that the data is accurate and ready for analysis, reducing the time and effort spent on manual data preparation; **clustering and classification using** AI algorithms such as **k-means clustering** or **decision trees** in tools like **WEKA** and **Orange which** can automatically group or classify data into different categories; **Exploratory Factor Analysis (EFA) using** AI-based tools like **SPSS Amos** and **SmartPLS which** assists in identifying the underlying relationships between variables in a dataset, helping in simplifying complex data into manageable components, which is essential for developing theoretical models in business education; analyzing data that involves time-based trends using AI tools like **Azure ML** and **Prophet** (by Facebook) in order to help business education researchers track trends such as student enrollment patterns or financial performance over time; **Structural Equation Modeling (SEM) using** AI-driven platforms like **LISREL** and **AMOS widely used in business education** research to test hypotheses and validate theoretical frameworks; and in **visualization of data insights using** AI-powered visualization tools like **Tableau** and **Power BI** to automatically generate visual representations of data, such as graphs, heat maps, and dashboards, which help researchers to easily interpret and communicate complex data patterns and trends in business education.

This finding agrees and is equally in line with the previous study of **Eze, Chinedu and Agwu (2021)** which found out that a significant proportion of academic staff were not proficient in using AI-driven data analysis tools such as SPSS, R, or Python. The researchers noted that academic staff often struggled with understanding the algorithms and statistical techniques employed by these tools, leading to errors in data interpretation. The present study finding also relates with **Nguyen (2021) study** which found out that while AI had the potential to revolutionize data analysis, many academic researchers lacked the proficiency to use it effectively. Nguyen's study identified a knowledge gap in using AI to process large datasets, interpret patterns, and draw meaningful conclusions. **Bassey and Ekong (2020)** study also identified a gap in the proficiency of academic staff in using AI for Where the Business education lecturers in Federal College of Education (Technical) Umunze, Anambra State lacked the proficiency and skills in utilizing artificial intelligence (AI) to analyze data for their research development, this situation made them to heavily rely on other experts for their research work. In all, the findings of all these previous studies confirmed that the challenge of AI proficiency in research development is not unique to the current study but is a widespread issue across Nigerian higher education institutions. The consistent findings across these studies highlight the need for focused interventions to improve the proficiency of academic staff in using AI for their research development.

Conclusion

This study concludes and submits that the Business Education academic staff of Federal College of Education (Technical), Umunze, were not proficient in utilizing AI for their research development, particularly in sourcing literature, organizing their study design, and in analyzing data. As AI continues to transform the academic research by offering tools that enhance research productivity, it is evident that Business education academic staff are not fully equipped to leverage these tools for optimal research development. This lack of proficiency has far-reaching consequences for the efficiency, quality, accuracy and impact of their research output, calling for urgent interventions to ensure that academic staff are adequately prepared to utilize AI in their research efforts, likewise, improve the standard and relevance of research in business education. To address this situation, targeted professional development initiatives must be introduced to equip academic staff with the necessary skills, competences and proficiency to fully utilizevarious AI tools for their research development. By so doing, higher education institution like Federal College of Education (Technical), Umunze, can improve its research output and better prepare business education academic

staff for the evolving demands of educational research development. Hence, the recommendations proffered below.

Recommendations

Based on the findings of this study, the following recommendations were proffered:

1. The institution's leadership and management of Federal College of Education (Technical), Umunze should organize regular professional development workshops likewise other capacity building training programmes focused on enhancing the proficiency of business education academic staff in utilizing AI tools and also cover essential AI-driven platforms for literature sourcing (such as Google Scholar, Semantic Scholar, among others) to improve academic staff research efficiency and output quality for their research development.
2. Federal College of Education (Technical), Umunze, should provide institutional support by investing in AI-based research tools and creating access to relevant AI platforms. In addition to providing tools, the institution should create a supportive environment through constant mentorship, establishing AI resource centers, and incorporating AI online literacy that encourages business education academic staff to adopt AI for their research development.
3. AI literacy should be integrated into the curriculum of academic staff training programmes in the COEs by concerned authorities such as National Commission for Colleges of Education (NCCE) to ensure that new academic staff and student-teachers entering the teaching profession are already familiar with AI tools and their applications in research, which will contribute to sustained improvements in research quality and innovation across all the institutions including Federal College of Education (Technical), Umunze.

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