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# **Influence Of Multimedia Teaching Resources On Academic Performance Of Undergraduate Business Education Students In Delta State Tertiary Institutions.**

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## **ABSTRACT**

This study investigated the influence of multimedia teaching resources on the academic performance of undergraduate Business Education students in Delta State tertiary institutions. Guided by the Cognitive Load Theory, and Multimedia Cognitive Theory, the research explored key dimensions including availability, utilization, perceived impact, challenges, and strategies for enhancing multimedia integration in Business Education programmes. Five research questions guided the study and five null hypotheses were formulated and tested at 0.05 level of significance. The study adopted a descriptive survey research design. The population comprised 820 undergraduate Business Education students from four tertiary institutions, from which a sample of 200 was selected using a stratified random sampling technique and proportionate sampling technique. Data were collected using a validated 75-item structured questionnaire titled Influence of Multimedia Teaching Resources on Academic Performance Questionnaire (IMTRAPQ), and analyzed using descriptive statistics (mean and standard deviation) and inferential statistics (t-test and ANOVA), tested at a 0.05 level of significance. Findings revealed that multimedia teaching resources were moderately available and utilized in classroom instruction. Nevertheless, respondents perceived these resources to have a significant positive influence on their academic performance. Also, the finding revealed that there was no significant difference in perceptions of students on availability of multimedia teaching resources based on gender. The study concluded that multimedia teaching resources are moderately available for teaching undergraduate Business Education students in Delta State tertiary institutions. Also that Multimedia teaching resources influence academic performance of undergraduate Business Education students in Delta State tertiary institutions to a high extent . It recommends that government and institutional authorities should give priority to the provision and continuous upgrading of functional multimedia resources such as projectors, interactive boards, e-learning platforms, and virtual laboratories as the availability of these facilities will strengthen the teaching and learning process in Business Education programme.

## 1.0 INTRODUCTION

### 1.1 Background to the Study

Education globally is undergoing significant changes and innovations. In the 21st century due to rapid technological advancements, and teaching methodologies becoming a critical area influenced by this technological expansion. In higher education systems, effective instruction serves as a fundamental tool for achieving institutional goals, such as improving students' knowledge and preparing them for future societal roles and engagement. The Nigerian educational system is no exception to this global shift from traditional pedagogy to contemporary methods which are increasingly driven by integrating multimedia teaching resources into educational system, particularly in tertiary institution which will enhance students' engagement, motivation and academic performance in teaching and learning process. Multimedia resources, which include tools such as projectors, e-learning platforms, videos, and interactive software, have revolutionized traditional methods of instruction by providing dynamic and engaging learning experiences. These tools are relevant in teaching and learning business education, where practical application and real-world scenarios are crucial for skills development, Integration of multimedia teaching resources in Business Education is essential for equipping students with relevant skills, knowledge and values. Business Education programme focuses on preparing individuals for the dynamic world of work, adopting modern instructional processes, including multimedia teaching resources, becomes vital. These resources have the potential to enrich learning experience, improve academic performance, and align with the demands of a technology-driven society required in 21st century business education programme objective and goals.

Business Education is a component of Vocational and Technical Education (VTE) designed to train students to become competent business teachers, self-reliant entrepreneurs, and effective administrative officers (Ezeonwurie 2016). According to Umoeshiet (2015), Business Education represents a transformative learning experience aimed at preparing individuals for diverse roles within the business world while contributing meaningfully to society. It equips students with the requisite skills to secure gainful employment, explore entrepreneurial ventures, and pursue lifelong learning opportunities. Ajie-Uche, Efughi, and Ajaero (2018) described Business Education as an educational programme designed to enable students to acquire the necessary attitudes, knowledge, understanding, and skills essential for business activities, administration, and classroom teaching. This programme is structured to develop competencies relevant to both professional and academic business domains.

However, the significance of Business Education programme in building nation's workforce and relevance of multimedia resources in the learning process, many tertiary institutions face challenges in implementing effective instructional practices for the programme. These challenges arise primarily from reliance on outdated teaching methods and delivery systems. The programme demands technology-based learning strategies; however, many classrooms rely heavily on teacher-centered, oral explanations. As Nwachokor (2016) observed, "the application of ICT-based strategies has remained a mirage in many Departments of Business Education in Nigerian tertiary institutions," creating significant barriers to effective instructional delivery. Another critical issue is the increasing student population in classrooms, leading to congestion and exacerbating the inefficiency of traditional teaching methods. The orthodox methods being used are ill-equipped to handle these modern challenges, resulting in suboptimal learning outcomes.

The integration of technology into instructional processes is not only the backbone of 21st-century education but also a vital tool for driving reforms in teaching and learning process (Aslan & Zhu, 2015). However, despite the growing emphasis on embedding technology into the learning environment of business education programmes, many teacher educators have struggled to effectively implement ICT-based instructional methods in classroom practices. This indicates that most tertiary institutions offering business education programme have yet to fully harness the potential of technology-driven teaching strategies, posing significant challenges to the programme. Although multimedia teaching resources and ICT centers are present in many Nigerian tertiary institutions, evidence suggests that these technologies are underutilized in teaching and learning processes (Garba & Alademerin, 2014). The underutilization has also been observed in Delta State institutions, where ICT tools have minimal impact due to poor integration in classroom instruction (Akpojotor, 2022). This highlight a gap between the availability of instructional media facilities and their effective integration into the educational experience. Addressing these gaps is critical to enhancing the instructional process and improving digital and academic performance of undergraduate business education students.

Digital presentation tools are essential for effectively conveying information and capturing learners' attention. However, traditional instructional equipment such as chalkboards, opaque projectors, typewriters, overhead projectors, slide projectors, and filmstrip projectors have become increasingly cumbersome to operate and maintain (Sadik, 2014). Moreover, for many years, the delivery of school curriculum content has relied heavily on rote learning, making instruction predominantly teacher-centered. This approach often results in poor student

performance in examinations, especially when abstract concepts are taught theoretically without engaging students effectively. With the advancement of modern learning resources, teacher training institutions must adopt up-to-date technologies and tools. The Business Education programme cannot attain the desired level of dynamism and relevance unless teacher educators integrate cutting-edge multimedia resources into the teaching and learning process.

Recent research supports the integration of multimedia technologies into teaching practices as a means to improve students' academic achievement and enrich the overall learning experience. Recent studies affirm that effective ICT use can significantly enhance Business Education students' academic performance in Delta State tertiary institutions (Igberaharha & Okogi, 2023). Although some progress has been made in providing access, support, and curriculum flexibility by tertiary administrators, these efforts have not yielded the desired results (Bahadur & Ogarah, 2013). Many educators in business education still face challenges in adopting multimedia resources into teaching strategies. As a result, technological tools are often sidelined, and traditional teaching methods continue to dominate the instructional process. This persistent view underscores the need for a systematic approach to training and equipping educators with skills and confidence to utilize multimedia technologies effectively.

In the 2000s and 2010s, there was a significant influx of Information and Communication Technology (ICT) resources in classroom instructional delivery. Many high-tech tools initially developed for purposes such as office work and business presentations became integrated into classroom learning environments (Dobrovolná, 2015). The rapid advancement of technology has greatly influenced pedagogy, as it has other areas of education, leading to a proliferation of technology-based applications for teaching and learning. Although a variety of technology-based approaches are utilized in classroom teaching, no single method is universally effective for all instructional contexts. These approaches include web-based learning strategies, social media-driven methods, hypermedia tools, educational games, and multimedia-based instruction. Notably, multimedia-based instruction is the most commonly adopted method for classroom teaching (Pangaribuan, Sinaga & Sipayung, 2017).

Multimedia-based instruction has ushered in a new era of learning by accelerating the adoption of computer applications in teaching delivery. Multimedia integrates texts, graphics, pictures, animations, video, and audio to present information logically and engagingly (Incedayi, 2018). According to Wu and Tai (2016), multimedia represents the convergence of various technological elements, combining audio, visual, animated, graphic, and textual components into a cohesive communication system. These tools allow educators to create, edit, store, transmit, and receive information across multiple formats, enhancing both teaching and learning processes. Different types of multimedia-based instructional tools play an important role in facilitating learning by providing interactive and engaging platforms for both students and teachers (Jingjit, 2015). By incorporating multimedia tools, educators can create dynamic learning environments that cater to diverse learning needs, ultimately improving students' academic performance and their overall engagement with the content.

The inadequate use of multimedia in the instructional process of the business education programme has become a significant concern. Since the 2000s, there has been an increasing outcry from employers about the unsuitability of business education graduates for job placements, particularly in the Vocational and Technical Education (VTE) sector. Nwadiani and Egbri (2016) noted that if this lack of multimedia integration persists, it will continue to produce half-trained graduates who cannot compete effectively in the labor market. This challenge is exacerbated by rapid advancements and innovations in instructional technology, which demand a shift toward more dynamic teaching approaches. To address this, the instructional delivery process in the business education programme requires the integration of digital tools such as Interactive Whiteboards (IWBs), PowerPoint presentations (PPTs), and other ICT-based facilities. These tools have the potential to support pre-service teachers in adapting to real-world work environments and meeting the expectations of modern employers (Azih & Wagbara, 2018).

Currently, the teaching process in many Nigerian tertiary institution classrooms is predominantly one-way communication, where teachers deliver information directly, often relying solely on textbooks. Students in such classrooms remain passive and disengaged throughout lessons. Also, lecture halls are typically equipped with marker boards, limiting instructional effectiveness. According to Gambari, Shittu, Daramola, and Jimoh (2016), the limitations of this traditional approach include ineffectiveness in large-group instruction, the inability to store information for future use, lack of support for illustrations, and an overall lack of engagement and interest in learning. These deficiencies in instructional delivery contribute to the substandard quality of pedagogy in business education classrooms, leading to unsatisfactory performance among pre-service teachers. Stakeholders in the programme have expressed growing concerns over these issues, which have hampered student performance. If this challenge is not adequately addressed, it may jeopardize students' chances of gaining placement into degree programmes and their overall career prospects. Therefore, a deliberate and systematic approach to incorporating

multimedia teaching resources is essential to revitalize the instructional process and improve the academic performance of business education students.

While the lack of facilities was a primary concern for researchers during the 1990s and 2000s, advancements stemming from these studies led the Nigerian government to establish multimedia centers across tertiary institutions nationwide. However, the focus has since shifted from the lack of facilities to the underutilization of multimedia-based instructional tools (Garba & Alademerin, 2014). Despite the availability of these tools, insufficient emphasis has been placed on implementing innovative strategies to improve students' learning outcomes (Gambari, Shittu, Daramola & Jimoh, 2016). Multimedia teaching resources, such as PowerPoint presentations and interactive whiteboards, have the potential to address learning challenges in various subject areas. These tools can enhance students' motivation, attitudes, achievements, and retention rates (Mohammadian, Saed & Shahi, 2018). Integrating these resources into business education classrooms can play a pivotal role in improving the academic performance of business education students. Addressing this issue requires concerted efforts to leverage multimedia technology effectively in instructional processes, ensuring equitable access and opportunities for all students.

### **1.2 Statement of the Problem**

The educational system has witnessed a remarkable transformation through technological advancements, particularly in the use of multimedia teaching resources. Tools such as PowerPoint presentations, interactive whiteboards, and other ICT-based innovations have revolutionized teaching by fostering interactive, student-centered learning. These resources have been widely recognized for their ability to enhance academic performance, increase student motivation, and cater to diverse learning styles.

Despite the global advancements in multimedia teaching resources, its integration in business education programmes within tertiary institutions in Delta State remains a significant challenge. The availability of multimedia teaching resources is a critical factor in modernizing educational delivery. However, in many cases, the available resources are insufficient or inconsistently distributed, leaving students and educators unable to fully benefit from their potential. Traditional teaching methods, characterized by lecture-centered approaches, still dominate business education classrooms, stifling student engagement and creativity.

The lack of widespread access to multimedia teaching resources, their underutilization, and the limited understanding of their impact on students' academic performance create a significant gap in the educational experience of undergraduate business education students in Delta State. This gap is further complicated by the challenges students face in accessing and using multimedia resources, including inadequate ICT infrastructure and insufficient technical support. As a result, there is a need for empirical evidence and actionable insights that can shape policy, improve instructional practices, and ultimately enhance the academic performance of business education students in Delta State.

### **1.3 Purpose of the Study**

The study aims to examine the influence of multimedia teaching resources on the academic performance of undergraduate business education students in tertiary institutions in Delta State. Specifically, the study seeks,

1. To examine the availability of multimedia teaching resources for undergraduate Business Education students in Delta State tertiary institutions.
2. To assess the extent to which multimedia teaching resources are effectively utilized in Business Education programmes in Delta State tertiary institutions.
3. To determine the extent to which multimedia teaching resources influence academic performance of undergraduate Business Education students in Delta State tertiary institutions.
4. To identify the challenges undergraduate Business Education students, face in utilizing multimedia teaching resources in Delta State tertiary institutions.
5. To propose strategies for improving the utilization of multimedia teaching resources by undergraduate Business Education students in Delta State tertiary institutions.

### **1.4 Research Questions**

The following research questions guided the study

1. How available are multimedia teaching resources for undergraduate Business Education students in Delta state tertiary institutions?
2. To what extent are multimedia teaching resources effectively utilized in Teaching and Learning of Business Education in Delta State tertiary institutions?
3. To what extent does multimedia teaching resources influence academic performance of undergraduate Business Education students in Delta State tertiary institutions?
4. To what extent do undergraduate business education students face challenges in utilizing multimedia teaching resources in Delta State tertiary institutions?

5. What strategies can be implemented to improve the utilization of multimedia teaching resources by undergraduate Business Education students in Delta state tertiary institutions?

### 1.5 Research Hypotheses

The following null hypotheses were formulated and tested at 0.05 level of significance to guide the study:

Ho1. There is no significant difference in the mean ratings of male and female Business Education students on the availability of multimedia teaching resources in Delta State tertiary institutions.

Ho2. There is no significant difference in the mean ratings of Business Education students on the extent to which multimedia teaching resources are effectively utilized in Business Education programmes in Delta State tertiary institutions based on age.

Ho3. There is no significant difference in the mean ratings of Business Education students on the extent to which multimedia teaching resource influence business education students academic performance in Delta State tertiary institutions based on qualification in view.

Ho4. There is no significant difference in the mean ratings of Business Education students on challenges faced in utilizing multimedia teaching resources in Delta State tertiary institutions based on academic level

Ho5. There is no significant difference in the mean ratings of Business Education students on strategies for improving the utilization of multimedia teaching resources in Delta State tertiary institutions based on gender.

## 2.0 REVIEW OF RELATED LITERATURE

The influence of multimedia teaching resources on academic performance in undergraduate Business Education programmes has been extensively explored in educational research, drawing on foundational theories that explain how learners process information in technology-enhanced environments. Cognitive Load Theory (CLT), first proposed by John Sweller in the late 1980s, posits that effective learning depends on managing the cognitive demands imposed on working memory, which has limited capacity for processing new information while long-term memory stores schemas indefinitely (Sweller, 1988; Sweller et al., 2011). CLT categorizes cognitive load into intrinsic, arising from the material's complexity and learner's prior knowledge; extraneous, from suboptimal instructional design; and germane, which supports schema construction and deep learning (Leppink, 2017; Kirschner & Jimmy, 2018; Garvey & Gonzalo-Angulo, 2018).

Recent developments in CLT from 2020 to 2025 have expanded its application, incorporating emerging trends such as working memory recovery techniques to mitigate fatigue in prolonged learning sessions, emphasis on individual learner characteristics like cognitive styles for personalized instruction, and embodied learning where physical interactions reduce load by engaging sensorimotor pathways. Further innovations include integrating the physical environment as a load factor in workplace-based education, highlighting how distractions from surroundings can exacerbate extraneous load (BMC, 2024). In health education design, CLT has been applied to complex scenarios, proposing that finite processing capacity must account for environmental variables (PMC, 2025). Critiques have addressed theoretical constraints, urging a balance between load management and pedagogical flexibility, while AI-enhanced frameworks dynamically adjust instructional complexity to optimize learning (Taylor & Francis, 2024; Springer, 2025). Studies on pre-training effects underscore how prior knowledge influences load during problem-solving, aligning CLT with adaptive strategies for diverse learners (Frontiers, 2025).

Complementing CLT, the Cognitive Theory of Multimedia Learning (CTML), developed by Richard E. Mayer, builds on dual-coding principles to assert that learners process information through separate auditory-verbal and visual-pictorial channels, achieving deeper understanding when words and images are integrated without overload (Mayer, 2009; Paivio, 1986; Mayer & Moreno, 2016). CTML outlines key processes: selecting, organizing, and integrating information with prior knowledge, guided by principles such as multimedia (combining words and pictures), contiguity (simultaneous presentation), modality (narration over text), redundancy (avoiding duplication), coherence (excluding extraneous material), signaling (highlighting essentials), segmenting (user-paced chunks), pre-training (key terms first), personalization (conversational style), voice (friendly tone), image (no unnecessary speaker visuals), and embodiment (expressive agents) (Mayer, 2022; Learning Theories, 2014; Moreno & Mayer, 2000). Advancements from 2020 to 2025 have traced CTML's evolution, emphasizing evidence-based applications in digital contexts and extensions to augmented reality (AR) where multimodal cues enhance comprehension (Springer, 2024; ERIC, 2024; ScienceDirect, 2025). Mayer's third edition of *Multimedia Learning* reinforces an evidence-based approach to designing instruction, categorizing principles into extraneous, essential, and generative processing types (Cambridge, 2021; Mayer, 2014). Recent implementations extend CTML to fields like multimedia-enhanced problem-solving and AI integration, while discussions on the modality principle suggest refinements for integrated text-audio designs (ScienceDirect, 2024; DOI, 2025).

These theories provide a foundation for understanding multimedia-based instructions, which integrate text, graphics, audio, video, and interactivity to create dynamic learning experiences, categorized as linear or non-linear, supporting knowledge construction and cognitive skills (Shah & Khan, 2015; Jingjit, 2015; Baltimore, 2017; Harji & Gheitanchian, 2017; Sarac & Tarhan, 2017; Jena et al., 2018). In Business Education, a component of Vocational and Technical Education (VTE), these resources prepare students for roles as teachers, entrepreneurs, and administrators by fostering practical skills and employability in a technology-driven economy (Ezeonwurie, 2016; Umoeshiet, 2015; Ajie-Uche et al., 2018; Edokpolor & Egbri, 2017; Nwadiani & Egbri, 2016). Academic performance, encompassing cognitive, affective, and psychomotor domains as per Bloom's Taxonomy, is measured through grades, skills, and certifications, reflecting mastery aligned with curricular goals (Nworie et al., 2023; Adams, 2018; Anderson & Krathwohl, 2017; Ebrahimi et al., 2025). Availability of multimedia resources in tertiary education varies by funding and infrastructure, with tools like learning management systems (LMS), virtual reality (VR), and interactive whiteboards enhancing engagement, though disparities persist between urban and rural institutions (Kok & Govender, 2020; Akhtar & Rehman, 2021; Mtebe & Raphael, 2018; Smith & Caruso, 2022; Akpojotor, 2022). Utilization involves active integration, transforming passive learning into interactive processes, yet remains low due to training gaps and underutilization in Nigerian contexts (Igberaharha & Okogi, 2023; Garba & Alademerin, 2014; Akpojotor, 2022).

The impact on academic performance is positive, improving comprehension, motivation, and retention, particularly in Business Education where practical applications align with program objectives (Mohammadian et al., 2018; Mayer, 2022; Pangaribuan et al., 2017). Challenges include limited access, outdated tools, poor internet, insufficient training, and power issues, exacerbating inequities (Ushie, 2019; Okebukola, 2020; Akpojotor, 2022). Strategies for enhancement encompass workshops, policy integration, public-private partnerships, and infrastructure upgrades to promote effective adoption (Uzoechi & Adebayo, 2014; Dele-Ajayi et al., 2021; Olabiyi et al., 2022).

Empirical studies, such as Ibrahim and Musa (2023) who found multimedia significantly enhanced performance in Kaduna State using a mixed-methods approach, and Smith and Johnson (2019) who reported improved understanding via interactive tools at the University of Toronto, affirm these benefits but highlight methodological gaps like the lack of longitudinal data. Adewale and Bamidele (2022) noted positive correlations in Nigerian polytechnics, while Ahmed and Al-Harbi (2020) emphasized motivation at King Saud University. Overall, the literature underscores multimedia's potential but reveals gaps in region-specific, theoretically grounded research in Delta State, which this study addresses by integrating CLT and CTML to bridge knowledge disparities and inform policy for enhanced academic outcomes in Business Education.

### **3.0 RESEARCH METHOD AND PROCEDURE**

This chapter delineates the methodological framework employed to investigate the influence of multimedia teaching resources on the academic performance of undergraduate Business Education students in Delta State tertiary institutions, encompassing the area of the study, research design, population, sample and sampling techniques, research instrument, validation and reliability processes, data collection methods, and data analysis procedures. The study was conducted in Delta State, a major oil-producing region in Nigeria's South-South geopolitical zone, named after the Niger Delta and established on August 27, 1991, from the former Bendel State, with Asaba as its capital and sharing boundaries with Onitsha across the River Niger, providing a context rich in natural resources, cultural diversity, and historical significance that influences educational dynamics in its tertiary institutions. A descriptive survey research design was adopted, deemed appropriate for eliciting opinions, perceptions, and practices from a defined population, as it facilitates systematic data collection from numerous respondents to capture snapshots of current phenomena, attitudes, and behaviors, enabling a comprehensive examination of multimedia resource integration and its effects on academic performance (Saunders, Lewis, & Thornhill, 2023; Fowler, 2014). This design allowed for gathering insights from a representative sample of students and educators, revealing how multimedia tools contribute to engagement, comprehension, and overall success in Business Education programs, with findings intended to be generalizable to the broader population while offering actionable recommendations for enhancing technology-driven instruction. The population comprised 820 undergraduate Business Education students from four tertiary institutions offering the program: Delta State University, Abraka; University of Delta, Agbor; College of Education, Warri; and Delta State College of Education, Mosogar, focusing exclusively on these students as primary beneficiaries of multimedia-enhanced instructional practices to ensure targeted and relevant perspectives on availability, utilization, and impact. A sample of 200 students was selected using stratified random sampling to ensure equitable representation across academic levels (100 to 400) and institutions, followed by proportionate sampling to distribute the sample according to each institution's population share, thereby minimizing bias and enhancing the validity of inferences drawn from the data. The research instrument was a self-designed questionnaire

titled "Influence of Multimedia Teaching Resources on Academic Performance Questionnaire (IMTRAPQ)," structured into two sections: Section A for demographic data such as gender, age, and academic level, and Section B with 75 items organized into five thematic clusters aligned with the research questions, availability, utilization, impact, challenges, and strategies, each containing 15 statements rated on modified 4-point Likert scales tailored to the construct (e.g., Very Highly Available to Not Available for availability; Very High Extent to Very Low Extent for utilization, impact, and challenges; Strongly Agree to Strongly Disagree for strategies), designed to yield quantifiable, structured responses for precise measurement of perceptions. The instrument underwent face and content validation by three experts, the research supervisor, a Business Education academic, and a Measurement and Evaluation specialist from Delta State University, Abraka, who scrutinized items for clarity, relevance, and alignment with study objectives, leading to revisions that eliminated ambiguities and ensured comprehensive coverage. Reliability was established via a pilot study using the test-retest method on 30 undergraduate Business Education students from Ambrose Alli University, Ekpoma (outside the study area to avoid contamination), administered twice with a two-week interval, yielding a Pearson product-moment correlation coefficient of 0.84, indicating high consistency and suitability for the main study. Data collection involved the researcher and four trained assistants distributing questionnaires directly to the 200 sampled students across the institutions, with each assistant overseeing one site, providing on-site guidance to clarify items and ensure completeness, achieving a 100% retrieval rate through prompt follow-up to maintain data integrity and response accuracy. Data analysis utilized SPSS version 23, employing descriptive statistics (mean and standard deviation) to address research questions, with decision boundaries for mean interpretations (e.g., 3.50-4.00 for very high extent/availability/agreement, 2.50-3.49 for high, 1.50-2.49 for low/moderate, 0.50-1.49 for very low/not available/disagreement), where standard deviation assessed response dispersion; inferential statistics included t-tests for hypotheses 1, 3, and 5 (testing differences by gender and qualification) and ANOVA for hypotheses 2 and 4 (by age and academic level), all at a 0.05 significance level, rejecting null hypotheses when  $p \leq 0.05$  to determine statistical significance.

#### 4.0 RESULTS AND DISCUSSION OF FINDINGS

Table 1: Mean and Standard Deviation of Responses on the Extent to which multimedia teaching resources are available for undergraduate Business Education students (N=200)

S/N	Item	$\bar{X}$	SD	Remark
1	Projectors and screens are available for lectures.	2.00	0.92	MA
2	Interactive whiteboards are accessible for teaching.	1.94	0.89	MA
3	Laptops or desktops are provided for student use during lectures.	2.05	1.03	MA
4	E-learning platforms are available for course delivery.	2.07	1.03	MA
5	Audio-visual aids such as videos are used in classrooms.	2.01	1.03	MA
6	Simulation software is accessible for practical sessions.	1.99	0.97	MA
7	Internet access is available for academic purposes.	2.10	0.94	MA
8	Multimedia labs are available for Business Education students.	2.05	0.89	MA
9	Educational apps are provided to support learning.	2.03	0.90	MA
10	Digital textbooks and e-libraries are accessible to students.	2.09	0.92	MA
11	Printers and scanners are available for academic use.	2.18	1.01	MA
12	Course-related animations are used for instruction.	2.17	0.99	MA
13	Institutional subscriptions to online journals are provided.	2.19	1.07	MA
14	Podcasts and audio resources are available for student learning.	2.69	1.09	HA
15	Virtual reality tools are accessible for Business Education courses.	2.68	1.10	HA
	<b>Grand Mean/SD</b>	<b>2.15</b>	<b>0.99</b>	<b>MA</b>

Sources: Field Study 2025

The results in Table 1 revealed that the mean scores for the availability of multimedia teaching resources for 13 items in the scale ranged from 1.94 - 2.19 signifying moderate availability while 2 items have mean score of 2.68 and 2.69 which implied a high availability of these resource. While the standard deviation (SD) ranged from 0.89 – 1.10 indicating that the respondents are not far apart in their responses. However, the grand mean was 2.15 meaning that multimedia teaching resource are moderately available for teaching Business Education. Therefore, multimedia teaching resources are moderately available for teaching undergraduate Business Education students in Delta State tertiary institutions.

Table 2: Mean and Standard Deviation of Responses on the Extent of Effective Utilization of Multimedia Teaching Resources in Teaching and Learning of Business Education Courses (N=200)

S/N	Item	$\bar{X}$	SD	Remark
1	Interactive whiteboards are used regularly in Business Education lectures.	2.15	0.93	LE
2	Projectors are effectively utilized for course presentations.	2.19	0.73	LE
3	E-learning platforms are actively integrated into teaching activities.	1.73	0.90	LE
4	Multimedia videos are incorporated into lectures to explain concepts.	1.72	0.85	LE
5	Educational software is used to enhance practical business skills.	1.82	0.89	LE
6	Online simulations are employed to teach real-world business scenarios.	1.65	0.80	LE
7	Audio teaching aids are used for interactive learning in classes.	2.37	0.82	LE
8	Animations are utilized to illustrate complex business concepts.	2.20	0.48	LE
9	Digital presentation tools (e.g., PowerPoint) are frequently employed.	2.40	0.81	LE
10	Virtual reality tools are used for experiential learning.	1.74	0.93	LE
11	Computers and laptops are utilized during practical sessions.	2.81	0.67	HE
12	The Internet is used as a teaching tool for business case studies.	2.50	0.71	HE
13	Online assessments and quizzes are used to evaluate student learning.	1.96	0.86	LE
14	Multimedia tools are used in seminars and workshops in the department.	2.29	0.82	LE
15	Smart boards are used for real-time interaction in class.	1.89	0.82	LE
	<b>Grand Mean</b>	<b>2.09</b>	<b>0.80</b>	<b>LE</b>

Sources: Field Study 2025

The results presented in Table 2 indicates that the grand mean score is 2.09, with individual means of 13 items in the scale ranging from 1.65 – 2.40 and 2 items in the scale having mean scores of 2.50 and 2.81. Based on the interpretation benchmark ( $X < 2.50 =$  Low Extent). While the standard deviation score ranges from 0.48 – 0.93 insinuates that the respondents are not too far part in their responses. The findings indicate that multimedia teaching resources are not being effectively utilized in the instructional delivery of Business Education courses at Delta State tertiary institutions. This suggests a limited integration of digital tools in classroom practices.

Table 3: Mean and Standard Deviation of Responses on the Perceived Influence of Multimedia Teaching Resources on the Academic Performance of Business Education Students (N=200)

S/N	Item	$\bar{X}$	SD	REMARK
1.	Multimedia teaching resources enhance students' understanding of complex concepts.	2.78	0.82	HE
2.	The use of projectors improves student engagement during lectures.	2.86	0.74	HE
3.	Videos and animations aid in better retention of course materials.	2.86	0.78	HE
4.	Multimedia-supported lectures increase students' academic motivation.	2.99	0.75	HE
5.	Integration of e-learning platforms fosters self-paced learning.	2.95	0.77	HE
6.	Simulation software improves the application of business theories.	2.99	0.67	HE
7.	Interactive whiteboards encourage collaborative learning.	3.02	0.68	HE
8.	Multimedia tools simplify the explanation of abstract topics.	3.02	0.72	HE
9.	Access to online resources enhances research skills.	2.99	0.72	HE
10.	Use of multimedia reduces reliance on rote memorization.	2.97	0.77	HE
11.	PowerPoint improves the clarity of course delivery.	3.07	0.70	HE
12.	Audio-visual aids make lectures more engaging and less monotonous.	2.94	0.80	HE
13.	Multimedia teaching improves academic performance in tests and assignments.	2.92	0.80	HE
14.	Interactive learning apps improve problem-solving skills.	3.05	0.77	HE
15.	Online simulations help students gain real-world business insights.	3.06	0.80	HE
	<b>Grand Mean</b>	<b>2.96</b>	<b>0.75</b>	<b>HE</b>

Sources: Field Study 2025

The data in Table 3 shows a grand mean score of 2.96, with individual item means ranging from 2.78 to 3.07. Based on the interpretation guide (Mean  $\geq 2.50 =$  High influence), this implies that respondents perceive multimedia teaching resources to have a high positive influence on academic performance. The results indicate that tools like projectors, animations, e-learning platforms, and simulations contribute meaningfully to students' comprehension, engagement, motivation, and overall academic success in Business Education. Therefore, multimedia teaching resources influence academic performance of undergraduate Business Education students in Delta State tertiary institutions to a high extent.

Table 4: Mean and Standard Deviation of Responses on Challenges Associated with Utilizing Multimedia Teaching Resources (N=200)

S/N	Item	$\bar{X}$	SD
1.	Access to multimedia teaching resources is limited in my institution.	3.21	0.74
2.	The availability of functioning multimedia tools is inadequate.	3.01	0.79
3.	Multimedia resources are often outdated.	3.02	0.82
4.	Internet connectivity issues hinder the use of multimedia tools.	2.97	0.80
5.	There is insufficient training for students on the use of multimedia resources.	2.96	0.85
6.	Technical support for troubleshooting multimedia resources is not readily available.	2.94	0.86
7.	Multimedia resources are not integrated into most course materials.	3.07	0.86
8.	Many classrooms lack the necessary facilities for using multimedia teaching aids.	2.98	0.77
9.	The high cost of multimedia resources limits their accessibility.	3.11	0.82
10.	Lack of awareness about available multimedia resources poses a challenge.	3.15	0.73
11.	Multimedia tools are often underutilized due to lecturers' teaching preferences.	3.08	0.87
12.	Scheduling conflicts prevent adequate use of multimedia-equipped spaces.	3.01	0.94
13.	Overcrowding in classrooms limits the effective use of multimedia resources.	3.12	0.84
14.	The language or interface of multimedia tools can be a barrier for some students.	3.08	0.85
15.	Time constraints during lectures reduce opportunities to fully utilize multimedia resources.	3.06	0.91
	<b>Grand Mean</b>	<b>3.05</b>	<b>0.83</b>

Sources: Field Study 2025

The data presented in Table 4 revealed a grand mean score of 3.05, indicating that Business Education students generally agree that substantial challenges exist in utilizing multimedia teaching resources in their institutions. With all individual items scoring well above the benchmark of 2.50. Therefore, business education students are faced with challenges such as limited access, outdated tools, insufficient training, poor internet connectivity, and overcrowded classrooms which pose as obstacles in utilizing multimedia teaching resources in Delta State tertiary institutions.

Table 5: Mean and Standard Deviation of Responses on Strategies for Enhancing Multimedia Teaching Resources (N=200)

S/N	Item	$\bar{X}$	SD
1.	Providing regular training programmes for students on the use of multimedia teaching resources.	3.20	0.82
2.	Increasing the availability of functional multimedia devices in classrooms and lecture halls.	3.11	0.85
3.	Ensuring a reliable power supply to support the use of multimedia teaching resources.	3.24	0.75
4.	Improving internet connectivity across the campus for better access to online multimedia tools.	3.27	0.86
5.	Allocating a dedicated budget for maintaining and upgrading multimedia teaching resources.	3.29	0.80
6.	Including multimedia training sessions as part of the curriculum for Business Education students.	3.16	0.81
7.	Establishing resource centers equipped with advanced multimedia facilities for student use.	3.17	0.87
8.	Encouraging lecturers to integrate multimedia tools into their teaching practices regularly.	3.19	0.72
9.	Organizing workshops and seminars on innovative uses of multimedia in education.	3.29	0.69
10.	Creating user-friendly guides or manuals for students on how to operate multimedia resources.	3.11	0.80
11.	Partnering with external organizations to provide additional multimedia resources and training.	3.05	0.87
12.	Incorporating multimedia utilization as part of student evaluation and assignments.	3.13	0.88
13.	Offering technical support services to assist students in troubleshooting multimedia equipment.	3.12	0.91
14.	Setting up feedback mechanisms to identify and address challenges faced in using multimedia.	3.21	0.81
15.	Encouraging collaborative projects among students that require the use of multimedia resources.	3.29	0.83
	<b>Grand Mean</b>	<b>3.19</b>	<b>0.82</b>

Sources: Field Study 2025

The findings from Table 5 shows a grand mean of 3.19, which implies that respondents strongly support the outlined strategies for enhancing the utilization of multimedia teaching resources. Each item recorded a mean value above the benchmark of 2.50, indicating widespread agreement among respondents. Notably, strategies such as organizing workshops, providing technical support, ensuring reliable infrastructure (power and internet), and integrating multimedia training into the curriculum were strategies to improve the utilization of multimedia teaching resources by undergraduate Business Education students in Delta state tertiary institutions.

Table 6: t-test Analysis of male and female respondents' mean ratings on students' perceptions of the availability of multimedia teaching resources

Variable	N	Mean	SD	df	t-value	$\alpha$	p-value	Decision
Male	82	2.09	0.61					
Female	118	2.06	0.68	198	0.276	0.05	0.78	NS

Table 6 shows a t-value of 0.276 and a p-value of 0.78 which is greater than the alpha value of 0.05. This indicates that gender has no statistically significant influence on students' perceptions of the availability of multimedia teaching resources. Hence, the null hypothesis ( $H_0$ ) was retained. Therefore, there is no significant difference in the mean rating of business education students on perceptions of the availability of multimedia teaching resources based on gender.

Table 7: Shows the descriptive statistics of ANOVA summary of students' perceptions of how multimedia teaching resources are effectively utilized based on age

Age	N	Mean	Std. Deviation
16 Years-25 Years	64	2.09	.811
26 Years - 35 Years	122	1.61	.722
36 Years - 45 Years	8	1.75	1.035
Above 45 Years	6	1.67	.516
Total	200	1.77	.788

Table 8: ANOVA summary of students' perceptions of the effective utilization of multimedia teaching resources based on age

Sources of Variance		Sum of Squares	Df	Mean Square	F	Sig.	Decision
Effective utilization of multimedia teaching resources	Between Groups	10.034	3	3.345	5.782	.001	S $H_0$ Rejected
	Within Groups	113.386	196	.578			
	Total	123.420	199				

P = 0.05

Data presented in Table 8 indicated that the F-value of the item is 5.782 while the corresponding p-value is .001. This showed that the p-value of .001 is lesser than the significance level ( $\alpha = 0.05$ ). Therefore, the null hypothesis ( $H_0$ ) was rejected. The implication of this is that age is a major factor to be considered in utilization of multimedia teaching resources. Therefore, there is a statistically significant difference in the mean rating of business education students on students' perceptions of the effective utilization of multimedia teaching resources based on age.

Table 9: T-Test Summary for Multimedia Teaching Resources' Influence on Academic Performance Based on Qualification in View

Variable	N	Mean	SD	df	$\alpha$	t-value	p-value	Decision
B.Sc (Ed.)	106	2.76	0.69					
NCE	94	2.74	0.77	198	0.05	0.149	0.88	NS Retain H <sub>0</sub>

Table 9 shown a p-value of 0.88, which is greater than the 0.05 significance level. This indicated that the difference in mean scores between B.Sc. and NCE students regarding how multimedia teaching resources influence their academic performance is not statistically significant. Meaning that students' perceptions do not differ significantly based on whether they are pursuing a B.Sc (Ed) degree or NCE. Hence, the null hypothesis was retained. Therefore, there is no significant difference in the mean ratings of Business Education students on the influence of multimedia teaching resources on their academic performance in Delta State tertiary institutions based on qualification in view.

Table 10: Shows the descriptive statistics of ANOVA summary of Challenges faced by undergraduates in Utilization of Multimedia Resources based on Academic Level

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
					100 level	36		
200 level	55	3.13	.511	.069	2.99	3.27	2	4
300 level	72	3.06	.579	.068	2.92	3.19	2	4
400 level	37	3.14	.481	.079	2.97	3.30	2	4
Total	200	3.12	.577	.041	3.03	3.20	2	4

Table 11: ANOVA summary of Challenges faced by undergraduates in Utilization of Multimedia Resources based on Academic Level

Sources of Variance		Sum of Squares	df	Mean Square	F	Sig.	Decision
Challenges of utilization of Multimedia Resources	Between Groups	.505	3	.168	.501	.682	NS Ho Retained
	Within Groups	65.850	196	.336			
	Total	66.355	199				

P = 0.05

Data presented in Table 11 displayed that the F-value of the item is .501 while the corresponding p-value is .682. This showed that the p-value of .682 is greater than the significance level ( $\alpha = 0.05$ ). Therefore, the null hypothesis (H<sub>0</sub>) was retained. The implication of this is that academic level has no interference with students' perception of challenges they face in utilizing multimedia resource in Delta State tertiary institutions. Therefore, there is no statistically significant difference in the mean rating of business education students on challenges face in utilization of multimedia resource in Delta State tertiary institutions based on academic level.

Table 12: T-Test Summary of Business Education students on strategies for improving the utilization of multimedia teaching resources based on gender.

Variable	N	Mean	SD	df	$\alpha$	t-value	p-value	Decision
Male		82	3.30	0.72				
Female	118	3.18	0.74		198	0.05	1.214	0.23
								NS Retain $H_0$

Table 12 showed a t-value of 1.214 and a p-value of 0.23, which is greater than the 0.05 significance level. This showed that there was no statistically significant difference between male and female students' perceptions of strategies to improve the use of multimedia teaching resources in Delta State tertiary institutions. Thus, the null hypothesis of no significant difference was retained. This implied that gender does not significantly affect how students perceive strategies for improving the application of multimedia tools in teaching. Therefore, there is no significant difference in the mean ratings of Business Education students on strategies for improving the utilization of multimedia teaching resources in Delta State tertiary institutions based on gender.

### DISCUSSION OF FINDINGS

The result of data analysis on research question one indicated that multimedia teaching resources are moderately available for teaching undergraduate Business Education students in Delta State tertiary institutions. This finding is in harmony with the findings of Akpojotor (2022) who found that there are insufficient modern computers in the laboratory. The finding is in support of Okonkwo and Emeka (2023) who found that multimedia resources such as projectors and e-learning platforms were moderately available. Also, the finding is in line with Akpojotor(2022), who found that there are inadequate personal computers and laptops to ICT centres.

The finding of research question two revealed that multimedia teaching resources are not being effectively utilized in instructional delivery of Business Education courses at Delta State tertiary institutions. This finding is in agreement with the findings of Akpojotor (2022) that ICT facilities are under-utilized in business education programmes in tertiary institution in Delta State.

The finding of research question three showed that multimedia teaching resources influence academic performance of undergraduate Business Education students in Delta State tertiary institutions to a high extent. The finding is in agreement with Okonkwo and Emeka (2023) who found that utilization of multimedia resource was significantly related to better academic performance. This finding this finding also harmonized that of Clark and Mayer (2016), who emphasized that well-designed multimedia resources, such as synchronized words and pictures, enhance clarity and learner engagement, particularly in technical and professional education like Business Education. Similarly, St-Hilaire et al. (2021) demonstrated that technology-enhanced, personalized, and active learning environments significantly improve learner outcomes and metacognitive skills. Moreover, Mayer (2022) notes that multimedia tools that leverage both verbal and visual channels support improved comprehension and retention, consistent with the multimedia principle of the Cognitive Theory of Multimedia Learning.

Research question four found that business education students are faced with challenges such as limited access, outdated tools, insufficient training, poor internet connectivity, and overcrowded classrooms which pose as obstacles in utilizing multimedia teaching resources in Delta State tertiary institutions. This finding is in line with the findings Ushie, (2019) who found that Inadequate or unstable internet connectivity has been identified as a barrier to the use of educational technologies in Nigerian institutions. Also, the finding corroborate with Okebukola (2020) who asserted that multimedia tools are being introduced in educational settings, however, their full instructional potential is often underexploited due to systemic inefficiencies and poor digital literacy levels among staff. Further, the finding aligned with Akpojotor (2022) that internet connectivity is slow in the computer laboratory and that there is inadequate power supply to the computers and ICT facilities in the laboratory. Also, the finding harmonized Akpojotor (2022) who found that digitalizing business education programme is faced with various challenges such as high cost of ICT facilities, poor electricity power supply, low standby alternative power supply.

Research question five found that strategies such as organizing workshops, providing technical support, ensuring reliable infrastructure (power and internet), and integrating multimedia training into the curriculum were strategies to improve the utilization of multimedia teaching resources by undergraduate Business Education students in Delta state tertiary institutions. This finding agreed with Uzoечи and Adebayo (2014), who concluded that holistic

strategies are vital for the sustainable implementation of multimedia technologies in teacher education. Also, the finding supported that of Dele-Ajayi, Fasae, and Okoli (2021), who argue that sustained integration of ICT in classrooms relies heavily on teacher commitment and capability. It also supported the findings of Olabiyi, Okeowo, Adedayo, and Ipinlaye (2022), who highlight that public-private partnerships significantly enhance the delivery of technical and vocational education by improving access to essential digital resources during the pandemic.

Hypothesis one found that there is no significant difference in the mean rating of business education students on perceptions of the availability of multimedia teaching resources based on gender. This finding is in contradiction with Nantok et al. (2025) who found that male students are more influenced by perceived ease of use of ICT facilities than their female counterparts who are more concerned with infrastructure availability.

It was found in hypothesis two that there was a statistically significant difference in the mean rating of business education students on students' perceptions of the effective utilization of multimedia teaching resources based on age. This finding contradicted that of Okonkwo and Udeze (2021), who noted that when instructional technologies are uniformly implemented within academic programmes, differences due to age tend to be minimal.

The finding of hypothesis three revealed that there was no significant difference in the mean ratings of Business Education students on the influence of multimedia teaching resources on their academic performance in Delta State tertiary institutions based on qualification in view. This implied that students from both qualification pathways hold similar views about the benefits of multimedia teaching on their academic performance. This aligned with research by Nwachukwu and Ajayi (2020), who found that the impact of ICT-based instruction is less dependent on programme type and more on the consistency of multimedia integration into pedagogical practice.

Hypothesis four showed that there was no statistically significant difference in the mean rating of business education students on challenges face in utilization of multimedia resource in Delta State tertiary institutions based on academic level. This corroborates the findings of Eze, Okafor, and Anazodo (2021), who reported that challenges in digital resource usage in Nigerian tertiary institutions are more infrastructural and institutional than learner-specific.

The finding of hypothesis five indicated that there was no significant difference in the mean ratings of Business Education students on strategies for improving the utilization of multimedia teaching resources in Delta State tertiary institutions based on gender. This finding agreed with Ukwueze and Nwanne (2022), students' perception of enhancement strategies tends to converge when they experience similar academic environments and teaching challenges, regardless of gender.

## 5.0 CONCLUSION

Based on the findings of the study, it was concluded that multimedia teaching resources are moderately available for teaching undergraduate Business Education students in Delta State tertiary institutions. Also that Multimedia teaching resources influence academic performance of undergraduate Business Education students in Delta State tertiary institutions to a high extent. It was further concluded that there was no statistically significant difference in the mean rating of business education students on challenges face in utilization of multimedia resource in Delta State tertiary institutions based on academic level.

## 6.0 RECOMMENDATIONS

Based on the findings, it was recommended that:

1. Government and institutional authorities should give priority to the provision and continuous upgrading of functional multimedia resources such as projectors, interactive boards, e-learning platforms, and virtual laboratories as the availability of these facilities will strengthen the teaching and learning process in Business Education programme.
2. Management of tertiary institutions should ensure that regular workshops and training sessions are provided to build the digital competence of both lecturers and students, also to equipping them with the skills needed to effectively apply multimedia technologies in classroom instruction and academic activities.
3. Policymakers should embed multimedia resource utilization into the Business Education curriculum while ensuring compliance through clear instructional standards. Such integration will promote consistent and purposeful use of multimedia tools in teaching and learning.
4. Stakeholders of tertiary institutions must address recurring challenges such as poor internet connectivity, unstable electricity supply, and lack of technical support, as these remain major obstacles to effective adoption and use of multimedia technologies in teaching and learning.
5. Management of tertiary institutions should form strategic collaborations with private ICT companies, non-governmental organizations, and international development partners. These alliances can support the acquisition, training, and maintenance of multimedia teaching resources.

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