# ROLE OF DIGITAL TECHNOLOGY ON BUSINESS EDUCATION STUDENTS' ACADEMIC PERFORMANCE IN ABUBAKAR TAFAWA BALEWA UNIVERSITY (ATBU) BAUCHI

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## Abstract

The study focused on the Role of Digital Technology on Business Education Students' Academic Performance in Abubakar Tafawa Balewa University (ATBU) Bauchi. In this study, two specific objectives and two research questions guided the conduct of the study. Relevant literature both conceptual and empirical are reviewed based on the study focus. The study used survey research design and that one hundred and four (104) 300L education students were used as population and 80 300L Business Education Students were used as a sample of the study. Structured questionnaire was used as an instrument for data collection. The instrument was validated by two experts. The data was collected by the researcher with the aid of two research assistants. Data collected were analyzed using descriptive statistics (i.e., mean and standard deviation). The findings of the study revealed a significant role of mobile phones and Artificial Intelligence (AI) on Business Education Students' Academic Performance in Abubakar Tafawa Balewa University (ATBU) Bauchi. To the best of the researcher's knowledge, little or no published study was found on Role of Digital Technology on Business Education Students' Academic Performance in Abubakar Tafawa Balewa University (ATBU) Bauchi.

**Keywords:** *Digital Technology, Academic Performance, Mobile phone and Artificial Intelligence (AI)*

## Introduction

Business education is a vital tool for fostering students' self-reliance and in promoting national development. By equipping students with entrepreneurial and managerial skills, it reduces unemployment and enhances economic growth (Nwosu, 2020). Business Education is an educational programme that prepares students for entry and advancement in jobs within business and to handle their business affairs as well as to function intelligently as consumers and citizens in a business economy (Ononye & Agbo, 2023). In the same direction, Eze (2022) stated that business education fosters creativity, problem-solving abilities and economic participation, which contribute to the overall growth of a nation. Business education equips students with the knowledge and skills needed to initiate and manage enterprises. According to Odu (2019) business education fosters critical thinking, risk-taking, and decision-making, which are essential traits for entrepreneurship. Williams (2021) asserted that business education encourages innovation and technological advancement, which are crucial for a nation's competitiveness in the global economy.

Despite its benefits, the poor performance of students in the course more especially in Abubakar Tafawa Balewa University (ATBU) Bauchi is alarming (Departmental exams office, 2026). According to the departmental exams officer, business education course have been facing with several challenges that ranges from inadequate funding, outdated curricula, lack of practical exposure and above all, is the inadequate utilization of digital technology in the process of teaching and learning. It is important to note here that, digital technology has revolutionized Business Education by enhancing learning experiences, facilitating research, promoting collaboration and improving practical skills. The use of digital technology in business education can enhance learning efficiency and accessibility.

According to Smith and Johnson (2021), digital platforms like Learning Management Systems (LMS) facilitate interactive learning, enabling students to access educational resources anytime and anywhere. As stated by Garcia (2019), the effective use of technology can significantly boost students' academic performance and prepare them for successful careers in the business world. Garcia lamented further that embracing technological advancements in education is essential for producing competent and competitive graduates. Nguyen (2020) defined digital technology as an electronic tools, systems, devices and resources that generate process and store data in digital form. Nguyen added that digital technology encompasses a wide range of innovations, including computers, mobile devices, software applications, artificial intelligence, cloud computing and the internet. It is important to note here that in today's digital era, technology plays a crucial role in shaping education (Mohammad, 2019). According to Williams (2021) digital technology has the capacity to transform the way students learn, interact and engage with academic materials.

As asserted by Miller and Davis (2022), digital technology can provides students with access to a vast range of learning resources such as e-books, online courses, video tutorials, and interactive simulations. On the other hand, Williams (2021) stated that the integration of digital technology in Business Education will significantly improve students' academic performance. Studies show that students who use digital tools effectively tend to have higher engagement levels, better comprehension and improved problem-solving skills. According to Miller and Davis (2022) some features of digital technology includes: automation, connectivity, data processing, interactivity, integration. Digital systems can perform tasks without constant human intervention, improving efficiency and accuracy (Nguyen, 2020). Nguyen, continued that the internet enables instant communication and information sharing worldwide. Digital tools, such as AI-powered tutors and adaptive learning systems can cater for individual student needs and thereby ensuring better academic performance (Garcia, 2019). It is on the bases of these importance of digital technology that the present study intended to be conducted and determine the role of Digital Technology on Business Education Students' Academic Performance in Abubakar Tafawa Balewa University (ATBU) Bauchi. This will be determine through the study two major construct to include role of mobile phones which is a portable electronic device that enables wireless communication through cellular networks (Kumar & Singh, 2020) and artificial intelligence which is the simulation of human intelligence in machines, enabling them to perform tasks that typically require human cognition, such as learning, reasoning, problem-solving, and decision-making (Russell & Norvig, 2020) on Business Education Students' Academic Performance in Abubakar Tafawa Balewa University (ATBU) Bauchi.

**Statement of the Problem**

Business education is one of the course of study offered at University that contributes significantly to national development by enhancing economic participation and fostering industrialization. Eze (2022) stated that business education fosters creativity, problem-solving abilities and economic participation, which contribute to the overall growth of a nation. Despite its benefits, business education students performs poorly in the course more especially in AbubakarTafawaBalewa University (ATBU) Bauchi (Departmental exams office). According to the departmental exams officer, business education course have been facing several challenges that ranges from inadequate funding, outdated curricula and above all is the inadequate utilization of digital technology in the process of learning. It is on these bases that the present study will be conducted and determine the Role of Digital Technology on Business Education Students' Academic Performance Abubakar Tafawa Balewa University (ATBU) Bauchi.

**Aim and Objectives of the Study**

1. Determine the role of mobile phones on Business Education Students' Academic Performance in Abubakar Tafawa Balewa University (ATBU) Bauchi.
2. Find out the role of Artificial Intelligence (AI) on Business Education Students' Academic Performance in Abubakar Tafawa Balewa University (ATBU) Bauchi.

**Research Questions**

In line the study objective, the following research questions were raised to guide the conduct of the study.

1. What is the role of mobile phones on Business Education Students' Academic Performance in Abubakar Tafawa Balewa University (ATBU) Bauchi?
2. What is the role of Artificial Intelligence (AI) on Business Education Students' Academic Performance in Abubakar Tafawa Balewa University (ATBU) Bauchi?

## Literature Review

### Concept of Digital Technology

The effective use of digital tools has higher engagement levels, better comprehension and improved problem-solving skills. Nguyen (2020) defined digital technology as an electronic tools, systems, devices and resources that generate process and store data in digital form. Nguyen added that digital technology encompasses a wide range of innovations, including computers, mobile devices, software applications, artificial intelligence, cloud computing and the internet. According to Miller and Davis (2022) some features of digital technology includes: automation, connectivity, data processing, interactivity, integration. As asserted by Miller and Davis (2022) digital technology provides students with access to a vast range of learning resources such as e-books, online courses, video tutorials, and interactive simulations. Similarly, Brown (2020) reported that Business Education students benefit from digital tools that provide hands-on experience in financial analysis, marketing, and management. Business education is a course of study offered at University that contributes significantly to national development by enhancing economic participation and fostering industrialization. Software applications such as QuickBooks, Excel and SPSS allow students to develop practical skills that align with industry demands.

Digital systems can perform tasks without constant human intervention, improving efficiency and accuracy (Nguyen, 2020). Nguyen, continued that the internet enables instant communication and information sharing worldwide. Digital tools, such as AI-powered tutors and adaptive learning systems, cater to individual student needs, ensuring better academic performance (Garcia, 2019). Digital technology provides access to vast business-related databases, e-books and case studies that enhance students' academic understanding. On the other hand, Williams (2021) stated that the integration of digital technology in Business Education has significantly improved students' academic performance. Studies show that students who use digital tools effectively tend to have higher engagement levels, better comprehension and improved problem-solving skills. It is important to note here that digital technology has revolutionized Business Education by enhancing learning experiences, facilitating research, promoting collaboration and improving practical skills. According to Kumar and Singh (2020) digital technology has some challenges such as digital literacy, lack of access to reliable internet and distractions from social media can hinder academic performance. Educators must implement strategies to ensure that technology is used effectively and responsibly in the learning process.

### Concept of Academic performance

The definition of academic performance varies among scholars. Academic performance was once thought to be the most important outcome of formal educational experiences and while there is little doubt as to the vital role such performances play in student life and later (Kell, Lubinski & Benbow, 2013**)**, researchers and policy makers are ever increasingly turning to social and emotional factors, as well as the relationships among them, as indicators of student well-being and psychological development (Chernyshenko, Kankaras & Drasgow, 2018). Academic performance is the outcome of education and the extent to which a student, teacher or institution has achieved their educational goals. Illahi and Khandai (2021) explains Academic performance as the knowledge attained or skills developed in the school subjects, usually determined by test scores or marks assigned by teachers or both. Dictionary of Psychology by Chaplin defines Educational or Academic performance as specified level of attainment or proficiency in academic work as evaluated by the teachers, by standardized tests

or by a combination of both. Abdulkareem (2016) defined performance as the accumulated knowledge and skills that students are able to demonstrate after learning a specific task.

Performance entails excellence in all academic disciplines, in class as well as co-curricular activities. It includes excellence in sporting behavior, confidence, communication skills, punctuality, arts, culture and the like which can be achieved only when an individual is well adjusted (Ganai & Muhammad, 2013). According to Adams (2020), academic performance is the outcome of education; the extent to which a student, teacher or institution has achieved their educational goals. Academic performance is commonly measured by examinations or continuous regulation but there is no general agreement on how it is best tested or which aspects is most important procedural knowledge such as skills or declarative knowledge such as facts (Erdogan *et al.*, 2016). Academic performance represents performance outcomes that indicate the extent to which a person has accomplished specific goals that were the focus of activities in instructional environments, specifically in school, college, and university. Cognitive area majorly concerned with the intellectual growth of the individual. Growth in the area includes the acquisition of basic intellectual skills, such as reading, ability to manipulate figures as well as learning of facts, concepts and generalization. Bloom as cited in Adesoga and Adebowale (2020) holds that cognitive domain includes all those objectives which deal with the recall or recognition of knowledge and development of intellectual abilities. Cognitive domain contains six major levels namely: (1) Knowledge, (2) Comprehension, (3) Application, (4) Analysis, (5) Synthesis, and (6) Evaluation. Academic can be measured in different ways.

**Concept of Mobile Phones**

Mobile phones serve as double-edged swords in the academic realm of Business Education students. While they offer tools that can enhance learning and productivity, their misuse or overuse can lead to distractions and other detrimental effects. According to Radesky and Christakis (2016) a mobile phone or cell phone is a portable telephone that allows users to make and receive calls over a radio frequency link while moving within a designated telephone service area, unlike fixed-location phones (landline phones). Radesky and Christakis lamented that this radio frequency link connects to the switching systems of a mobile phone operator, providing access to the public switched telephone network (PSTN). As stated by Heid (2024) modern mobile telephony relies on a cellular network architecture, which is why mobile phones are often referred to as 'cell phones' in North America. Beyond traditional voice communication, digital mobile phones have evolved to support a wide range of additional services (Harris & Cooper, 2019). Harris and Cooper added that these include text messaging, multimedia messaging, email, and internet access (via LTE, 5G NR or Wi-Fi), as well as short-range wireless technologies like Bluetooth, infrared, and ultra-wideband (UWB). Mobile phones also support a variety of multimedia capabilities, such as digital photography, video recording, and gaming. In addition, they enable multimedia playback and streaming, including video content, as well as radio and television streaming. Furthermore, mobile phones offer satellite-based services, such as navigation and messaging, as well as business applications and payment solutions (via near-field communication (NFC). The evolution of mobile phones has been marked by significant technological advancements. According to Heid (2024) the first handheld mobile phone was demonstrated by Martin Cooper of Motorola in 1973, weighing approximately 2 kilograms. Since then, mobile phones have become ubiquitous, with over 9.1 billion subscriptions worldwide by 2024, reflecting their integral role in modern communication.

In the Nigerian educational context for example, research by Fasae and Adegbilero-Iwari (2015) indicated that 89% of students use smartphones for both social and academic purposes. The study found that factors such as the level of study and average time spent studying significantly influenced academic performance. It recommended the integration of smartphone usage into educational curricula to enhance academic outcomes. Educational institutions and students should strive for a balanced approach, leveraging the benefits of mobile technology while implementing strategies to mitigate its potential downsides. Mobile phones offering only basic features are often

referred to as feature phones (slang: dumbphones), while those with advanced computing power are known as smartphones. According to Harris and Cooper (2019) the first handheld mobile phone was demonstrated by Martin Cooper of Motorola in New York City on 3 April 1973, using a handset weighing 2 kilograms (4.4 lbs). Gibbs (2016) asserted that in 1979, Nippon Telegraph and Telephone (NTT) launched the world's first cellular network in Japan. Gibbs added that in 1983, the DynaTAC 8000x was the first commercially available handheld mobile phone. From 1993 to 2024, worldwide mobile phone subscriptions grew to over 9.1 billion; enough to provide one for every person on Earth. In the first quarter of 2016, the top smartphone developers worldwide were Samsung, Apple and Huawei; smartphone sales represented 78 percent of total mobile phone sales. For feature phones as of 2016, the top-selling brands were Samsung, Nokia and Alcatel. Mobile phones are considered an important human invention as they have been one of the most widely used and sold pieces of consumer technology.

**Concept of Artificial Intelligence (AI)**

In envisioning future jobs and human resources specialists' requirements, teachers must equip students with a proficiency that makes them adaptable to challenges. Artificial Intelligence (AI) refers to the ability of computer systems or machines to perform tasks that typically require human intelligence. These tasks include learning from data, understanding natural language, recognizing patterns, solving problems, and making decisions (Elhajjar et al, 2021). According to Zhang and Li (2023) Artificial Intelligence (AI) is transforming the educational landscape, particularly in business education, by enhancing learning experiences, personalizing instruction, and improving student engagement and performance. Zhang and Li added that teachers significantly contribute to society by educating generations of upcoming students that will become future entrepreneurs. AI refers to machines that can perform cognitive functions associated with human minds, such as learning and problem-solving, at scale (Tan, 2020). Tan further stated that AI enables adaptive learning platforms that tailor content to individual student needs, learning styles, and pace. This is particularly effective in business education where students grapple with complex concepts in accounting, economics, and management. Here, the students should be able to chase trends and not just stay current with the events and environment (Elhajjar *et al.*, 2021). Hence, the demand for innovative teachers embracing change, integrating new materials, and enabling student-AI interactions in education is increasing.

AI is the science and engineering of making intelligent machines, especially intelligent computer programs capable of performing tasks that usually require human intelligence (Russell & Norvig, 2023). Russell and Norvig explained that AI tools assist educators in identifying at-risk students early by analyzing behavioral data, attendance, and performance metrics. This allows for timely intervention. Similarly, Nuseir, Basheer and Aljumah (2020) stated that AI augments human skills in the workplace and serves as an educational partner, enhancing content and competencies. Elhajjar, Karam and Borna (2021) advocate integrating AI into education to equip students with skills essential for future jobs and digital society's demands, such as innovation, creativity, and design thinking. AIEd employs diverse tools, techniques, and systems in educational activities (McGrath *et al*., 2023). Investing in human capital to embrace AIEd tools is vital for societal development, despite widespread distrust and misconceptions about AI's role in human activities, especially in education (Antonenko & Abramowitz, 2023).

Artificial intelligence is a system's ability to correctly interpret external data, to learn from such data, and to use those learnings to achieve specific goals and tasks through flexible adaptation (Kaplan & Haenlein, 2023). Ouyang and Jiao (2021) posited that AI technology in education is expected to grow significantly in the coming decades, presenting new opportunities and challenges. AI represents progress in education, offering benefits on multiple levels, and stimulates the evolution of teaching and learning through technologies like chatbots, robots, automated assessment, digitalised artefacts, and intelligent tutoring systems, despite occasional organisational challenges (Chiu *et al.*, 2023). As asserted by Matzavela and Alepis (2021) the demand for adaptive digital learning with AI support has surged in the past decade, driven by challenges like the Covid-19 pandemic and social conflicts in contemporary societies. Online and blended learning are now prevalent in modern communities and emerging economies as they strive to integrate these methods

into the educational system. AIEd provides feasible solutions to complex societal problems, enabling students to engage closely with global challenges and develop real-life problem-solving skills (Southworth et al., 2023).

**Methodology**

The study used cross-sectional survey research design. In this study, three specific objectives and three research questions guided the conduct of the study. Relevant literature both conceptual and empirical are reviewed based on the study focus. The population of the study was 104 300L Business education students. The sample size of the study was 80 300L Business Education Students. The instrument for data collection was a structured questionnaire. The instrument was validated by two experts. The data was collected by the researcher with the aid of two research assistants. Data collected were analyzed using descriptive statistics (i.e., mean and standard deviation) with the aid of Special Package for Social Science (SPSS v 25).

**Results**

**Research question two**

What is the role of mobile phones on Business Education Students' Academic Performance in Abubakar Tafawa Balewa University (ATBU) Bauchi?

The analysis of the 5 items used to address research question two revealed the mean scores range between 3.03 to 4.32 with standard deviations of .439 and .947 respectively. The weighted mean scores obtained were under the index score of agreed. This was obtained based on the obtained grand mean of 3.48 with its corresponding standard deviation of 0.659. The result indicated that, there is a significant role of mobile phones on Business Education Students' Academic Performance in Abubakar Tafawa Balewa University (ATBU) Bauchi.

**Table 1:** Descriptive Statistics of role of mobile phones on Business Education Students' Academic Performance

| S/N | Items | Mean | S. Deviation | Remark |
|---|---|---|---|---|
| 1 | Mobile phones significantly enhance students' ability to manage their own learning | 3.24 | .684 | Agreed |
| 2 | Mobile technology aids students in scheduling classes and study sessions, leading to better time management | 3.03 | .439 | Agreed |
| 3 | Mobile phones for academic activities like social media and gaming, can lead to students' ability to concentrate during study sessions. | 3.57 | .643 | Agreed |
| 4 | Using mobile phones before bedtime can interfere with sleep patterns due to exposure to blue light, leading to fatigue and reduced cognitive function. | 3.23 | .543 | Agreed |
| 5 | Excessive smartphone use among students can lower academic performance | 4.32 | .974 | Agreed |
| | **Grand Mean** | **3.48** | **0.657** | **Agreed** |

**Research question two**

What is the role of Artificial Intelligence (AI) on Business Education Students' Academic Performance in Abubakar Tafawa Balewa University (ATBU) Bauchi?

The analysis of the 5 items used to address research question three revealed the mean scores range between 3.26 to 3.75 with standard deviations of .735 and .891 respectively. The weighted

mean scores obtained were under the index score of agreed. This was obtained based on the obtained grand mean of 3.54 with its corresponding standard deviation of 0.869. The result indicated that, there is a significant role of Artificial Intelligence (AI) on Business Education Students' Academic Performance in Abubakar Tafawa Balewa University (ATBU) Bauchi.

**Table 2:** Descriptive Statistics of role of Artificial Intelligence (AI) on Business Education Students' Academic Performance

| S/N | Items | Mean | S. Deviation | Remark |
|---|---|---|---|---|
| 1 | AI envisioning future jobs | 3.26 | .735 | Agreed |
| 2 | AI assist in human resources specialists' requirements. | 3.45 | .943 | Agreed |
| 3 | AI helps in performing tasks that typically require human intelligence. | 3.75 | .891 | Agreed |
| 4 | Artificial Intelligence (AI) transformed the educational landscape, particularly in business education | 3.53 | .921 | Agreed |
| 5 | Artificial Intelligence (AI) helps in educating generations of upcoming students that will become future entrepreneurs. | 3.71 | .853 | Agreed |
| | **Grand Mean** | **3.54** | **0.869** | **Agreed** |

## Discussion

The result of research question one showed that, there is a significant role of mobile phones on Business Education Students' Academic Performance in Abubakar Tafawa Balewa University (ATBU) Bauchi. The finding is relate with the finding of Romel, Angelo and Sergiris (2025) who conducted a study that explores the impact of mobile phone use on self-regulated learning among students at the Nueva Ecija University of Science and Technology San Isidro Campus, specifically within the College of Management and Business Technology and disclosed that mobile phones play a crucial role in enhancing students' ability to manage their learning autonomously. In the same vein, this finding is in tune with the finding of Haruna et al. (2016) who conducted a study on the impact of Mobile Phone usage on Academic Performance among Secondary School Students in Taraba State, Nigeria and reported that mobile phone usage significantly influence academic performance among senior secondary school students.

The result of research question two disclosed that, there is a significant role of Artificial Intelligence (AI) on Business Education Students' Academic Performance in Abubakar Tafawa Balewa University (ATBU) Bauchi. This study is related with the study of Joel, Egbunefu and Onyemaechi (2025) who conducted a study that focused on the Application of Artificial Intelligence in Business Education Programme for Enhanced Learning Capabilities of Postgraduate Students in Rivers State Universities and showed that postgraduate students in Rivers State universities agreed to a high extent that Postgraduate Business Education Students apply natural language processing (NLP), data analysis and predictive analytics and automation for enhanced learning capabilities of postgraduate students. This finding is also related with the findings of Mallillin (2024) who examined the impact of artificial intelligence (AI) on students' academic performance and revealed that AI effectively targets the specific learning needs of students, facilitating comprehensive and improved learning experiences.

## Conclusion

The current study empirically investigated the Role of Digital Technology on Business Education Students' Academic Performance Abubakar Tafawa Balewa University (ATBU) Bauchi. The findings of the study revealed a significant role of computer, mobile phones and Artificial Intelligence (AI) on Business Education Students' Academic Performance in Abubakar Tafawa Balewa University (ATBU) Bauchi. Therefore, the problems associated with role of computer, mobile phones and Artificial Intelligence (AI) on Business Education Students' Academic Performance will be minimal as a result of appropriate knowledge gathered in the course of this study.

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