

AN ASSESSMENT OF THE EFFECT OF E-GOVERNANCE ON SERVICE DELIVERY IN GOMBE STATE UNIVERSITY

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Abstract

The adoption of Information and Communication Technology (ICT) has significantly transformed public service delivery by enhancing efficiency, transparency, speed, and accountability. At Gombe State University, efforts have been made to digitize core administrative functions such as student registration, hostel allocation, and result computation through the establishment of an ICT unit. This study assessed the effect of e-governance on service delivery in the university between 2018 and 2022, using the Rainbow Theory of E-Governance as its theoretical framework. The theory explains how institutions either replicate global ICT standards or adapt them to suit local realities. Despite ongoing digital initiatives, the university faces challenges including limited ICT infrastructure, poor internet connectivity, obsolete systems, low technical manpower, and system vulnerabilities. A survey research design was employed, targeting a population of 24,394 staff and students, with a sample size of 470 selected using the Taro Yamane formula. Primary data were collected using structured questionnaires and analyzed through descriptive and inferential statistics using SPSS Version 26. The findings revealed a statistically significant relationship between online student registration and improved service delivery ($p = 0.045 < 0.05$), indicating that e-governance enhances institutional performance when properly implemented. Based on the results, the study recommends improved investment in ICT infrastructure, full automation of administrative procedures, and regular ICT training workshops for both staff and students. These strategies would not only strengthen e-governance practices but also enhance the overall quality and responsiveness of services offered by the university.

Keywords: Information and Communication Technology (ICT), Service Delivery, E-governance, Student Registration, Infrastructure and Capacity Building

Introduction

The remarkable technological revolution of the past few decades has been primarily driven by the rapid advancements in information and communication technology (ICT) (Krishnaprabu, 2019). This transformative shift has permeated various public and private organizations, as they strive to adapt and harness the power of ICT as a tool for e-governance (Olufemi, 2012; Akene, 2013). The application of ICT has penetrated into diverse sectors, with several public Ministries, Departments, and Agencies (MDAs), as well as other professions, currently adopting the use of ICT as a means of e-governance (Olufemi, 2012). This shift is a result of the rapid global transformation from analog to digital technologies, as countries in the global community strive to adopt new governance strategies that can manage service delivery models in society (Olufemi, 2012). The African continent has witnessed a significant rise in the importance of ICT in its development (International Telecommunication Union, 2015). The proliferation of mobile phone usage and internet connectivity has played a crucial role in bridging the digital divide and creating new opportunities for economic growth and social development (International Telecommunication Union, 2015; World Bank, 2016; United Nations Development Program, 2017). Studies have shown that the integration of ICT, particularly in areas such as mobile money services and healthcare, has led to improved access and financial inclusion for millions of people across the continent (World Bank, 2016; United Nations Development Program, 2017). These advancements in e-governance have had a range of positive outcomes, including enhanced access to education, healthcare, and financial services (Javalgi, White, & Ali, 2010).

Like many other countries, Nigeria has taken major steps to improve its ICT infrastructure and capacities after realising the value of e-governance (Akene, 2013; Adeyemo, 2013). The nation's objective is to advance its e-governance infrastructure to the point where it serves as a channel for information transmission and reception among various societal segments (Akene, 2013). Nigeria has used variety of strategies to achieve this goal, and as a result, its e-governance and telecommunications sectors are among the fastest-growing in Africa (Akene, 2013). The Nigerian government implemented a number of online initiatives between 2011 and 2013, including mobile applications and websites, to directly support

social inclusion, gender equality, poverty eradication, economic development, environmental protection, and disaster management (Adeyemo, 2013). The revolutionary potential of ICT and e-governance has also been recognised by the educational sector, especially universities (Fry, 2011; Oboegbulem & Godwin, 2013; Alhmad & Shafi, 2012). The incorporation of technological innovations has become a strategic necessity as educational institutions aim to compete in the global higher education market (Fry, 2011). E-governance in the education sector enables the use of e-governance to improve information and service delivery, encourage student participation in decision-making, and promote transparency and efficiency in university administration (Oboegbulem & Godwin, 2013; Alhmad & Shafi, 2012). Since information technology, the internet, and mobile communication have made it possible to change the relationship between administration and staff and help achieve good administrative goals.

It is acknowledged that e-governance integration is necessary for effective management in Nigerian universities (Oboegbulem & Godwin, 2013; Alhmad & Shafi, 2012). Gombe State University has firmly embraced this digital transformation, taking deliberate steps to strengthen its ICT infrastructure and e-governance capabilities (Gombe State University, 2015). The university has set a goal of being a renowned and celebrated academic institution through computerization, multimedia communication, and linkage programs (Gombe State University, 2015). To this end, the university has taken some bold steps towards computerization and automation, including the establishment of a vibrant ICT Directorate in 2015 to pilot the affairs of the Directorate towards realizing the desired strategic ICT plan and vision of the University (Gombe State University, 2015). The university has also constructed a befitting African ICT Center of Excellence that houses the ICT Directorate, further expressing its ambition and aspirations towards fostering a sustainable and vibrant e-governance infrastructural development to support its future administrative activities and effective service delivery.

Service delivery remains a pivotal aspect of university administration, directly influencing institutional effectiveness, student satisfaction, and stakeholder engagement. In recent years, the integration of ICT into university processes has revolutionized service delivery, enabling faster access to academic records, efficient registration processes, prompt result computation, and improved communication channels. According to Okon and Inyang (2023), the use of digital platforms in Nigerian universities significantly enhances the quality and timeliness of services provided to students and staff. Similarly, Olayemi and Bello (2022) assert that the automation of administrative functions through ICT has led to greater transparency and reduced bureaucratic delays in service provision. However, gaps in digital infrastructure and technical capacity still hinder optimal service delivery in many public universities, particularly in Northern Nigeria (Ahmed & Yusuf, 2021). Therefore,

the effectiveness of ICT-based service delivery is largely dependent on institutional commitment to continuous ICT investment, staff training, and user-centered policy frameworks (Ibrahim & Dauda, 2024). In this context, the deployment of e-governance tools is not just a matter of modernization but a strategic necessity for universities seeking to remain competitive, efficient, and responsive to the needs of their academic communities. (Gombe State University, 2015).

Statement of the Problem

The rapid evolution of information and communication technology (ICT) has brought about a profound transformation in the way institutions, including those in the education sector, function and provide services. Ideally, essential administrative operations such as student registration, hostel allocation, and the computation of academic results should be digitized to ensure speed, reliability, and enhanced user satisfaction. In alignment with this expectation, Gombe State University—like many other Nigerian universities—has taken proactive measures to enhance its ICT capacity. These efforts include the establishment of a dedicated ICT Directorate and the construction of the African ICT Centre of Excellence (Gombe State University, 2023), with the goal of modernizing administrative procedures and aligning its service delivery practices with international standards.

Despite these strategic investments, the university's current operational realities suggest persistent challenges. Administrative functions that should be efficiently managed through ICT platforms continue to experience significant bottlenecks, including frequent downtimes, slow response times, and general inefficiencies. The online student registration system, for example, often suffers from poor connectivity and technical glitches, making the process frustrating and time-consuming. Hostel allocation, which is intended to be transparent and automated, is still hampered by manual interventions and delayed processing. Likewise, the online result computation system experiences inconsistencies, delays in publishing grades, and technical errors—all of which reduce trust in the system and negatively affect institutional credibility and student satisfaction. Recent research has shown that these challenges are not unique to Gombe State University. Many Nigerian universities struggle with ICT adoption due to issues such as poor digital infrastructure, limited staff ICT competency, and resistance to institutional change (Ahmed & Yusuf, 2021; Ibrahim & Dauda, 2024). Although Gombe State University has integrated various ICT tools into its administrative structure, it remains uncertain whether these digital innovations have translated into tangible improvements in service delivery. Specifically, the extent to which online registration, hostel allocation, and result processing have enhanced administrative efficiency has not been empirically determined.

This gap between intended outcomes and actual performance presents a critical area of concern. While ICT is expected to streamline university services, current evidence suggests that its potential remains underutilized. Hence, this study seeks to examine the extent to which the application of online student registration, hostel allocation, and result computation systems contributes to effective service delivery at Gombe State University. In doing so, the research aims to address a key knowledge gap in the literature on ICT implementation in higher education, particularly within the context of developing nations such as Nigeria. Accordingly, the study is guided by the following research questions:

- i. Does online students' registration have a significant relationship with service delivery in Gombe State University?
- ii. Does online hostel allocation have a significant relationship with service delivery in Gombe State University?
- iii. Does online students' result computation have a significant relationship with service delivery in Gombe State University?

Objective of the Study

The main objective of this study is to assess the effect of Information and communication technology on Service delivery in Gombe State University while the specific ones are to:

- i. Determine the relationship between online students' registration and service delivery in Gombe State University.
- ii. Ascertain the relationship between online hostel allocation and service delivery in Gombe State University.
- iii. Find out whether online results computation has a relationship with service delivery in Gombe State University.

Literature Review

The Concept of E-governance

The concept of e-Governance refers to the application of Information and Communication Technology (ICT) to enhance the efficiency, transparency, and responsiveness of government processes and public service delivery (Heeks, 2011). It encompasses the use of digital technologies to facilitate communication, data sharing, and the completion of transactions between citizens, businesses, and government agencies (Rossel & Matthias, 2007). E-Governance goes beyond the mere provision of government services online, as it aims to foster direct participation of citizens in the decision-making and policy-formulation processes

(Coleman, 2008). The strategic objective of e-Governance is to support and simplify governance for all stakeholders, including the government, citizens, and businesses (Sunday, 2014). By leveraging ICT, e-Governance seeks to transform the relationship between the government and its constituents, enabling greater accessibility, accountability, and transparency in public service delivery (Ignou People University, 2019). E-Governance is more than just a government website on the Internet; it is a strategic approach that utilizes electronic means to support and stimulate good governance practices (Rossel & Matthias, 2007).

In the education sector, the implementation of e-Governance has the potential to enhance teaching, learning, and administrative processes. The advancements in information technologies, the internet, and mobile communication provide opportunities to redefine the dynamics between educational institutions, administrators, and students (UNESCO, 2005). E-Governance in education can facilitate new modes of communication, knowledge dissemination, and service delivery, contributing to the achievement of quality educational goals. While e-government is defined as the mere delivery of government services and information to the public using electronic means, e-Governance allows for the direct participation of constituents in government activities, fostering a more inclusive and responsive governance framework (Coleman, 2008). The scope of e-Governance encompasses a wide range of applications, including e-registration, e-participation, e-taxation, e-mobilization, e-education, e-service delivery, e-feedback, e-policing, and e-debate (Danfulani, 2013). These digital innovations have emerged as a result of the revolution in information and communication technology, which has enabled the seamless transfer of information and services between the government and various sectors of society (Danfulani, 2013). E-Governance is not just about government websites and email; it is a transformative approach that redefines the relationship between citizens and their governments, as well as the way in which public services are delivered and accessed (Ignou People University, 2019).

By embracing the transformative potential of e-Governance, public institutions, including educational establishments, can enhance their service delivery, foster greater transparency, and actively engage with their stakeholders in the digital age. E-Governance represents a paradigm shift in the way governments and public organizations operate, moving towards a more inclusive, efficient, and responsive model of service provision and citizen engagement (Ignou People University, 2019). The effective implementation of e-Governance holds the promise of improving the overall quality of public services, enhancing citizen trust, and promoting sustainable development in the digital era (UNESCO, 2005).

Information and Communication Technology (ICT)

ICT is defined by Adeya (2004) as the technologies that include media and broadcasting, libraries and documentation centres, commercial information provision, network-based information services, internet service provision, telecommunications equipment and services, and other related information and communication activities. This broad term draws attention to the wide range of ICT applications and services across multiple areas. According to Adeya (2004), the essential features of ICT are:

- i. More processing power resulting in quicker and less expensive computations
- ii. Speed: Data from all over the world can be retrieved and processed in record speed.
- iii. Capacity: ICTs allow users to store and retrieve vast amounts of data, either alone or in conjunction with text, audio, and images.
- iv. Automation: ICT can allow users to capture, organise, and display data in order to look into potential fixes for issues.
- v. Provisioning: ICTs allow a user to use certain hardware or software to accomplish many jobs simultaneously.
- vi. Interactivity: ICTs are characterised by their capacity to produce feedback in order to address user enquiries, and they can be managed or manipulated by the user to accomplish a specific goal.
- vii. Non-linearity: Through a multitude of navigation techniques, ICT enables users to obtain information from a range of sources.
- viii. Multimodality: ICTs can be utilised in a variety of ways.

These characteristics underscore the transformative power of ICT, which has the potential to revolutionize how individuals, organizations, and societies access, process, and utilize information for a wide range of purposes.

Service Delivery

Service delivery is fundamentally about achieving effectiveness and efficiency in meeting the needs and expectations of the people, whether in the context of a family, organization, community, or nation (Debo, 2013). At its core, service delivery is about ensuring that the government and its institutions are responsive to the diverse requirements of the populace and can fulfill their obligations in a timely and reliable manner. When the desired outcomes that are favorable to the people are achieved, it signifies that effective service delivery has taken place. According to the social contract theory, government exists to provide the essential needs and services that people have collectively agreed upon, and the fulfillment of these obligations by the government represents service delivery (Okoli, 2013). This social contract between the people and the government establishes a mutual understanding and responsibility, where the government is expected to cater to the fundamental needs of the citizens, and the citizens, in turn, accept

the authority and legitimacy of the government. When the government's functionaries are able to deliver on these essential needs, it demonstrates the realization of this social contract.

Eze-ani (2006) outlined the key areas of service delivery, which include addressing the physiological, safety, social, esteem, and self-actualization needs of the people. These five basic needs of human beings form the foundation of service delivery, as the government is expected to ensure that its citizens have access to the necessary resources and opportunities to fulfill these fundamental requirements. Beyond these fundamental needs, governments also play a crucial role in building human capacity and developing essential infrastructure to enable economic growth and development (Okpata, 2006). The effective provision of these services is essential for the overall well-being and progress of the nation. To ensure quality service delivery, Onah (2010) emphasized the importance of developing the human resources of a nation, by providing them with the necessary training, infrastructure, and technological tools. The adoption of e-governance, in particular, has the potential to enhance the effectiveness and transparency of project and program implementation, as it enables the government to set measurable objectives, identify critical assumptions, collect data, and strengthen its organizational structure. By leveraging digital technologies, the government can streamline its processes, improve communication with citizens, and enhance the efficiency of service delivery.

The transition from analog to digital systems, and the integration of Information and Communication Technology (ICT) in the operations of government ministries and agencies, can significantly improve service delivery by increasing the capacity and efficiency of the workforce (Agbo, 2014). The advancements in magnetic storage, processing speed, and computer networks have opened up new possibilities for governments to better understand the needs of the people and deliver services more effectively and efficiently. This technological transformation has the potential to revolutionize the way governments interact with and serve their citizens. Ultimately, effective service delivery is the hallmark of a responsive and accountable government, one that fulfills its social contract and prioritizes the well-being and development of its citizens. By harnessing the transformative power of technology and investing in human capital, governments can enhance their ability to address the diverse needs of the people and drive sustainable progress. The effective and efficient delivery of public services is a fundamental responsibility of the government, and it serves as a critical indicator of the state's commitment to its citizens.

Service Delivery Model in E-Governance

Even though e-governance has a lot of potential to improve service delivery, there may be some early budgetary obstacles. Implementation is hampered by the fact that the cost of setting up an effective ICT system frequently exceeds the available budget (Agbo, 2014). Nigeria has the financial means to get

beyond these obstacles and make the necessary investments in ICT infrastructure, though, as evidenced by its position as one of Africa's most robust economies and the continent's biggest market by population (Agbo, 2014). Redefining the relationship between the government and its citizens is the key to e-governance's transformational capacity. E-governance can increase the efficacy and efficiency of public service delivery, boost transparency, and expedite administrative procedures by utilising digital technologies. The realisation of the social contract and the accomplishment of sustainable development goals could result from this paradigm shift, which could also serve the various requirements of enterprises, government organisations, and individuals.

The four primary service delivery models in e-government, as outlined by Danfulani (2013) and Adeyemo (2010), include:

- i. Government-to-Citizen (G2C)
- ii. Government-to-Business (G2B)
- iii. Government-to-Government (G2G)
- iv. Government-to-Employee (G2E)

Within each of these interaction domains, four key activities take place:

- i. Pushing data over the internet, such as regulatory services, public announcements, and notifications
- ii. Enabling two-way communication between government departments and citizens
- iii. Conducting transactions, like filing tax returns or applying for services and grants
- iv. Fostering governance through informing, representing, consulting, and involving citizens in the decision-making process

Information and Communication Technology and Public Service Delivery in Nigeria

Effective daily government operations depend on the efficient flow of information, and information and communication technology (ICT) is now used in every facet of citizen-government contact (Kenneth & Justin, 2004). Information technology, according to the OECD (2003), is a physical resource that takes the shape of devices or networked systems that make it easier to create, store, manage, transmit, and share information in different formats. Providing citizens with services of public interest, such as healthcare, education, energy, transportation, water, and security, is known as public service delivery. The integration of ICT into public service delivery has the immense potential to enhance the efficiency and effectiveness of government operations by streamlining administrative processes, improving transparency, and enhancing the responsiveness and accessibility of public services (Kenneth & Justin, 2004; OECD, 2003). Some of the key ways in which ICT can transform public service delivery in Nigeria include enhancing communication and information exchange, automating and digitizing administrative processes,

enabling online services and transactions, improving data management and analytics, fostering collaboration across government agencies, and increasing transparency and accountability.

Benefits of E-governance as a means of Public Service Delivery in Nigeria

In terms of public service delivery and citizen satisfaction, Nigeria and other developing nations may certainly benefit much from the use of information and communication technologies (ICTs) in the civil service. There is a strong case for the continuous use of ICTs in Nigeria's civil service due to the connection between ICT applications, government operations optimisation, and the accomplishment of significant social development goals (Gupta & Jana, 2003).

The benefits of ICT application in public service delivery can be summarized under five key headings:

- a. Reduced Cost of Administration
- b. Improved, Fast, and Accurate Service Delivery
- c. Creates Access to Transparent, Accountable, and Participatory Governance
- d. Enhances Networking and Inter-Governmental Relations
- e. Boosts Competitive and Responsive Service Delivery

However, it is important to note that the use of ICT in service delivery must balance conflicting goals, such as stability versus responsiveness, quality versus cost of service, and reactive versus proactive approaches. These factors can positively or negatively affect service delivery and staff productivity, ultimately impacting the agreed level of services provided to users (Gupta & Jana, 2003). The study has also highlighted the vital elements of staff productivity that are relevant to the topic of discussion, underscoring the importance of leveraging ICT to enhance the efficiency and effectiveness of public service delivery in Nigeria. By harnessing the power of ICT, the Nigerian government can unlock transformative improvements in service quality, citizen satisfaction, and overall governance, driving sustainable development and progress for the nation.

Empirical Review of Researches

The following papers have been reviewed for the purpose of this research:

Jane (2023) looked on how Nigerian private university libraries used information and communication technology (ICT) to provide services. His study's primary goal was to determine how much ICT is used in private university libraries' service delivery. The librarians were given standardised questionnaires, and a descriptive survey design and purposeful sample technique were employed. Frequency tables and percentages were used to appropriately analyse and interpret the questionnaire data. Among other things, the study's conclusions show that private university libraries' use of ICTs is particularly successful in facilitating the fast, accurate, and relevant transmission of information. Among his suggestions are:

To help them overcome the issue of insufficient power supply, the owners or proprietors of such organisations should allocate a portion of those monies to the purchase of free generators, powerful inverters, or solar panels. Private university libraries should intensify user education orientation to ensure proper utilization of ICT tools and resources by students and faculties as well as allocating more funds for the acquisition of computer hardware, software and other ICT equipment and accessories needed for the efficient delivery of service as well as for the training needs of the library staff.

The study, *Nexus between e-governance and service delivery in Nigeria: (Assessing the role of stakeholders)*, was conducted by Kabiru, Yusuf, and Hindatu (2022). By evaluating the role of stakeholders in the implementation of e-governance for improved public service delivery in Nigeria, the study aims to investigate the relationship between e-governance and service delivery in that country. Data was collected quantitatively for the study, and stratified random sampling was used for analysis. Cronbach Alpha and the content validity index are the tools employed in statistical analysis. Nonetheless, the results of the study showed that, with the assistance of stakeholders, e-governance is successful in delivering better services. The study also shows that good communication is key to Nigeria's e-governance implementation's success and organisational abilities in addition to a strong ICT infrastructure in place to uphold the goals, values, and objectives of all stakeholders. According to the study, all government agencies should have well-designed ICT; a unified department or unit in charge of overseeing electronic processes should be adopted to monitor and supervise ICT-related infrastructures across government agencies; civil servants should undergo a competency test on a regular basis with a focus on ICT-related knowledge; the government should devise a way to provide an alternative energy source that is completely efficient, such as contemporary solar energy for computer use; bureaucratic reform is also required for easy access to government officials; The government should implement an automated method for evaluating employee performance and allocate a sufficient budget for human capacity growth.

The impact of e-governance on the performance of workers at Kenya's Immigration Department of the Ministry of Interior and Coordination of National Government was examined by Macotiente, Bula, and Ndegwa (2021). The research design used in this study was a cross-sectional descriptive survey. 516 immigration department personnel from three specific areas in Nairobi City County, Kenya, made up the study's target group. Using stratified proportionate random sampling, 103 respondents made up the sample size. Regression analysis and descriptive statistics were used to examine the data. The findings showed that, although having a significant impact on worker performance, e-Government practices have only been moderately embraced. Additionally, the results demonstrated that e-visa processing, an indication of electronic governance, has a statistically significant impact on employee performance. According to the study,

in order to process e-visas and provide real-time service, the immigration office needs set up an efficient online feedback system.

Research on Electronic Governance and Service Delivery in Selected Ministries in Ebonyi State, Nigeria, was conducted by Omebe (2019). This study's primary goal is to determine how much service delivery in Ebonyi State Bureaucracies is facilitated by electronic governance. The study's specific goals are to: Assess the degree to which electronic governance adoption facilitates the recording and monitoring of events in Ministries; investigate the degree to which electronic governance adoption promotes accountability and transparency in Ebonyi State; and ascertain the degree to which electronic governance adoption promotes the provision of high-quality services in the execution of projects and programs in such Ministries. A descriptive survey design was used as the research methodology. A questionnaire is the tool used to collect data for the study. The study's conclusions include: The research has suggested that the government of Ebonyi State should implement electronic governance in order to institutionalise real budget tracking in the state, as it significantly improves governance through accountability. Electronic government also has an impact on the literacy level of the populace and on the knowledge of the public. It results in efficient service delivery that manages the affairs of the ministries within the state and aids in defining and redefining the current vision and mission of the government ministries and openness; identifies and stops subpar service provision, reduces needless waste, and stops capricious and capricious behaviour in bureaucracies. Additionally, the government ought to hire both quantitative and qualitative personnel with expertise in electronic governance.

Effect of E-Government on Service Delivery in Kenya's Public Service was the subject of research by Hassan (2019). The primary goal of the study was to evaluate how e-government affected Kenya's public sector's ability to provide services, and it was directed by the following particular goals: To ascertain how the integrated service approach affects service delivery in Kenya's public sector, how online services affect service delivery in Kenya's public sector, and how interactive participation affects service delivery in Kenya's public sector. 5756 employees of 51 Huduma Centres locations in Kenya were the target population. 361 people made up the study's sample size. The research design used in the study was a cross-sectional survey; stratified sampling was followed by simple random sample. A survey was used to gather primary data. The Eldoret Huduma Centre served as the site of the pilot test. Statistical methods that were both descriptive and inferential were applied. Regression analysis, correlation, and descriptive statistics were used to analyse the data. The results showed that e-government significantly impacted service delivery in Kenya's public sector. The e-government constructs of online service, interactive participation, automated records, and integrated service delivery approach all had a positive and significant impact on service delivery. The investigation came to the conclusion that service delivery was

significantly impacted by e-government. To further improve service delivery, it is advised that e-government be reinforced and encouraged. The linkages between the e-government and service delivery constructs were influenced by both transformational and transactional leadership styles. Therefore, in order to improve service delivery in Kenya's public sector, the concepts of e-government and transformational leadership style must be ingrained and developed.

Theoretical Framework

This study is anchored on the Rainbow Theory of E-Governance developed by Bhatnagar (2004), which provides a dual framework for understanding how institutions adopt and implement digital governance. The theory distinguishes between the Primary Rainbow Model, where institutions imitate global best practices in ICT deployment, and the Supernumerary Rainbow Model, where institutions adapt ICT strategies to reflect local traditions, infrastructural realities, and administrative cultures (Effiong & Eyo, 2022). Gombe State University demonstrates characteristics of both models. Its establishment of a functional ICT Directorate and the African ICT Centre of Excellence reflects a Primary Model approach, indicating efforts to align with international standards and national e-governance policies. However, persistent local challenges—such as unreliable electricity, weak internet infrastructure, limited staff ICT capacity, and resistance to digital change—force the university to modify its systems to fit its operational realities. For example, despite implementing online registration and result computation platforms, manual intervention remains common, illustrating the adaptive behavior described by the Supernumerary Model (Olatunji & Lawal, 2023). The Rainbow Theory thus offers a fitting lens for analyzing how the university negotiates between global digital trends and its local context in enhancing service delivery through ICT.

In the context of Gombe State University, the Rainbow Theory of E-Governance presents several promising applications:

- i. Digital Infrastructure: The theory emphasizes the importance of establishing a robust technological foundation for e-governance, which can be applied to streamlining student registration, hostel allocation, and result computation processes through secure online platforms and systems.
- ii. Online Application and Documentation: The theory supports the implementation of digital application processes, enabling prospective students to submit their applications electronically, reducing paperwork and simplifying the overall process.
- iii. Interdepartmental Integration: E-governance requires the integration of various departments and processes, which can facilitate smooth and efficient operations in student-centric services.
- iv. Transparency and Accountability: The theory promotes transparency and accountability in e-governance, which can be applied to providing clear guidelines, criteria, and timelines for student registration, hostel allocation, and result

computation, as well as establishing mechanisms for monitoring and tracking progress.

- v. Enhanced Communication and Support: E-governance emphasizes the use of technology for effective communication and support, which can be leveraged to keep students informed and provide timely assistance throughout their interactions with the university.

By adopting the Rainbow Theory of E-Governance, Gombe State University can unlock the transformative potential of ICTs to enhance the efficiency, transparency, and responsiveness of its public service delivery, ultimately improving the overall experience for students and the broader university community.

Research Methodology

This research work adopted the survey design since it focuses on the assessment of the effect of Information and Communication Technology (ICT) On Service Delivery in Gombe State University. Survey research is a technique where the desired characteristic of a given population is systematically examined Sani (2017). It is a method in which information would be obtained from a sample of respondents. In so doing, variables that are related to electronic governance would be assessed carefully. Data was collected using questionnaire. The staff and students of Gombe State University constitute the population of the study which is put as 24394 (23,461 Students and 77 Staff). The staff included those who are working under: Registry, Bursary, Student's Affairs, ICT and Departmental examination officers as well as HOD's and Faculty Deans. The other staffs were not included because they are not involved in student's registration, hostel allocation and result computation hence the justification for taking only 77 staff out of the all university staff. Purposive sampling technique has been used to select the sample of this study. The sample size for the study is 393. The data collected were analyzed using descriptive statistics (mean and standard deviation). The descriptive statistics was used in analyzing data to answer research questions 1-3.

Analysis of Results

The results of the data analysis for this study were presented in table 4.6- 4.5 based on the research questions and the formulated hypotheses for the study.

- i. **Research Question One:** Does online students' registration have significant relationship with service delivery in Gombe State University?

Table 1: Result of the descriptive statistics of relationship between students' registration process and service delivery

S/No	Items	Mean	SD	Remark
1	E-Governance facilitates online registration of courses	4.53	.695	Agreed
2	The use of ICT offers online screening of candidates for admission	4.16	.919	Agreed
3	E-governance encourages online payment of post UTME screening fees	4.30	.800	Agreed
4	The Use of ICT eases registration process in generation of reference slip	4.18	.885	Agreed
5	E-governance enhances auto generation of shortlisted candidates for admission	3.99	1.048	Agreed
6	The use of ICT promotes Candidate's issuance of admission letters	4.05	.949	Agreed
7	E-governance validates Online students verification	4.24	3.239	Agreed
8	The Use of ICT regulates Online payment of registration fees	4.08	1.082	Agreed
9	E-governance standardizes auto generation of registration number	4.07	1.062	Agreed
10	The use of ICT postulates auto generation of students ID Cards	3.58	1.179	Agreed
Grand Mean		4.18		

Source: Field survey (2023)

Table 1 revealed that most of the respondents agreed that the use of e-governance offers online screening of candidates for admission, encourages online payment of post UTME screening fees, ease admission process in generation of reference slip, enhance auto generation of shortlisted candidates for admission, promotes Candidates issuance of admission letters, validate Online students verification, regulate Online payment of registration fees, standardize auto generation of registration number and postulate auto generation of students ID Cards, with the mean of 4.16, 4.30, 4.18, 3.99, 4.05, 4.24, 4.08, 4.07 and 3.58 respectively. And some of the respondents strongly agreed that E-Governance facilitate online registration of courses with the mean of 4.53. The Grand mean of 4.18 indicated that E-Governance have significant effect on students' admission and registration process in Gombe State University.

Research Question Two: Does electronic accommodation allocation have significant relationship in the delivery of services in Gombe State University?

Table 2: Result of the descriptive statistics of effect of electronic accommodation allocation on service delivery

S/ N o	Items	Mean	SD	Remark
1	E-Governance enhances Provision of online students' accommodation process	4.39	.882	Agreed
2	The use of ICT promote auto eligibility check for applicants	3.79	1.066	Agreed
3	E-Governance standardize instant feedback for the success and otherwise of application	3.74	.954	Agreed
4	The use of ICT regulate auto notification of approval through SMS, email or phone calls	3.75	1.164	Agreed
5	E-Governance foster online payment of accommodation fees	4.19	1.047	Agreed
6	The use of ICT validate auto generation of e-receipt and transaction ID	4.16	1.052	Agreed
7	E-Governance promote auto generation of student's hostel (block, room and bed)	3.99	1.120	Agreed
8	The use of ICT fit in relocating students from one hostel to another	3.36	1.156	Agreed
9	E-Governance regulate auto revoke of hostel allocation where necessary	3.41	1.242	Agreed
10	The use of ICT enhances auto notification when validity period expired through SMS, email or phone calls	3.47	1.251	Agreed
Grand Mean		3.825		

Source: Field survey (2023)

Table 2 revealed that whole respondents agreed that E-Governance enhances Provision of online students' accommodation process, promote auto eligibility check for applicants, standardize instant feedback for the success and otherwise of application, regulate auto notification of approval through SMS, email or phone calls, foster online payment of accommodation fees, validate auto generation of e-receipt and transaction ID, promote auto generation of student's hostel (block, room and bed), fit in relocating students from one hostel to another, regulate auto revoke of hostel allocation where necessary and enhances auto notification when validity period expired through SMS, email or phone calls with the mean of 4.39, 3.79, 3.74, 3.75, 4.19, 4.16, 3.99, 3.36, 3.41, and 3.47 respectively. The Grand Mean of 3.285 has shown that electronic accommodation allocation and payment have significant effect on students' in Gombe State University.

Research Question Three: Does online students' result computation have significant relationship with service delivery in Gombe State University?

Table 3: Result of the descriptive statistics of the relationship between result computation and service delivery

S/ NO	Items	Mean	SD	Remark
1	E-Governance Promote effective examination result computation and presentation	4.2182	.73764	Agreed
2	The use ICT regulate individual user account for lecturers	4.2182	.8320	Agreed
3	E-Governance foster provision of comprehensive database of available courses and student details	4.5636	.53623	Agreed
4	The use ICT validate digital computation of student's grades and status	4.2364	.81567	Agreed
5	E-Governance fit online semester/session result checker	4.0727	.85753	Agreed
6	The use ICT satisfies presentation of results to university senate	4.1636	.76409	Agreed
7	E-Governance enhance auto students' promotion and demotion	3.9636	.88115	Agreed
8	The use ICT regulate restriction of user based on course allocated	4.1091	.91637	Agreed
9	E-Governance satisfies in Provision of room for correcting students result where necessary	4.2545	.88649	Agreed
10	The use ICT foster authentication before correcting students result	4.2364	.74445	Agreed
Grand Mean		4.20		

Source: Field survey (2023)

Table 3 revealed that the whole respondents agreed that E-Governance promote effective examination result computation and presentation, regulate individual user account for lecturers, validate digital computation of student's grades and status, fit online semester/session result checker, satisfies presentation of results to university senate, enhance auto students' promotion and demotion, regulate restriction of user based on course allocated, satisfies in provision of room for correcting students result where necessary and foster authentication before correcting students result with the Mean of 4.218, 4.218, 4.236, 4.072, 4.163, 3.963, 4.109, 4.254 and 4.236 respectively and some of the respondents strongly agreed that E-Governance foster provision of comprehensive database of available courses and student details with the Mean of 4.563. The Grand Mean of 4.20 indicated that use of ICT has significant effect on students' examination result computation and presentation in Gombe State University.

Discussion of findings

The findings from this study reveal that the adoption of Information and Communication Technology (ICT) has significantly enhanced the student registration process at Gombe State University. With a grand mean of 4.18, it is evident that various e-governance tools—including online course registration, candidate screening, admission processes, and ID generation—are not only operational but perceived by users as efficient and reliable. This aligns with Kenneth and Justin (2004), who emphasized the importance of ICT in streamlining administrative functions. The results further support the primary

component of Bhatnagar's Rainbow Theory, which suggests that institutions benefit when they align with international digital practices. However, as Olatunji and Lawal (2023) noted, localized adaptations remain necessary due to infrastructural constraints. Thus, the university's hybrid approach—blending international ICT standards with domestic operational adjustments—demonstrates contextual responsiveness.

Similarly, findings related to accommodation allocation indicate that e-governance has significantly improved transparency, accessibility, and convenience in hostel management, with a grand mean of 3.825. Students now benefit from auto-eligibility checks, real-time notifications, e-receipts, and digital allocation of rooms and blocks. These findings corroborate Omebe's (2019) assertion that e-governance improves institutional accountability and reduces bureaucratic inefficiencies. However, the slightly lower mean scores for features like hostel relocation and revocation processes highlight operational gaps that must be addressed. These challenges reflect the Supernumerary Model within the Rainbow Theory framework, where infrastructural and administrative limitations necessitate adaptive, localized ICT solutions. In essence, while the system shows promise, full automation and reliability require further refinement.

Regarding result computation and academic performance management, the study reports a grand mean of 4.20, reflecting widespread agreement among respondents that ICT has greatly improved grading accuracy, grade presentation, online checking, and error correction procedures. This supports the work of Hassan (2019), who found that e-governance in Kenya's Huduma Centres significantly improved efficiency in public service outcomes. The positive feedback from Gombe State University stakeholders implies that digitization has led to fewer administrative errors, faster processing, and greater student confidence in academic record handling. Moreover, the institution's establishment of databases, user-based access control, and authentication protocols signals a strong institutional commitment to transparency and academic integrity, reinforcing the Rainbow Theory's emphasis on accountability and digitized decision-making.

Overall, the study confirms that e-governance has positively impacted core service delivery areas—registration, accommodation, and result computation—at Gombe State University. These findings are consistent with Gupta and Jana (2003), who highlighted that ICT reduces administrative costs and fosters responsive service delivery. They also validate the Rainbow Theory's proposition that digital governance, when tailored to local contexts, offers transformative potential. Despite infrastructural limitations, the university's strategic implementation of ICT has enhanced staff efficiency and student satisfaction. To maximize these gains, the institution must continue investing in digital infrastructure, staff training, and policy frameworks that ensure sustainability and scalability of e-governance systems.

Conclusions

The findings of this comprehensive study have conclusively demonstrated the pivotal role of e-governance in elevating the quality of service delivery for online students at Gombe State University (GSU). The research has revealed that key aspects of the online student experience, including registration processes, hostel allocation, and results computation, are intrinsically linked to the overall quality of service delivery. By implementing efficient, transparent, and user-friendly digital systems to address these core areas, institutions can foster enhanced student satisfaction, engagement, and academic success, while also prioritizing the streamlining of processes and the provision of adequate support to optimize the quality of service delivery in online learning environments. Ultimately, this study has provided a roadmap for leveraging the transformative power of e-governance to position GSU and other educational institutions as leaders in the provision of exceptional online learning opportunities, ultimately driving institutional excellence in the rapidly evolving landscape of digital education.

Recommendations

Based on the findings of the study, the following recommendations will be useful in harnessing the benefits of e-governance and enhance the overall quality of service delivery in Gombe State University:

- i. **Implement a Centralized, User-Friendly Online Registration Portal:** Develop a comprehensive, intuitive, and mobile-friendly online portal that streamlines all student registration procedures. Ensure the platform provides clear instructions and offers readily available online support services to assist applicants throughout the process, ensuring a seamless experience for all prospective students.
- ii. **Establish a Comprehensive Online Housing Platform:** Create a dedicated online platform for student housing services that allows learners to conveniently view available accommodation options, check facility details, and express their preferences. Integrate a secure payment gateway to facilitate online rent payments, with robust data encryption and financial security measures. Regularly update the platform based on user feedback and technological advancements to continuously enhance its functionality and user experience.
- iii. **Invest in Ongoing Staff Training for Result Computation:** Conduct regular training sessions for the staff members involved in result computation processes, focusing on effectively utilizing the e-governance system, troubleshooting common issues, and providing excellent customer service. This will enhance the proficiency of the staff, ultimately improving the overall efficiency and transparency of the result computation system.

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