ADOPTION AND USE OF CLOUD COMPUTING FOR MANAGING STUDENTS' ACADEMIC RECORDS AMONG INFORMATION MANAGEMENT STAFF AT THE FEDERAL UNIVERSITY DUTSIN-MA

By

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Abstract

This study investigated the factors influencing the adoption and use of cloud computing for managing students' academic records among information management staff at the Federal University Dutsin-Ma (FUDMA). The study was guided by two objectives: to identify the factors influencing the adoption and use of cloud computing for managing students' academic records and to determine the challenges associated with its use. A quantitative approach based on a cross-sectional descriptive survey design was adopted. The population of the study comprised 76 Management Information System (MIS) staff of the university, and data were collected using a structured questionnaire. Descriptive statistics, including frequencies, percentages, means, and standard deviations, were used for data analysis. The findings revealed that the major factors influencing the adoption and use of cloud computing were perceived usefulness, positive staff attitudes towards change, and the availability of adequate resources, including budget and infrastructure. Compatibility with existing systems and the influence of peer institutions were also identified as important factors. The major challenges associated with the use of cloud computing were power failure and data protection risks, followed by inadequate funding and the high cost of internet bandwidth. The study recommends leadership engagement workshops to secure top management support, address perceived security concerns, and demonstrate the usefulness of cloud technologies in fostering positive staff attitudes and encouraging resource allocation. It also recommends investment in resilient infrastructure, including backup power systems, affordable high-speed internet connectivity, and robust data protection mechanisms.

Keywords: Cloud computing, adoption, use, academic records, information management staff

Introduction

Universities are established to promote learning, knowledge creation, development, and the advancement of society. The achievement of these objectives depends, to a considerable extent, on the effective management of institutional records. Records serve as an important repository of information that can be stored, preserved, and retrieved whenever needed. They are essential resources in universities and are required regularly for problem-solving, planning, decision-making, and administrative purposes.

Students' academic records, whether in physical or electronic formats, are particularly important and therefore require effective management systems. The smooth operation of any higher education institution depends partly on the availability of an efficient and effective records management system (Sen & Jindal, 2024). Universities generate and receive

different categories of records, including admission files and letters, payment records, medical records, continuous assessment records, examination results, accommodation records, and end-of-semester academic progress reports, among others (Mabera, 2020).

Universities are increasingly faced with the need for efficient, reliable, and scalable systems for managing students' academic records. Traditional paper-based and locally hosted systems often encounter challenges such as data redundancy, high maintenance costs, limited flexibility, restricted accessibility, and inadequate scalability. Cloud computing (CC) has emerged as a promising technological paradigm capable of addressing many of these challenges by providing on-demand access to shared pools of configurable computing resources, including servers, storage facilities, applications, and services, which can be rapidly provisioned and released with minimal management effort. Cloud computing is an innovative technology with diverse characteristics, including adaptability, wide accessibility, flexibility, scalability, and efficient management of computing resources (Khan & Ullah, 2017).

The National Institute of Standards and Technology (NIST) defines cloud computing as a model for enabling ubiquitous, convenient, and on-demand network access to a shared pool of configurable computing resources, such as networks, servers, storage, applications, and services, which can be rapidly provisioned and released with minimal management effort or service provider interaction. The cloud computing model comprises five essential characteristics, three service models, and four deployment models (Moswell & Bwalya, 2023).

Cloud computing has become an important area of interest in information technology because of its numerous advantages. These include ease of use, accessibility, time savings, cost-effectiveness, flexibility, and scalability. Given its benefits and potential positive impact on universities and other organisations, an increasing number of institutions are adopting cloud-based technologies (Chang et al., 2013). Cloud computing has gained considerable importance in academic institutions and continues to spread rapidly across the world (Alhamazani et al., 2015).

Despite these advantages, some higher education institutions are yet to fully adopt and utilize cloud computing. The adoption and use of cloud computing in Management Information System (MIS) units, particularly for managing students' academic records, are influenced by a combination of technological, organizational, environmental, and individual factors. These factors reflect the complex interaction among technical capabilities, organizational readiness, environmental conditions, and user acceptance. Understanding these factors can assist university administrators and policymakers in developing strategies that promote digital transformation in higher education management.

Therefore, this study investigated the factors influencing the adoption and use of cloud computing for managing students' academic records among information management staff at the Federal University Dutsin-Ma (FUDMA).

Statement of the Problem

Traditionally, many universities in Nigeria have relied on paper-based records and locally hosted digital systems for managing students' academic records. However, these conventional methods are often associated with challenges such as delays in information retrieval, the risk of data loss due to inadequate backup systems, limited accessibility,

duplication of records, and high operational and maintenance costs.

Cloud computing offers the potential to improve academic records management by providing scalable storage facilities, real-time accessibility to information, enhanced collaboration, improved data protection, and cost-effective computing services. Despite these potential benefits, the adoption and use of cloud computing for managing students' academic records in some Nigerian higher education institutions appear to be limited. This situation may be influenced by factors such as staff attitudes, inadequate facilities and infrastructure, insufficient funding, concerns about data security, and resistance to changing from traditional methods of records management (Umar, 2022).

Although cloud computing has the potential to improve the efficiency and accessibility of academic records management, there is a need to understand the specific factors that influence its adoption and use within university information management environments. There is also a need to identify the challenges that may hinder its effective utilization.

It is against this background that this study assessed the factors influencing the adoption and use of cloud computing for managing students' academic records among MIS staff at the Federal University Dutsin-Ma.

Research Objectives

The study was guided by the following objectives:

1. To identify the factors influencing the adoption and use of cloud computing for managing students' academic records at the Federal University Dutsin-Ma.
2. To identify the challenges associated with the use of cloud computing for managing students' academic records at the Federal University Dutsin-Ma.

Literature Review

Concept of Cloud Computing

The evolution of cloud computing represents a significant development in computing technology. It has contributed to improving information systems by providing computing services and resources that can respond to users' needs in real time. Cloud computing can be described as a model that provides computing resources as services. These resources include applications, storage, networks, processing capabilities, and other information technology services (Chang et al., 2021).

Cloud computing has been defined in different ways by scholars and organisations based on their perspectives and areas of application. It is generally regarded as an umbrella term for sophisticated, on-demand computing services initially popularized by commercial providers such as Amazon, Google, and Microsoft (Yang & Abraham, 2024). Cloud computing facilitates the sharing and delivery of computing resources and services through the internet rather than relying solely on locally installed servers, personal computers, or institutional data centres.

Cloud Computing and Students' Academic Records Management

Universities require functional and effective records management systems to operate successfully in the contemporary academic environment, which is characterized by the generation and use of large volumes of sensitive data and information. Records constitute the institutional memory of the universities that create them and serve as evidence of past transactions, activities, and decisions.

Students' academic records provide documented evidence of their academic careers and activities within the university. Such records may include information relating to

admission, registration, academic performance, examinations, graduation, and other academic activities. Records may exist in different forms and media and are created, received, maintained, used, and preserved as evidence of institutional activities and transactions (Julaihi et al., 2024).

The continuous increase in the volume of information has transformed the manner in which records are created, stored, processed, and distributed. Significant changes have occurred in the nature of information management as institutions increasingly depend on digital technologies. Although technology can improve the creation, storage, processing, and retrieval of information, its effective use requires an understanding of established records and information management principles. The use of technology without appropriate records management practices may result in inefficiency and disorder (Asnawi et al., 2025).

Records management involves the systematic control of records throughout their life cycle, from creation or receipt to maintenance, use, preservation, and eventual disposal. Effective records management is therefore essential to the successful administration of academic institutions, particularly universities.

Cloud computing can support effective records management by providing storage, accessibility, backup, collaboration, and security mechanisms. Appropriate security protocols can also help protect sensitive institutional documents and information. This enhances accountability among information management staff by ensuring that records are appropriately handled and protected.

Don-Solomon and Ayawei (2020) found that the adoption of cloud computing in academic records management could improve information security by protecting records from unauthorized access, modification, disruption, and destruction. Security incidents may result in the theft of confidential information, data tampering, or deletion of important records. Therefore, although security is only one component of academic records management, it remains a critical requirement for protecting institutional information.

Cloud computing can also support data governance and data protection by improving access to information and enabling the effective utilization of institutional resources. Elsawi (2024) observed that failure to adopt modern records management technologies, including cloud computing, may result in poor decision-making and difficulties in managing information securely and efficiently. The security of institutional records is an important component of effective data governance and a major requirement for data protection.

Poor records security may expose institutional systems and services to risks and may result in harm to individuals and organisations. Consequently, the role of cloud computing in improving the management of records cannot be underestimated, particularly because of its capacity to capture, store, retrieve, analyze, and transmit large volumes of data and information across different locations and institutional units.

Factors Influencing Cloud Computing Adoption

Despite its numerous benefits, the adoption of cloud computing may be influenced by several technological, organizational, and environmental factors. Santos et al. (2024) identified several obstacles that may affect cloud computing adoption in universities.

1. Compatibility of Hardware and Existing Systems

Not all existing applications and hardware systems may be compatible with cloud-based technologies. Older hardware and legacy applications may not support newer cloud-

based software and services. Institutions may therefore need to upgrade or modify their technological infrastructure to ensure compatibility with emerging innovations.

2. Data Protection Risks
Data protection and information security represent major concerns in cloud computing adoption. Institutions may be concerned about unauthorized access, cyberattacks, data breaches, and other forms of information security threats.

3. Access to Technical Support
The provision of cloud services by external vendors may create concerns regarding access to technical personnel and service providers, particularly when technical problems occur. Institutions may depend on external providers for maintenance, troubleshooting, and service continuity.

4. Provision of Computing Resources
Effective utilization of cloud computing requires access to appropriate computing devices and other technological resources. Financial limitations may make it difficult for institutions to provide adequate computing facilities for staff and students.

5. Availability of Network Services
Cloud computing depends heavily on reliable internet connectivity. Therefore, the availability, speed, reliability, and affordability of network services are essential for the effective use of cloud-based technologies.

6. Hardware Upgrading
Technological innovations require institutions to continuously upgrade their computing infrastructure. As hardware becomes obsolete, new systems may be required to support improved applications and services. This may create additional financial responsibilities for institutions.

7. Software Installation and Upgrading
Continuous technological development also leads to the introduction of new and improved software applications. Institutions may incur additional expenses in acquiring licensed software and upgrading existing applications to ensure compatibility with emerging technologies.

Despite the significant benefits associated with cloud computing, concerns relating to information security and privacy, data location, regulatory compliance, vendor lock-in, vendor reliability, and legal jurisdiction may affect its adoption in universities. In addition, critical infrastructure supporting cloud services, such as stable electricity supply, fast and affordable internet connectivity, and reliable network availability, remains inadequate in many developing countries, including Nigeria.

Technology Acceptance Model
The Technology Acceptance Model (TAM) is one of the major theoretical models used to explain individuals' acceptance or rejection of innovative technologies. The model explains technology adoption and use based on users' beliefs, attitudes, behavioural intentions, and perceptions regarding a particular technology (Turner & Reyniold, 2010).

Two major constructs of TAM are perceived usefulness and perceived ease of use. Perceived usefulness refers to the extent to which an individual believes that using a particular technology will improve job performance, while perceived ease of use refers to the extent to which an individual believes that the technology will be easy to understand and use. The model is relevant to this study because the adoption and use of cloud computing for managing students' academic records may be influenced by information management staff members' perceptions of the usefulness and ease of use of cloud-based technologies. Positive perceptions may promote favourable attitudes and intentions towards adoption,

while negative perceptions may discourage effective utilization.

Methodology

The study employed a quantitative research approach based on a cross-sectional descriptive survey design. The population of the study comprised 76 Management Information System (MIS) staff of the Federal University Dutsin-Ma. A structured questionnaire was used as the instrument for data collection. The questionnaire was designed to obtain information on the factors influencing the adoption and use of cloud computing and the challenges associated with its use in managing students' academic records. Descriptive statistics, including frequencies, percentages, means, and standard deviations, were used to analyze the data and provide a clear overview of respondents' views and responses.

Findings of the Study

Factors Influencing the Adoption and Use of Cloud Computing

The study examined the factors influencing the adoption and use of cloud computing for managing students' academic records, as presented in Table 1.

Table 1: Factors Influencing the Adoption and Use of Cloud Computing

S/N	Statement	Yes (F)	%
1	Compatibility of cloud computing technologies with existing systems is a factor influencing adoption and use.	39	67.2
2	Perceived usefulness of cloud computing is a factor influencing adoption and use.	49	84.5
3	Ease of use of cloud computing technologies is a factor influencing adoption and use.	33	56.9
4	Reliability and security of cloud computing technologies influence adoption and use.	23	39.7
5	Top management support influences the adoption and use of cloud computing technologies.	22	37.9
6	Availability of resources, such as budget and infrastructure, influences adoption and use.	48	82.8
7	Organizational culture influences the adoption and use of cloud computing technologies.	33	56.9
8	The influence of peer institutions affects the adoption and use of cloud computing technologies.	33	56.9
9	Staff attitudes towards change influence the adoption and use of cloud computing technologies.	49	84.5

Table 1 shows that perceived usefulness of cloud computing and staff attitudes towards change were the most frequently identified factors influencing adoption and use, with 49 respondents (84.5%) each. The availability of resources, including budget and infrastructure, was also identified as a major factor by 48 respondents (82.8%).

Compatibility of cloud computing technologies with existing systems was identified by 39 respondents (67.2%). Ease of use, organizational culture, and the influence of peer

institutions were each identified by 33 respondents (56.9%).

However, reliability and security of cloud technologies and top management support received relatively lower responses, with 23 respondents (39.7%) and 22 respondents (37.9%), respectively. These findings suggest that, although perceived usefulness, positive attitudes towards change, and resource availability are major drivers of cloud computing adoption, concerns relating to security and inadequate top management support may constitute significant barriers.

Overall, the findings suggest that successful adoption and use of cloud computing depend not only on the perceived benefits of the technology and the availability of adequate resources but also on addressing security concerns and securing strong institutional and managerial support.

Challenges of Using Cloud Computing for Managing Students' Academic Records

The challenges associated with the use of cloud computing for managing students' academic records are presented in Table 2.

Table 2: Challenges of Using Cloud Computing for Managing Students' Academic Records

S/N	Challenge	Yes (F)	%
1	Power failure	49	84.5
2	Absence of comprehensive records management policies	23	39.7
3	Inadequate skilled and experienced management personnel	10	17.2
4	Inadequate funding	33	56.9
5	Inadequate infrastructure and modern technology	9	15.5
6	Difficulties associated with the management of manual records	25	43.1
7	Data protection risks	49	84.5
8	Poor internet connectivity and low internet speed	25	43.1
9	High cost of internet bandwidth	33	56.9

The data presented in Table 2 indicate that power failure and data protection risks were the most significant challenges associated with the adoption and use of cloud computing for managing students' academic records, with 49 respondents (84.5%) identifying each challenge.

Inadequate funding and the high cost of internet bandwidth were also major challenges, with 33 respondents (56.9%) identifying each. Difficulties associated with the management of manual records and poor

Internet connectivity was identified by 25 respondents (43.1%), while the absence of comprehensive records management policies was identified by 23 respondents (39.7%). Inadequate skilled and experienced management personnel, identified by 10 respondents (17.2%), and inadequate infrastructure and modern technology, identified by 9 respondents (15.5%), were the least frequently reported challenges.

The findings therefore indicate that the major challenges associated with cloud computing use in the management of students' academic records are primarily related to unreliable electricity supply, data protection concerns, inadequate funding, and the high cost of internet services.

Discussion of Findings

The findings revealed that perceived usefulness, positive staff attitudes towards change, and the availability of adequate resources, including budget and infrastructure, were the major factors influencing the adoption and use of cloud computing for managing students' academic records. Compatibility with existing systems and the influence of peer institutions were also identified as important considerations.

The prominence of perceived usefulness suggests that information management staff are more likely to adopt and use cloud computing when they believe that it can improve the management, accessibility, and efficiency of students' academic records. Similarly, positive attitudes towards technological change may facilitate the acceptance and implementation of cloud-based systems. The availability of financial and technological resources also emerged as a critical factor. This finding indicates that the successful adoption of cloud computing requires institutional investment in the necessary infrastructure and services.

The findings are consistent with Don-Solomon and Ayawei (2020), who identified perceived benefits and resource availability as important drivers of cloud computing adoption in academic records management. However, concerns regarding the reliability and security of cloud technologies reflect the findings of El Moudni and Ziyati (2025), who observed that data protection risks can discourage institutions from fully adopting cloud-based solutions.

The relatively low level of top management support identified by respondents suggests the need for stronger leadership involvement in cloud computing initiatives. Management commitment is important for policy formulation, funding, infrastructure development, staff motivation, and the successful implementation of technological innovations.

Regarding the challenges associated with cloud computing use, the findings revealed that power failure and data protection risks were the most significant challenges. Inadequate funding and the high cost of internet bandwidth were also identified as major constraints.

These findings suggest that the major challenges affecting cloud computing use at the Federal University Dutsin-Ma are primarily related to infrastructure, financial resources, and information security. The findings are consistent with Asiri (2024) and El Moudni and Ziyati (2025), who identified infrastructural limitations and security concerns as major barriers to cloud computing implementation.

The relatively lower emphasis on inadequate skilled personnel differs from the findings of Ejedafiru and Ogbogbaidi (2024), who identified skill deficiencies as a major obstacle to cloud technology adoption. This difference may indicate that, within the context of the present study, infrastructure, electricity supply, financial limitations, and data protection concerns are more immediate challenges than staff competence. The findings also support the position of Asnawi et al. (2025) regarding the importance of appropriate policies and systematic records management practices in addressing emerging technological challenges.

Conclusion

The study concludes that the adoption and use of cloud computing for managing students' academic records at the Federal University Dutsin-Ma are influenced primarily by the perceived usefulness of cloud technologies, positive staff attitudes towards change, and the availability of adequate resources, including budget and infrastructure. Compatibility with existing systems and the influence of peer institutions also contribute to the adoption process.

However, the effective use of cloud computing is constrained by significant challenges, particularly power failure, data protection risks, inadequate funding, and the high cost of internet bandwidth. Concerns relating to the reliability and security of cloud technologies, as well as inadequate top management support, may also limit effective adoption.

The study therefore concludes that the successful adoption and use of cloud computing for managing students' academic records require a combination of technological readiness, adequate institutional resources, positive staff attitudes, effective leadership support, reliable infrastructure, and robust data protection mechanisms.

Recommendations

Based on the findings of the study, the following recommendations are made:

1. The university should organise leadership engagement workshops and awareness programmes to strengthen top management support for cloud Computing initiatives. Such programmes should address perceived security concerns, demonstrate the usefulness of cloud technologies, promote positive attitudes towards technological change, and encourage adequate resource allocation.
2. The university should invest in resilient technological infrastructure, including backup power solutions, reliable and affordable high-speed internet connectivity, and modern computing facilities to minimize the effects of power failure and internet-related challenges.
3. Robust data protection and information security mechanisms should be established to address concerns relating to unauthorized access, data breaches, privacy, and the security of students' academic records.
4. Adequate financial resources should be allocated to cloud computing initiatives to support the acquisition, maintenance, and sustainability of relevant cloud-based services and infrastructure.
5. Comprehensive policies and guidelines on cloud computing and electronic records management should be developed to provide a clear framework for the management, security, accessibility, retention, and protection of students' academic records.

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