

INFLUENCE OF DIGITAL TECHNOLOGIES ON SECURITY OF STUDENTS' RECORDS IN PUBLIC UNIVERSITIES IN AKWA IBOM AND CROSS RIVER STATES.

Blessing Joy Iheanacho (CLN), PhD

University of Uyo, Akwa Ibom State

and

Favour Ihuoma Tobias

University of Uyo, Akwa Ibom State

Abstract

The study examined the influence of digital technologies on security of students' records in public universities in Akwa Ibom and Cross River States. Three research questions were raised to guide the study. The study adopted the descriptive survey research design. The area of the study was Akwa Ibom and Cross River States. The population for the study consisted of 38 ICT unit personnel in the universities under study. Total enumeration sampling technique was used for the study. Questionnaire was used for data collection. The researcher with the help of research assistants from the institutions administered the questionnaire to the respondents. Data collected were analysed using simple regression analysis. The findings from the data analyses showed that digital technologies influence the security of students' records. It was concluded that universities should endeavour to secure their students' records using the digital technologies. It was recommended among others that the universities management should provide adequate funds for regular updating of the institution's database that hosts students' records.

Keywords: Digital Technologies, Security, Students' Records

Introduction

The emergence of digital technologies has changed the way records are preserved and secured in universities. The advent of computer has brought a remarkable turning point in the management of records in organisations and institutions such as the universities. The immense use of records has brought with it the security risks of

unauthorised access, loss, alteration, erasure, and damage of recorded information; thereby compromising the principles of corporate governance especially in the areas of integrity, accountability and transparency (Musembe, 2019). Appropriate security is required for records to ensure business continuity and efficiency, and to avoid breaches of statutory, regulatory or contractual obligations (Oseni *et al.*, 2023). Records can be secured through a variety of measures aimed at minimising the risks of loss of records and damages to the records caused by disasters either natural or man-made.

The use of digital technologies in the security of record is the process and activities which stabilises and protects reformatted and digital authentic electronic records in forms, which are retrievable, readable, and usable over time (Abdulkadir, 2019). According to Ashantti (2019), digital security of records refers to all of the actions required to maintain access to digital materials beyond the limits of media failure or technological change. These materials may be records created during the day-to-day business of an organisation, born-digital records created for a specific purpose or the products of digitisation projects. These technologies include the following: cloud computing, database and website.

Cloud computing is seen as the physical structure of a communication network, where data is stored in large data centres and can be accessed anywhere, at any time, and from different devices (Hartmann *et al.*, 2019). Cloud computing is a record security strategy that involves the storing, managing, and processing digital records in a cloud-based infrastructure.

Database refers to a collection of data that is multi-dimensional in the sense that internal links between its entries make the information accessible from a variety of perspectives (kustitskaya, 2023). According to Omotunde & Ahmed (2023), databases are important in securing records within the university by providing a centralised, organised, and secured platform for storing and managing data. This can involve the use of a website to store and secure data.

A website is a collection of related webpage, images, videos or other digital assets that are hosted on one web server, usually accessible through the internet (Schuett & Rahman, 2021).

Securing students' records in the web using well-designed software enhances the availability and accessibility of the records.

The immense use of records has attracted some security risks of unauthorized access, loss, alteration, erasure, and damage of recorded information; thus, compromising the principles of good corporate governance especially integrity, accountability, and transparency (Musembe, 2019). According to Musembe (2019), records security is defined as the minimization of unauthorized addition, modification, alteration, erasure or deletion of records and ensuring only authorized personnel have access to the records. It also includes the policies, procedures and technical measures used to prevent unauthorized access, alteration, theft or physical damage to information (Ngoepe *et al.* 2013).

Security of students' records refer to the process of safe-guarding students' records and its facilities against internal or external destruction (Akpa *et al.* 2022). Seniwoliba *et al.* (2017) affirmed that record maintenance in schools is any activity carried out with the aim of keeping the surface of students' records as neat as possible and to ensure that records are in good condition and placed in orderly manner. Records management occupies a strategic position in the effective and efficient management of students' records in the university administration (Seniwoliba *et al.* 2017). It is central in ensuring the credibility of students' records, because proper records maintenance always proves very relevant in terms of providing accurate students' records for verification and confirmation in times of disputes, hence effective maintenance of students' records is paramount in universities.

Universities need functioning students' records in order to effectively carry out their day-to-day activities. University institutions are characterised by multiple goals and objectives which are pursued through their main functions and activities of learning, teaching, research and public services for the advancement of knowledge (Oloniruha & Momohjimoh, 2022). The university is a formal organisation with a high degree of permanency. Students come and go but the university remains (Usman, 2017). It is therefore imperative that students' records should be properly maintained and secured to ensure consistency and continuity of educational services.

Security threats to students' records come from all directions ranging from malware and data breaches to theft, fire, flood, and vandalism making it necessary to include other

forms of record security measures other than the traditional forms of records security, in order to adequately tackle any form of unforeseen event. Although, there is literature on digital security of records; which emphasises on the methods of securing records digitally and not the technologies used in securing records, and the limited studies were also not conducted in relation to the security of students' records. Hence, studies focusing on the investigation digital technologies and security of students' records seem to have received less attention. This is the gap that this study has identified to fill.

The findings of the study would be beneficial to university administrators, record officers, students and researchers. The study would be beneficial to university administrators as it would give a better understanding of the use of digital technologies such as cloud computing, database and website in the security of students' records that will enhance availability, accessibility and usability of records when needed. The study would sensitise the record officers on the need to apply digital technologies such as cloud computing, database and website in the security of sensitive records such as students' records from any unforeseen occurrence. The outcome of the study would bring about an enhanced security framework for improved students' records management that would promote quick access and retrieval of records thereby eliminating frustrations on the part of the students when seeking for records retrieval. The study would also be significant to researchers as the outcome of the study would assist the researchers to appreciate the influence of digital security of students' records using cloud computing, database, website,

software, data replication and firewall on disaster preparedness and as well contribute to the body of knowledge.

The study covered five public universities in Akwa Ibom and Cross River States. The public universities are University of Uyo, Federal University of Technology Ikot Abasi, Akwa Ibom State University, University of Calabar and Cross River State University. The study will further be delimited to the following variables: cloud computing, database, website and security of students' records.

Statement of the Problem

The educational life cycle of a student and his relationship with the University may never cease owing to the fact that even after graduation, the student might come back to the University to request for some important academic documents to further their education, for employment or any other occasion that may demand for it. Also, whenever there is a contradicting issue involving the student and the university over the certificate issued to a student, the student's academic record is the easiest way to establish the fact.

It is therefore evident that records are very essential instruments in every society, organisation or institution especially in reference, decision-making or administration. In spite of all these, literature and personal observation by the researcher had showed that records are not adequately secured in organisations and institutions such as the universities despite the potentials they hold for easy historical and analytical reference as well as ensuring comprehensive data that is up-to-date. One wonders if this could be attributed to the technologies and facilities used in securing these records. Observation by

the researcher revealed that some of the public universities in Nigeria still use only the traditional record security systems which are not commensurate with the increasing number of records created in the universities as a result of the continuous increase of students' enrolment and which do not offer adequate security for records in the event of disasters, as interaction with record officers revealed that fire disaster in the year 2000 engulfed the University of Uyo students' record unit and caused loss and serious damage to the records.

Although, limited studies have been carried out on digital security of records, but none had attempted to investigate the influence of digital technologies on the security of students' records. In the light of the above, this study will investigate digital technologies and security of students' records in public universities in Akwa Ibom and Cross River States.

Research Questions

- i. What is the influence of cloud computing on the security of students' records in Public Universities in Akwa Ibom and Cross River States?
- ii. What is the influence of database on the security of students' records in Public Universities in Akwa Ibom and Cross River States?
- iii. What is the influence of website on the security of students' records in Public Universities in Akwa Ibom and Cross River States?

LITERATURE REVIEW

The Parkerian Hexad (PH) Model (Parker, 1998)

The PH model is a model that aimed to change how information security is understood and implemented in the contemporary computing environment where growth of nomadic computing (independence of location, motion, computing platform, communication devices and communication bandwidth where its driving dynamics include availability of hotspots, new generations of mobile phones, high demand and sale of laptops, and the increasing availability of specialised and inexpensive internet access devices) has changed the computing environment. The six elements of PH Model include confidentiality, integrity, availability, authenticity, possession or control and utility. The PH model is aimed at filling the gaps of the confidentiality, integrity and availability model, and thus, improve the security of today's information assets. The hexagon not only symbolises the six components, but also figuratively suggests that each component fits together perfectly, solving the puzzle of comprehensive information security.

The Parkerian Hexad Model is non-overlapping. This means that each principle (attribute) is necessary to ensure that security is maintained. The model is explained thus:

Confidentiality: Ensures that information is accessible only to those authorized to have access.

Integrity: Ensures that digital records are accurate and have unchanged representation of the original secured record.

Availability: Ensures that the digital records are readily accessible to the authorised users at all times.

Authenticity: Ensures the validity, trustworthiness, and dependability of the digital records.

Possession: Refers to the ownership or control ability to use the digital records.

Utility: Refers to the usefulness of information.

The PH model is relevant to the study since it strongly advocates for the security of information and appreciates the fundamental role of creators/custodians. New technological trends embraced by most federal universities such as online students' registrations that capture their biodata and Hostel booking system (HBS) among others have made digital records security and information contained therein a more daunting task. In addition, interest in digital records security has been ignited by numerous occurrences of threats, which call for better methods of securing the computers and the records they store, process and transmit. The elements of the PH model are vital in the continual management of digital records and necessary to digital records essential characteristics that are content, context and structure, which give the digital records meaning overtime and ensure efficient access.

Conceptual Framework

Digital technologies for the Security of Students' Records

Digital describes electronic technology that generates, stores and processes data in terms of positive and non-positive states. The advent of computers has brought a remarkable turning point in the security of records in every organisation. Information and Communication Technologies (ICTs) have led to a paradigm shift in recent years, influencing roles and practices (Hartmann *et al.*, 2019). According to Sadiku *et al.* (2022), digital security refers to various resources employed to protect your online presence (data,

identity, and assets). It also protects information. In their views, digital security includes the tools which one can use to secure digital personality, assets, and technology in the online and mobile world.

These resources and tools are used for online navigation, encryption, and encrypting instant messaging. These resources and tools include cloud computing, migration, emulation, anti-virus software, vulnerability scanner, data replication, and firewall (Zhong *et al.*, 2018; and Ibeh & Okeke, 2024). Matlala (2019) opined that digital technologies are aimed at managing the risks of information loss as well as ensuring long term and meaningful access to digital information. These techniques include creating digital archives, backups, implementing metadata standards and management, migration to newer file formats to prevent data loss and ensure the authenticity and integrity of the records. Where computers are used, confidentiality can be maintained.

In the view of Abdulrazaq (2015), record refers to any recorded information regardless of form or medium, received and maintained by an agency, institution, organization or individual in pursuance of its legal obligations or in the transaction of business of any kind. Records are defined as documents that memorialise and provide objective evidence of activities performed, events occurred, results achieved or statement made (Clement, 2018). According to Oseni *et al.* (2023) they are seen as the lifeblood of every organisation which preserves the organisation's heart, mind, spirit, conscience and memory. Therefore, the importance of records in every organisation cannot be over-

emphasised. Therefore, effective records management ensures the adequate security of these sensitive documents.

Nwaomah (2020) averred that the following are some of the students' records that are kept in universities: Admission List and Letters, Course registration, Academic transcripts, Semester results, Students bio-data form, Statement of results for Graduate students, Undergraduate and postgraduate Certificates, Graduation List, Payment details of school fees/Accommodation, Examination Malpractices, Minutes and Reports, Dissertation, Thesis and Projects, Postgraduate Seminars and Defence.

Disorganisation of students records in the university can be a great challenge given the expectation of the digital era of accuracy, speed, and accessibility of service which continues to increase dramatically making students of today's demand for instantaneous service both in person and online (Matthew, 2019). To guarantee efficiency and effectiveness and to enable organisations including universities to survive in the accountability period of the digital era, records must be actively managed throughout their life cycle (Muthoni, 2018).

Ogwo & Ugocha (2015) maintained that digital security of records is a way of securing records created as a result of converting analogue records to digital form (digitisation), as well as those that are bon-digital. Digital security aims at taking steps to ensure the longevity of electronic records. It applies to records that are either born digital or stored online (Compact Disk-Rom, diskettes or other physical carriers), or to the products of analogue-to-digital conversion, if long term access is intended. According to

the duo, born digital records refers to those records that were initially created using some form of digital technology; while digitally created records refer to those records which have been transformed from analogue to digital form through some reproductive means such as re-keying the information or scanning the record (Ogwo & Ugocha, 2015). Ilem & Ojohwhoh (2020) inferred that digital security of records or protection system is primarily a software-based methodology used by an organisation to manage all its records, regardless of format over the entire records life cycle. Issa & Saka (2021) further asserted that they serve as a form of disaster management when there are cases of security threats to stored records.

Universities and organisations need functioning records to succeed in their day-to-day activities that are characterised with uncertainty and high risk. Universities in particular need to keep proper and secured records of its activities including information about students' academic activities. Threats, risks, crimes, and access control difficulties of records are some of the fundamental security problems in universities. It is therefore necessary for record officers to develop and embrace new approaches and technologies to protect their organisational information infrastructure from disastrous occurrences (Ashibani & Mahmood, 2017). Although, it is impractical to remove all risks, however, Forde (2017), affirmed that record officers can mitigate risks to an acceptable level by employing technical, technological, formal and informal strategies.

Cloud Computing

The word 'cloud' is used figuratively to refer to the Internet, based on the cloud graphic used in the past to represent the telephone network, and more recently to describe and represent the Internet in computer network schemes, as an abstract image of the infrastructure it represents (Alfailakawi & Al-Anzi, 2016). Cloud computing, according to Hayek (2015), is defined as a technology based on the transfer of processing and computer storage space to the so-called cloud, a server accessed via the Internet, so information technology (IT) software travels from products to services. It is a service that offers cheap, secured on-demand platforms that can be accessed and used in easy ways (Alfailakawi, 2021). Cloud computing is a model for enabling convenient, on-demand network access to a shared pool of configurable computing resources (for example networks, servers, storage, application and services) that can be rapidly provisioned and released with a minimal management effort or service provider interaction (Agbawodikeizu & Orakwe, 2020; Masenya, 2020). To Dutt (2015), cloud computing is a very flexible model. It provides a common computing platform.

According to Suman & Singh (2016), cloud computing is a network paradigm where large pool of systems are connected in private and public networks, to provide dynamically scalable infrastructures for application, data and file storage. In the same vein, Raza (2020) inferred that cloud computing is storing or processing programmes, apps, and data via the internet, instead of directly from a computer hard drive. Hartmann *et al.* (2019) viewed cloud computing as the physical structure of a communication network, where data is stored in large data centres and can be accessed anywhere, at any time, and from different

devices. Rajeswari (2019) defined cloud computing as the use of Information Technology (IT) infrastructure for the provision of services to customers, using the internet. Tomblin (2021) affirmed that cloud computing takes place through the internet (cloud).

Database

A database is a single organised collection of structures data, stored with a minimum of duplication of data items so as to provide a consistent and controlled pool of data (French, 2022). The term database, according to kustitskaya (2023) refers to a collection of data that is multi-dimensional in the sense that internal links between its entries make the information accessible from a variety of perspectives. Abouelmehdi *et al.* (2017) maintained that databases play a crucial role in digital records security strategy, serving as the backbone for storing, managing, and safeguarding sensitive information. In the same vein, Omotunde & Ahmed (2023) asserted that databases are important in securing records within the university by providing a centralised, organised, and secured platform for storing and managing data.

Students' records play an essential part in the effective and efficient running of a university. The effectiveness of instruments built on specific data crucially depends on their completeness, consistency, and diversity (Aye & Khin, 2019). Databases are normally set up in order to meet the information needs of major parts of an organisation by adequately storing and securing the recorded information, so that it can be accessed and retrieved as at when needed. Abdulraham (2020) avowed that data is the bedrock of any organisation and institutions, and students' academic records, especially the students

results appear to be the most valuable asset to the educational institutions. Therefore, it is pertinent that these students' records should be properly secured in the institution's database against emergency occurrences such as internal threats for integrity and reliability using appropriate database auditing techniques to know who did what, when and how.

Website

Internet usage has increased rapidly in this digital era. Websites have become the most important portal for most, if not all, business organisations and institutions. A website is a collection of related webpages, images, videos or other digital assets that are hosted on one web server, usually accessible through the internet (Schuett & Rahman, 2021). The pages of a website can usually be accessed from a common root Uniform Resources Locator called the homepage, and usually reside on the same physical server. Securing students' records and ensuring they are safely stored is of a great importance to educational institutions. Students' records contain sensitive information which should be properly secured against any form of disaster. Securing students' records in the web enhances the availability and accessibility of the records. Aziz *et al.* (2021) inferred that websites are widely used all over the world as a medium for preservation and security of information. This is because the website serves the task and goal of quick, easy and effective search and retrieval of information regardless of location.

Securing students' records in a website requires a multi-faceted approach that prioritises data security, accessibility and compliance with relevant regulations. This

includes implementing robust security measures, using secure storage solutions, establishing clear data governance policies, and ensuring users authentication. Website design is critical in ensuring that the data stored in the website are secured void of any breach such as unauthorised access, alteration of data, or disclosure (Lee & Kozar, 2022). Lee & Kozar (2022) maintained that a well designed website has been found to have positively influence the way data are preserved and used in the web. Website usability is defined as the extent to which the website serves in achieving desired task with effectiveness and satisfaction. Pacio (2018) stressed that usability is determined by download time, navigation, content, interactivity, and responsiveness.

Security of Students' Records

The importance of students' records security in the university cannot be over-emphasized. Ajibola (2022) asserted that the purpose of records security is to improve the recording and preservation of information so that information can be readily retrieved and discarded when they are no longer valuable. Supporting this view, Usman (2017) opined that the essence of securing students' records is aimed at ensuring continuity, preservation, optimal use and accessibility of such records as at when needed. Thus students' records security is the general handling of documents that contains useful information and kept for reference purposes.

The importance of records in the existence of every organization such as the university calls for proper security for the attainment of goals to which the university was established (Kachalloah, 2017). Students' records security according to Ozoemelum (2018)

is one of the most important administrative elements of university organization in which the university registrar must adhere to, hence the purpose of students' record keeping and security is to ensure accurate, valid and proper records of students achievement and growth.

. According to Akpa *et al.* (2023), students' records security refers to the process of safeguarding students' records and its facilities against internal and external destruction. Ugwumba (2014) viewed students' records security as any activity carried out with the aim of keeping the surface of the students' records as neat as possible and to ensure that records are in good condition and placed in orderly manner. This, in the views of Anyanwu (2017); and Ogomuegbulem (2020), means that students' records security is imperative in ensuring quick and easy access to students' information. It will make students' records available for use and serve as major information tools that sustain the university and aid in achieving educational goals and objectives.

Research Method

The study adopted the descriptive survey research design. This design was considered appropriate because it is a design in which a group of people are studied by collecting and analysing data from a few people who are considered to be representative of the entire group, and also it permits the use of a variety of data collecting techniques such as questionnaire, interview and observation (Amajuoyi & Joseph, 2016). The area of the study were Akwa Ibom and Cross River States.

The target population of the study comprised 38 Information and Communication Technology unit personnel. The choice for this category of staff was based on the fact that they are responsible for securing students' records digitally in the universities under study. Total enumeration sampling technique was used for the study; this implies that the entire population of 38 Information and Communication Technology unit personnel was used for the study. Hence, there was no sampling because the population was small and manageable. According to Singh & Masuku (2014), total enumeration sampling is a method in research where the entire population of interest is included in the study rather than selecting a sample.

A structured questionnaire titled: Digital Technologies and Security of Students' Records Questionnaire (DTSSRQ) was used for data collection. The instrument was validated by three experts. To achieve the internal consistency of the instrument, 10 copies of the questionnaire were administered once to respondents drawn from Ritman University. These respondents were not part of the study population. The data obtained was subjected to Cronbach Alpha reliability statistics and it yielded a reliability coefficient of 0.76 which showed that the instrument was reliable for data collection.

The researcher with the help of research assistants from the institutions administered the questionnaire to the respondents. The data collection lasted for two weeks. Data obtained were analysed using the simple regression analysis. Statistical Package for Social Sciences (SPSS) version 22 was used for the data analysis. The regression weights were used to interpret the results of analysis. The integer of the

unstandardized coefficient gives the indication whether it is positive influence or negative influence. The value of the coefficient of determination (R squared) gives the extent of percentage of influence.

Results and Findings

Research Question1: What is the influence of cloud computing on the security of students' records in public universities in Akwa Ibom and Cross River States?

Table 1: Summary of Simple Regression Analysis on Influence of Cloud Computing on Security of Students' Records

Model	Unstandardised Coefficients		Standardised Coefficients	r	R ²
	B	Std. Error	Beta		
1	Constant	34.562	1.620		
	Cloud Computing	.374	.215	-.156	.024

Source: Researcher's field computation (2026)

Table 1 presents the summary of the simple regression test on how cloud computing influences the security of students' records. The result reveals that the unstandardised coefficient index is .374, indicating that cloud computing positively influences the security of students' records. The result thus, shows that there is a positive influence of cloud computing on security of students' records in public universities in Akwa Ibom and Cross River States. The coefficient of determination (R²) is .024, indicating that only 2% changes in security of students' records is associated with cloud computing.

Research Question 2: What is the influence of database on security of students' records in public universities in Akwa Ibom and Cross River States?

Table 2: Summary of Simple Regression Analysis on Influence of Database on Security of Students' Records

Model	Unstandardised Coefficients		Standardised Coefficients Beta	r	R ²
	B	Std.Error			
1	(Constant)	29.301	.777		
	Database	.140	.035	.336	.113

Source: Researcher's field computation (2026)

Table 2 presents the summary of the simple regression test on how database influences the security of students' records. The result reveals that the unstandardised coefficient index is .140, indicating that database positively influences the security of students' records. The result thus, shows that there is a positive influence of database on security of students' records in public universities in Akwa Ibom and Cross River States. The coefficient of determination (R²) is .113, indicating that only 11% changes in security of students' records is associated with database.

Research Question 3: What is the influence of website on security of students' records in public universities in Akwa Ibom and Cross River States?

Table 3: Summary of Simple Regression Analysis on Influence of Website on Security of Students' Record

Model	Unstandardised Coefficients		Standardised Coefficients Beta	r	R ²
	B	Std.Error			
1	(Constant)	25.090	1.189		
	Website	.297	.049	.480	.230

Source: Researcher's field computation (2026)

Table 3 gives the summary of the simple regression test on how website influences the security of students' records. The result reveals that the unstandardised coefficient index is .297, indicating that website positively influences the security of students' records. The result thus, shows that there is a positive influence of website on security of students' records in public universities in Akwa Ibom and Cross River States. The coefficient of determination (R^2) is .230, indicating that only 23% changes in security of students' records is associated with website.

Recommendations

- i. The universities should consider exploring the possibilities of benchmarking and collaborating with other key sectors for effective implementation of cloud computing technologies in the universities.
- ii. The universities management should provide adequate funds for regular updating of the institution's database that hosts students' records.
- iii. There should be an increase in the internet penetration and bandwidth to ensure full and uninterrupted website access in the universities.

Conclusion

Students' records are one of the most important administrative elements of university organisation, and the importance of their security cannot be over emphasised. Security threats to records is becoming a serious issue in universities as a result of the use of the conventional traditional paper filing systems adopted by those in-charge of record keeping in the universities. Based on the findings of the study, it is obvious that the use of

digital technologies (cloud computing, database and website) are necessary to forestall the occurrences of loss or damage of students' records in universities.

REFERENCES

Abdulkadir, A. I. (2019). Preservation of electronic records in selected federal universities in Nigeria. *Middlebelt Journal of Library and Information Science*, 17,109-122.

Abdulraham, F. (2020). Application of database auditing for students' academic records. *World Journal of Innovative Research*, 8(6), 101-107.

Abdulrazaq, B. A. (2015). Management of university records for effective administration of universities in North Central, Nigeria. *Academic Journal*, 7(3), 47-54.

Abouelmehdi, K., Beni-Hssane, A., Khaloufi, H. & Saadi, M. J. P. C. S. (2017). Big data security and privacy in healthcare: A review. *Sustainability*, 113, 73-80.

Agbawodikeizu, E. C. & Orakwe, I. N. (2021). Cloud computing and the applications in libraries, pp192-209. In: J. O. Akidi, K. N. Igwe and J. C. Ujournunna (Editors) *Libraries in the era of digital technologies*. Zeh Communications Limited, Lagos.

Ajibola, R. E. (2022). *Records Management Practices as Correlate of Job Performance of Registry Staff in Some Selected Tertiary Institutions in Oyo State*. Conference proceedings of the first conference of the national institute of office administrators and information managers (NIOAIM) between 7th and 10th February, 2022 at the international conference center, Lead city university, Ibadan, Oyo State, Nigeria

Akpa, N. U., Sarah, O. E., Oko, N. O. & Ogbu, J. I. (2023). Extent of Maintenance and Utilisation of Records in the Administration of Public Secondary Schools in Ebonyi State. *African Journal of Educational Management, Teaching and Entrepreneurship Studies*, 8(1): 72-92

Alfailakawi, A. (2021). The reality of using cloud computing in university education from the point of view of faculty members in Kuwait. *International Journal of Business, Humanities and Technology*, 11(1), 9-25.

Alfailakawi, A. & Al-Anzi, D. (2016). *Encyclopedia of education technology*. Chambers Publishers, UK.

- Amajuoyi, I. J. & Joseph, E. U. (2016). *Research report writing: A concise approach*. Windmill Nig Ltd, Aba.
- Anyanwu, C. T. (2019). The educational manager and educational records. In U. O. Igbokwe (Ed). *Towards a more efficient primary education in Nigeria: Issues and Prospects*. Whytem Publishers, Owerri.
- Ashantti, J. (2019). The record in the information age: A progress report on reflection and research. *Records and Retrieval Report*, 12(1), 1-6.
- Ashibani, Y. & Mahmood, O. H. (2017). Cyber physical systems security: Analysis, challenges and solutions. *Journal of Computer Security*, 68, 81-97.
- Aye, M. W. & Khin, L. M. (2019). Database security model using access control mechanism in student data management. *International Journal of Trend in Scientific Research and Development (IJTSRD)*, 3(3), 529-531.
- Aziz, N. S., Sulaiman, N. S., Hassan, W. I., Zakaria, N. L. & Yaacob, A. (2021). A review of website measurement for website usability evaluation. *Journal of Physics: Conference Series*, 1874. <https://doi.org/10.1088/1742-6596/1874/1/012045> (Retrieved on 4th March 2025).
- Clement, R. (2018). *Fundamentals to administrative science*. PTK Publications, Lagos.
- Dutt, M. (2015). Cloud computing and its application in libraries. *International Journal of Librarianship and Administration*, 6(1), 19-31.
- Forde, E. S. (2017). *Security strategies for hosting sensitive information in the commercial cloud*. <https://doi.org/10.1016/b978-0-12-80/3801-7.00009-2> (Retrieved on 12th April 2025).
- French, C. S. (2022). *Computer science*. 5th edition. Learning Solutions Specialty Publications Ltd, Canada.
- Hartman, S. B., Braae, L. N., Pederson, S. & Khalid, M. S. (2019). The potentials of using cloud computing in schools: A systematic literature review. *The Turkish Online Journal of Education Technology*, 16(1), 190-202.
- Hayek, H. (2015). *Cloud computing is invading higher education institutions*. <http://blog.naseej.co./2015/03/02> (Retrieved on 6th February 2025).

- Ibeh, O. B. & Okeke, I. E. (2024). Electronic records security and librarians' job performance in university libraries in South-South, Nigeria. *Journal of Library Services and Technologies*, 6(2), 229-237. <https://credence-publishing.com> (Retrieved on 6th March 2025).
- Ilem, C. M. & Ojohwhoh, D. R. (2020). Extent of adoption of electronic records protection practices in polytechnics in Edo and Delta States. *ISJASOR*, 2(4), 40-48.
- Issa, O. & Saka, O. (2021). Evaluation of records management practices at the ministry of health, Kogi State, Nigeria. *Journal of Library and Information Science*, 5(2), 109-117.
- Kachallah, A. S. (2017). *Evaluation of Provision and Management of Records in Senior Secondary Schools in Northern part of Yobe State, Nigeria*. Ph.D Thesis, Ahmadu Bello University, Zaria
- Kustitskaya, L. M. (2023). Designing an education database in a higher education institution for the data-driven management of the educational process. *Educational Science*, 13(9), 947- 960.
- Lee, Y. & Kozar, K. A. (2022). Understanding the website liability: Specifying and measuring constructs and their relationships. *Decision Support Systems*, 52(2), 450-463.
- Matthew, P. (2019). The evolving role of the university registrar. *Inside Higher Education*. <https://www.insidehighered.com/views> (Retrieved on 6th February 2025).
- Masenya, T. M. (2020). Application of modern technologies in the management of records in public libraries. *Journal of South African Society of Archivists*, 53.
- Matlala, E. (2019). Long-term preservation of digital records using data replication at the university of Kwazulu-Natal archives. *Journal of the South African Society of Archivists (SASA)*, 52, 95-103.
- Musembe, C. N. (2019). *E-records security management at Moi University, Eldoret, Kenya*. PhD Thesis. University of Kwazulu-Natal, South Africa, 124p.
- Muthoni, F. (2018). *Evaluation of records management practices at the parliamentary service commission of Kenya*. PhD Thesis. Moi University.
- Ngoepe, M., Mokoena, L. & Ngulube, P. (2013). Security, Privacy and Ethics in Electronic Records Management in the South African Public Sector. *ESARBICA Journal*, 29, 36-66

- Nwaomah, A. E. (2020). Political Factors Influence on Students Record Management Effectiveness in the Nigerian University System. *European Journal of Research and Reflection in Management Sciences*, 3(2), 41-49.
- Ogomuegbulem, B. O. (2020). *Basic Issues in School Management*. Computer Edge Publishers, Abuja.
- Ogwo, O. K. & Ugocha, O. C. (2015). Digital preservation of electronic records: Review of concepts, challenges and strategies. *International Journal of Applied Technologies in Library and Information Management*, 1(1), 75-86.
<http://www.jatlim.org> (Retrieved on 15th February 2025).
- Oloniruha, E. A. & Mimohjimoh, K. O. (2022). An assessment of students' records management system and preservation as determinant for the effective retrieval and dissemination of information in tertiary institutions in Kogi State, Nigeria. *Library Philosophy and Practice (e-journal)*, 3041.
<https://digitalcommons.unl.edu/libphilprac/3041> (Retrieved on 9th March 2025).
- Omotunde, H. & Ahmed, M. (2023). A comprehensive review of security measures in database systems: Assessing authentication, access control, and beyond. *Mesopotamia Journal of Cyber Security*, 115-133.
[https://mesopotamian.press/journals/index.php/cyber security](https://mesopotamian.press/journals/index.php/cyber%20security) (Retrieved on 29th March 2025).
- Oseni, S., Bakare, O. D. & Alli, A. Z. (2023). Impact of electronic records management system on the security of records among administrative staff. *Wukari International Studies Journal*, 7(5), 99-110.
- Ozoemelum, C. O. (2018). Assessment of the management of students' affairs record: Case of the University of MpumaLanga in South Africa. *Records Management Journal*, 32(2), 12-21.
- Pacio, R. D. (2018). Online student information system of Benguet State University (OSIS-BSU), Philippines. *International Journal of Innovative Interdisciplinary Research*, 4
- Parker, D. B. (1998). *Fighting computer crime: A new framework for protecting information*. Wiley computer publishing, John Wiley & sons, Inc, New York.
- Rajeswari, N. (2019). Overview of cloud computing and its types. *Journal of Emerging Technologies and Innovation Research*, 6(4), 61-67.
- Raza, M. (2020). *Public vs private vs hybrid: Cloud differences explained*.
<https://www.bmc.com/blogs/public-private-hybrid-cloud> (Retrieved on 4th March 2025).

- Sadiku, M. N. O., Shadare, A. E. & Musa, S. M. (2022). Digital preservation. *International Journal of Advanced Research in Computer Science and Software Engineering*, 7(4), 5-10.
- Schuett, M. O. & Rahman, S. M. (2021). Information Salesforce (2015). *What is cloud computing*. Salesforce platform, San Francisco: California.
- Seniwoliba, A. J. M., Mahama, A. V. & Abilla, B. J. (2017). Challenges of records management in higher education in Ghana: The case of university of development studies. *International Journal of Education Policy Research and Review*, 4(3), 29-41. <http://doi.org/10.15739/IJEP RR.170005> (Retrieved on 11th March 2025).
- Singh, A. S. & Masuku, M. B. (2014). Sampling techniques and determination of sample size in applied statistics research: An overview. *International Journal of Economics, Commerce and Management*, 2(11). <https://ijecm.co.uk/> (Retrieved on 11th June 2025).
- Suman, S. P. & Singh, N. K. (2016). Cloud computing in libraries: An overview. *International Journal of Digital Library Services*, 6(1), 1-18.
- Tomblin, J. (2021). *Cloud-based vs. web-based applications: What you need to know*. <https://www.linkedin.com/pulse/cloud-based-vs-web-based-applications-what-you-need-to-know-john-tomblin> (Retrieved on 9th February 2025).
- Ugwumba, M. (2014). Record keeping in Nigerian school. *Nigeria Journal of Education, Administration and Planning*, 6(18), 19-25.
- Usman, Y. D. (2017). Educational resources: An integral component for effective school administration in Nigeria. *Research in Humanities and Social Sciences*, 6(13), 27-37
- Zhang, Li, M. & Wang, X. (2018). A layered firewall architecture for protecting digital records. *Journal of Information Security and Applications*, 50, 102-123.