

**APPLICATION OF BIG DATA AND ARTIFICIAL INTELLIGENCE ON THE
ROLE OF LIBRARIES ON THE CONTEMPORARY ENVIRONMENT**

By

**Edikan Edikan UMOREN,
Library, Ritman University
Ikot Ekpene.**

And

**Effiong EKPO, Ph.D.
Department of Humanities and International Studies,
Ritman University,
Ikot Ekpene.**

ABSTRACT

The application of Big Data and Artificial Intelligence (AI) has significantly transformed the functional role of libraries in the contemporary information environment. These technologies enable libraries to enhance service quality through intelligent automation, data-driven decision-making, personalized information delivery, and improved user engagement. Big Data supports libraries in understanding user behavior, optimizing resource acquisition, and improving operational efficiency, while AI facilitates advanced cataloguing, smart retrieval systems, virtual reference services, and digital literacy support. Despite the notable progress, the study emphasizes the need for continuous investment in digital infrastructure, staff training, ethical data governance, and sustained evaluation of AI systems to ensure responsible and effective deployment. Strengthening partnerships with technology providers and academic institutions also remains crucial for expanding innovation capacity. Overall, the study concluded that the school library plays a central and transformative role in promoting a vibrant reading culture among students. It provides access to diverse and age-appropriate reading materials, foster independent and lifelong learning, supports curriculum and serves as a sanctuary for literary development. It also recommended that schools should organise book fairs, reading weeks, author talks, storytelling sessions and competitions to make reading fun and engaging.

KEYWORDS: Big Data and Artificial Intelligence, Libraries, Contemporary Environment

INTRODUCTION

Information is an indispensable asset that is utilized across various fields and endeavours. Serving as a backbone for education, research and progress in all aspects of life, information is created in both written and unwritten formats to facilitate worldwide dissemination. Information is an important factor for all human accomplishments. Information resources in library refer to the collection of valuable information – bearing, materials and information gadgets, print or electronic forms such as human, print and non – print or electronic.

The information resources can also be defined as the data and information used by an organization. The major information resources start from human beings who can be answerable to any queries from users, followed by print and non-print information resources. In the contemporary digital environment, libraries are undergoing a profound transformation driven by the adoption of big data and artificial intelligence. Traditionally seen as custodians of books and archives, modern libraries are now evolving into dynamic knowledge hubs, using advanced technology to meet the changing needs of users and institutions (Ezeyi, 2020) Big data allows libraries to collect and analyze vast volumes of information from multiple sources – usage logs, circulation data, user behaviour patterns, online queries, social media engagement, and more. This data can inform collection development identity high – demand resources, and improve decision – making about space usage, staff allocation, and digital services. For examples, data analytics can help predict which materials are likely to be in demand, thus optimizing acquisitions and reducing redundancy.

Application of artificial intelligence: The field of information technology has emerged as a prominent force, revolutionizing the world and turning it into a global village. The global economy now heavily relies on the effective management and dissemination of information, leading to substantial transformations in how information sources are obtained, utilized and shared to foster global knowledge exchange. (Okoye, 2012). The concept of information environment is often used to denote a development in the way information is generated. The new information environment aims to make information available as well as provide the necessary tools for possible access and utilization of the information resources. Thus, the publications of information resources in various forms, particularly e-resources maintain easy access and utilization of the information resources. Thus, the publications of information resources in various forms, particular e-resources maintain easy access to most of the resources on the internet. Therefore, the application of modern technology via computer and communication is bringing all these to the doorstep of the people. (Ifijeh, 2013)

OPEN ACCESS AND INSTITUTIONAL REPOSITORIES:

Open access (OA) refers to the free, immediate, online availability of research outputs without financial, legal, or technical barriers. Institutional Repositories (IRS) are digital platforms hosted by universities or research institutions to collect, preserve and disseminate the intellectual output of their scholars. Together, OA and IRS play a vital role in enhancing the visibility, accessibility, and impact of scholarly research; such as: Democratization of Knowledge: OA removes subscription barriers, enabling global access to scholarly literature, particularly for researchers in developing countries who may lack access to expensive databases and journals. Increased research impact: (Iwhiwhu, 2010) Studies show that OA publications receive more citations and wider readership. IRS enhances discoverability databases, broadening the audience institutional research. Preservation and Archiving: IRS ensure long – term preservation of research outputs, including preprints, theses, dissertations, databases, technical reports and unpublished materials, safeguarding institutional memory. Academic and Institutional Visibility: IRS showcases an institutional research profile and attracting collaboration, funding and student enrolment. Support for Open Science: OA and IRS promote transparency, reproducibility, and accountability in research by enabling access to raw data, methodologies and supplementary materials. Cost – Effective Knowledge

Sharing: They reduce dependency on commercial publishing modes and support sustainable community-driven alternative for scholarly communication.

However, Open Access and Institutional Repositories are powerful tools for expanding access to knowledge, supporting academic equity and enhancing global research visibility. (Clark, 2016)

ROLE OF JOURNAL RESOURCES:

Journal resources play a central role in the advancement in knowledge across, academic, scientific, and professional fields. As scholarly periodicals that publish peer-reviewed research articles, case studies, theoretical frameworks and empirical findings, journals serve as authoritative platforms for knowledge creation, validation, and dissemination through; (Ernst, 2023)

- **Advancement of Research and Scholarship:** Journals are the primary medium through which researchers communicate findings, critique existing knowledge, and propose new theories. They ensure that knowledge grows in a cumulative and evidence-based manner, peer review, a key feature of journals, upholds academic integrity and ensures methodological rigor.
- **Educational Resource:** In higher education, journal articles are essential teaching and learning tools, students and lecturers use journal content to support coursework, literature reviews, and thesis curricula aligned with the latest developments in each discipline.
- **Professional Development and Innovation:** In fields like medicine, law, engineering and education, professionals rely on journals to stay updated on new techniques, regulations, and best practices. This continual learning fosters innovation and improves professional standards.
- **Academic Visibility and Recognition:** Publishing in reputable journals enhances a scholar's profile and contributes to institutional prestige. Journal metrics such as impact factor and citation indexes are often used in performance evaluations and funding decisions.
- **Global Collaboration and Dialogue:** Journal resources facilitate cross-border academic collaboration. They enable scholars from diverse regions to engage with each other's work, exchange ideas, and contribute to global discussions on pressing issues such as climate change, public health and social justice.
- **Preservation of Knowledge:** Journals also serve as historical records of intellectual thought and scientific progress. Digital journal archives ensure long-term accessibility and preservation of research outputs.
- **Support for Open Science and Data Sharing:** Many modern journals now integrate supplementary data repositories, multimedia and interactive tools aligning with open science principles and enhancing transparency and reproducibility. Besides Journal resources are indispensable in academia and beyond. They disclose, drive professional excellence and support a culture of critical inquiry and advance-based practice (National, 2019)

THE SIGNIFICANCE ROLE OF MAGAZINE AS AN INFORMANCE RESOURCE

Magazines occupy a unique and valuable position within the spectrum of information resources, serving as a bridge between scholarly content and general readership while not as rigorously academic as journals, magazines provide timely, accessible, and often usually engaging content that plays a vital role in education, professional development, public awareness and cultural exchange via:

1) Current and Topical Information:

Magazines are often published weekly or monthly allowing them to cover current events, trends, and emerging issues more quickly than academic journals. This makes them a critical resource for staying informed about contemporary developments in politics, science, technology, business, and the arts, via:-

- **Accessible and Reader-Friendly:** Unlike technical journals, magazines and articles are written in more approachable language, making complex topics, understandable to a broader audience. This helps promote general literacy and public engagement with important issues.
- **Support for Teaching and Learning:** In education settings, magazines can be used to stimulate discussion, support research, and provide examples of different writing styles persuasive techniques, and journalistic integrity. They are particularly useful in media, communication and language studies.
- **Visual and design literacy:** Magazine contributes to learning through their use of layout, images, info graphics and typography. These elements support multimodal learning and improve visual literacy. Magazines are significant resources that compliment academic and scholarly materials by providing timely engaging and accessible content. Their role in education, industry, media literacy and cultural preservation makes their indispensable in both formal and informal learning environment. (Ibrahim, 2022)

The Role of Government Publications as Information Resources: The integration of big data and artificial intelligence into government publication systems transforms static bureaucratic documents into dynamic interactive and intelligent information resources. This fosters greater transparency, efficiency, citizen participation, and evidence based governance. As Nigeria and other developing nations digitize their public seekers, leveraging these technologies will be the key to unlocking the full potential of government information resources. (Scotish, 2024)

Government publications encompass a broad spectrum of documents – while papers, statistical reports, legislative acts, policy briefs, official gazettes, annual budgets, regulatory guidelines and more issued by national, states and local authorities. As primary sources of authoritative information, they play several vital roles through:

- 1) **Authority and Authenticity:** Official record: Government documents are the legally recognized record of decisions, laws, regulations and policies.
Credibility: Published under the imprimatur of official bodies, they carry inherent trustworthiness and are often used to verify facts in research and legal contexts.
- 2) **Policy Formation and Decision- Making:**

- Evidence Base: Policy makers rely on government statistics (e.g. Census data, economic indicators, health surveys) to diagnose societal needs and craft interventions.
 - Guidance: white papers and strategy dream and articulate government priorities, offering guidance to public agencies private- sector partners and non-profits.
- 3) Transparency and Accountability:
- Open Governance: By publishing budgets, audits, reports and performance evaluations, governments enable citizens and watchdogs to monitor public spending and programme effectiveness.
 - Citizen Engagement: Accessible reports foster informed public debate and participation in democratic processes.
- 4) Public Service Delivery: Regulatory information; Regulations, guidelines and procedure manuals inform businesses and individuals of companies requirements across sectors (eg. Taxation, health and safety, environmental standards).

By providing reliable, comprehensive, and up to date information, Government publications underpin policy making, scholarly research, public accountability and the efficient delivery of services; making them indispensable resources in both professional and academic environments (Danladi, 2018). The importance of gazetteers and atlases as information resources: Gazetteers and atlases are essential geographical reference tools used in Education, research, administration, planning and travel. Though often used together, they serve distinct purposes, such as, educational importance, research and academic use, government and planning, navigation and travel, preservation of historical and cultural knowledge.

However, Gazetteer is a geographical dictionary or directory that provides detailed information about places, names, coordinates, population, administrative divisions, historical background, economic activities and sometimes cultural features. Whole atlas is a collection of maps (physical, political, thematic or historical) often accompanied by charts graphs and statistical data that usually represent the earth's surface or specific regions. (Emmanuel, 2020).

- Educational Importance of Gazetteer: Atlases and gazetteers are core tools for teaching physical geography, population distribution, migration, geopolitics and global awareness. A visual learning, maps in atlases help students understand spatial relationships, terrains, and global interconnectivity more clearly than text alone.
- Research and Academic Use: Location verification: Gazetteers help researchers identify exact locations, alternative names, historical names or administrative classifications of places:
Data support: Atlases support empirical research by providing spatial data and visual representation of trends such as climate patterns, population growth or conflict zones.
- Government and Planning: Urban and regional planning: Planners use gazetteers and atlases to identify boundaries, plan infrastructure or allocate resources.
Causes and Development Projects: Governments use these tools to manage national surveys, monitor demographic changes and design regional development initiatives.
- Navigation and Travel: Tourism and logistics; Travellers and logistics companies rely on maps and gazetteers for route planning, site identification and cultural information:

Emergency Services: These tools help disaster response teams locate affected areas, especially in rural or unfamiliar locations.

- Preservation of Historical and Cultural Knowledge:

Cultural Heritage: Historical atlases and gazetteers preserve knowledge of ancient settlements, changing political boundaries, and past geographic knowledge.

Place Frame Documentation: Gazetteers document indigenous, colonial and modern names and contributions to linguistic and cultural studies (Olusola, 2017)

HANDBOOKS AND MANUALS AS INFORMATION RESOURCES

Handbooks and manuals are essential tools for learning, working, training and governance. They condense complex information into academic formats, support operational efficiency, ensure uniformity and empower users with practical guidance across disciplines.

Handbooks and manuals are vital information tools that serve a wide range of users in academic, technical, professional, and everyday contexts. Though sometimes used interchangeably, they have distinct characteristics: (Nwalo, 2003)

A handbook is a compact often comprehensive reference guide containing essential facts, procedures or principles on a particular subject while a manual is a more detailed instructional document that explains how to perform specific tasks, operate machinery, follow procedures or comply with processes, such as:

- Educational and Academic Use; Curriculum Support: Handbooks provide condensed knowledge in specific fields (For example, engineering science, law, education). Useful for students and teachers alike.

Self-Learning: Both handbooks and manuals allow learners to study and apply information independently, fostering continuous education.

- Technical and Professional Application: Operational guidance, manuals are indispensable in professional settings such as aviation, healthcare, manufacturing and industrial training, where they offer standardized instructions for equipment use, safety procedures and system operations: (Osunnije, 2015)

Best Practices: Handbooks often outline recommended standards, regulations or ethics in professions like nursing, teaching, engineering and public administration.

- Organizational Management: Policy and procedures: Employee handbooks and administrative manuals communicate internal policies, roles, expectations and workplace culture, enhancing transparency and accountability.

Training Resources: They serve as training tools during on boarding and skill development programmes, promoting consistency in task execution.

- Reference and Quick Decision- Making: Ready reference: Handbooks provide quick access to facts, formulas, charts, laws or definitions – ideal for time-sensitive decision making, portability; their structural format makes them easy to carry, consult and apply in the field.

- Standardization and Compliance: Legal and Regulatory Use: Manuals ensure procedures are followed according to legal, technical or institutional standard reducing risks and ensuring compliance.

Quality assurance in industries and education, handbooks help maintain quality by outlining rules for constant practice. (UNESCO, 2016)

THE ROLE OF ELECTRONIC RESOURCES IN THE LIBRARY

Electronic resources have redefined the role of the library from a passive storehouse of books to an active, digital knowledge center. They support academic excellence, expand access to information and facilitate lifelong learning in a technology driven world. Electronic resources are digital materials that libraries provide to support learning, research and information access. These include e-books electronic journals (e-journals) online databases, multimedia, files, institutional repositories and open access resources: With the advancement of information and communication technology (ICT). Electronic resources have become indispensable in modern libraries transforming how information is stored, retrieved and used, for instance:

- **Enhanced Access to Information:**
E-resources provide 24/7 remote access to a vast array of academic materials, removing the limitations of physical space and library hours: users can access global content, including international journals conference proceedings and research databases from any location with internet connectivity.
- **Cost-Effectiveness and Space Management:** digital Collections reduce the need for physical storage space and lower maintenance costs.

Many libraries subscribe to electronic databases that provide access to thousands of titles of a lower cost than print subscriptions.

- **Support for Research and Learning:** e- resources are essentials for academic research, offering advanced search capabilities hyperlinks, citations and multimedia features that enhance learning and discovery. Tools such as citation managers, annotation features, and keyword search functionalities impose research efficiency.
- **Resource sharing, Collaboration, Real- Time updates and Current Information:** electronic resources enable inter library cooperation and consortia-based access, allowing institutions to share resources and reduce duplication of costs. Platforms like JSTOR, EBSCOHOST, Science Direct and HINARI offer shared access of global academic content (Bassey, 2020)

Unlike printed materials, e- resources can be updated in real time, providing the most up-to-date information, particularly useful in fast-changing fields like medicine law and technology.

ROLE OF THE SCHOOL LIBRARY IN PROMOTING READING CULTURE AMONGST STUDENTS

The school library is more than just a room with books. It is a vital educational partner that nurtures the reading habit, supports literacy, enriches classroom learning, and contributes to the holistic development of students. A strong reading culture begins in the library, and its promotion is essential for building informed, thoughtful, and articulate learners. The school library plays a fundamental role in developing and sustaining a reading culture among students. In a world increasingly dominated by digital media and distractions, strong reading habit is vital for academic achievement, critical thinking, creativity and lifelong learning. The school library serves as the cornerstone of this process through the following roles:

- **Access to a wide variety of reading materials:** school libraries provide access to a diverse collection of fiction, non-fiction, storybooks, magazines, newspapers and

reference books tailored to different reading levels and interests. Exposure to a range of genres helps students explore new ideas, cultures and experiences.

- Creating a reading-friendly environment: A well-organised, comfortable and quiet school library encourages independent reading. The presence of reading corners, posters, storytelling zones and book displays, stimulates curiosity and enjoyment.
- Promoting literacy and language development: Libraries support language skills development by exposing students to rich vocabulary, correct grammar and varied writing styles. Regular reading enhances comprehension. Fluency and communication abilities (Bazar, 2017)

CONCLUSION

The application of big data and artificial intelligence on the roles of libraries in contemporary environment, is leading to substantial transformations in low information sources are obtained, utilized and shared to foster global knowledge exchange: The new information environment aims to make information available as well as provide the necessary tools for possible access and utilization of the information resources. The school library plays a central and transformative role in promoting a vibrant reading culture among students. It provides access to diverse and age-appropriate reading materials, foster independent and lifelong learning, supports curriculum and serves as a sanctuary for literary development. Though structured programmes such as book clubs, storytelling and reading competitions, school libraries culture curiosity, imagination and critical thinking, skills essential for academic success and personal growth (Jain, 2020). In an era marked by digital distractions and declining reading habits, the library remains a powerful tool for reviving and sustaining the reading culture especially among children and adolescents. Its ability to offer inclusive access to both print and digital resource makes it a vital component of any-well rounded educational system. (Kovac, 2020).

RECOMMENDATIONS

- Strengthen library infrastructure: Governments and school authorities should invest in well-equipped, modern libraries with a variety of print and digital resources that cater to different interests and reading levels.
- Employ Qualified Librarians: Trained and motivated librarians should be employed to manage library resources effectively and lead reading promotion programmes.
- Integrate library use into curriculum: Library periods should be incorporated into school timetables to ensure regular students engagement with reading materials.
- Promote reading programmes and activities: Schools should organise book fairs, reading weeks, author talks, storytelling sessions and competitions to make reading fun and engaging.
- Encourage parental and community involvement: Parents and local communities should be involved in encouraging reading at home and supporting library initiatives.
- Adopt technology and e-resources: Libraries should include digital content such as e-books, audio books, and online reading platforms to support diverse learning needs and preferences.

- Monitor and evaluate impact: School should regularly assess students reading habits and library usage to measure progress and improve strategies accordingly (Kuhagen, 2016)

REFERENCES

- Ezeji, E. And Asosiva, B. E. (2020), *Reading Promotion Activities in Nigerian School Libraries: Strategies and Challenges*, Library Philosophy and Practices.
- Ifije, G. And Yusuf, F. (2013), *Impact of School Libraries in Students' Academic Performance: the Case of Ogun State Arising*, PALA Quarterly, 77(3)
- Iwhiwhu, B. E., Ruteyan, J. O. and Eshwubare, A. (2010), *Mobile Phones for Library Services: Prospects for Library Services: Prospects for Delta State University Library, Abraka Library Philosophy and Practice*"
- Clark, C. (2016), *National Literacy Trust, 2017 reports*
- Ernst, M. I. (2023), The Crucial role of School Libraries in Influencing Children's Literacy and Learning, *Journal of childhood Literacy and Societal Issues*, 2(1), 32 – 39
- National Literacy Trust (2019), *Understanding the impact and characteristics of school libraries and reading spaces.*
- Reading Zone (2022), *School Libraries Can Have A Transformative Impact.*
- Scottish Libraries (2024), *Impact of School Libraries In Learning.*
- Ibrahim, M. M. and Anka, M. S. (2022), The Place of School Library Services in Promoting Reading Culture of The Basic Education Level in Nigeria. *Rima International Journal of Education*
- Danladi, D. R. and Yohanna, S. R. (2015), *the Role of School Libraries in Promoting Reading Culture among Secretary School Students: A Case Study of Federal Government College, Jos, Library Philosophy and Practice*"
- Emmanuel, S. (2020), *Reading Culture among Students in Selected Secondary Schools in Lagos State. Research Study, Lagos State.*
- Olusola et al (2017), *Assessment of Nigerian School Libraries in The Contemporary Era* (conference Compendium Reference).
- Nwalo, K. I. N. (2003), *fundamentals of Library Practices: A Manual on Library Routines*, Ibadan: Stirling Horden Publishers
- Osunniyi, S.O. (2015), *Role of Librarians in Promoting Reading Culture among Students in Nigerian Secondary Schools.* Nigerian Libraries
- UNESCO (2016), *Reading in the Mobile Era: A Study of Mobile Reading in Developing Countries, Paris.* Unesco Publishing.

Bassey, M. M. (2020), *Innovation and Entrepreneurship Education in Library Science Profession in Nigeria Education: The Way Forward*.

Bazer, A. (2017), E-resource and its uses in the Library, *Journal of Critical Reviews*, 7(8). 3583 – 3592, *Collection Management, Libraries and the Academy*. 13(2): 187 – 211

Jain, M. and Gupta, S. (2020), *An Overview of Open Access Institutional Repositories: Policy Planning and Implementation*, 1 -11

Kovac, S. (2020), *Developing Staff Competency for Effective, Acquisition and Maintenance of Electronic Resources* <https://www.taistonline.org>

Kuhasen, J. And Mansfield, T. (2016), *Bibframe: The Bibliographic Framework Initiatives Library Resources and Technical Services* 60(3), 165 – 179

Okoye, M.O. (2012), *Management of Electronic Resources by Cataloguers in Nigeria Federal University Libraries*. <http://www.digitalcommons.uni.edu>.