

ARTIFICIAL INTELLIGENCE (AI) IN NIGERIAN EDUCATION: A NECESSITY FOR SCHOOL RECORDS MANAGEMENT

Dr. BALA, BAKWAI KWASHABAWA; KOLAPO, PETER OLUWAYOMI AND ONAOLAPO, SAFURAT AHMED

Department of Educational Foundations,
Faculty of Educational and Extension Services,
Usmanu Danfodiyo University, Sokoto, Nigeria

E-Mail: bakwaibala@gmail.com/GSM-No.: 08035448236; E-Mail:
kolapoyomi@gmail.com /GSM-No.: 08160018808; E-Mail:
onaolapoahmed42@gmail.com /GSM-No.: 08056776464

ADENIRAN, DEBORAH OPEYEMI

Department of Business Administration,
Faculty of Management Science,
Usmanu Danfodiyo University, Sokoto, Nigeria

E-Mail: yemmiadeniran@gmail.com

GSM-No.: 08129600720

Abstract

The Nigerian education system faces persistent challenges in school records management at both ministry and school levels, necessitating a prompt and sustainable solution. Effective management of this data is critical, as high-quality, timely, and reliable information underpins sound decisions about future planning, current activities, and monitoring. Thus, a robust Management Information System (MIS) is essential to generate the necessary data for informed decision-making. MIS, a synergy of computer, communication, and electronics, enables the acquisition, processing, storage, and dissemination of various forms of information—vocal, textual, pictorial, and numerical—using micro-electronic equipment. The adoption of Information and Communication Technology (ICT) facilitates rapid information distribution, reflecting how ICT has reshaped society, including the education sector. Integrating Artificial Intelligence (AI) into school records data management offers a revolutionary path forward, enabling educational institutions to streamline processes, gain deeper insights into academic performance, improve decision-making, and ultimately enhance student outcomes by leveraging advanced AI technologies.

Keywords: Artificial Intelligence (AI), Education, School Records and Record Management

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Introduction

Artificial Intelligence (AI), as defined by Ogunode, et al. (2024), is the field of machine learning and robotics that aims to emulate human intelligence, enabling machines to perform tasks like learning, reasoning, and problem-solving. This technology has wide-ranging applications in sectors such as healthcare, finance, transportation, and education, where it has the potential to revolutionize entire industries. Similarly, Gaber, et al. (2023) and Madu and Musa (2024) characterize AI as a subfield of computer science dedicated to creating intelligent agents—systems that can reason, learn, and act autonomously, simulating or surpassing certain aspects of human intelligence.

The transformative power of AI extends directly to the crucial function of records management, particularly within organizations like educational institutions which generate vast amounts of data that require efficient handling.

AI possesses the capability to execute all records management activities—including record creation, automated classification, digitalization, storage, retrieval, and disposal—far more rapidly and efficiently than humans (Modiba et al., 2023; Modiba, 2021; Modiba, 2022). As highlighted by Modiba et al. (2019), archivists and records management professionals, particularly in contexts like South Africa, can harness advanced technologies like AI to streamline and enhance the efficiency of their existing processes.

One specific records management activity that can be seamlessly executed through AI is records imaging (Modiba et al., 2023). Record scanning, commonly referred to as digitization, involves the conversion of various physical formats—such as paper files, microfilm rolls, microfiche, and larger paper records—into digital data suitable for storage and processing (Meshds, 2022).

Artificial Intelligence (AI) and School Record Management

The school is an institution defined for the teaching of students under the direction of teachers. Effective administration is paramount to achieving the school's objectives. School administrators, typically principals, are responsible for the daily routines geared toward the attainment of educational goals (Oyedimo, 2015).

For the objectives of education to be fully actualized, the administrator must effectively maintain quality school records. An administrator's effectiveness is measured by their ability to provide a crucial link between the various parts of the school system and to ensure smooth communication and transmission of information throughout.

Considering the multifarious duties of the principal and the complexity of administration, particularly in public secondary schools, principals urgently require the support of Information and Communication Technologies (ICTs) for effective management. Educational management must evolve to keep pace with global changes.

The integration of ICT, of which Artificial Intelligence (AI) is a subset, is a key area where technology has influenced society. Yusuf (2011) noted that ICT evolved from the need to shift information management to a faster and easier handling of the enormous data available to users. In this regard, the use of AI is an indispensable tool for effective educational administration and school management.

AI Integration into School Record Management

AI plays a pivotal role in records imaging, where robotic scanners and AI-powered software collaborate to create machines embedded with algorithms for efficient digitization (Ripcord Company, 2019). These AI-powered robotic machines can not only remove staples from papers but also streamline the sorting and digitization processes, achieving faster results (Ripcord Company, 2019; Modiba, 2021).

Here are several ways on how AI can be integrated into school record data management:

Automated Data Entry and Grading

Automated data entry and grading are primarily used to save time and have various applications:

AI-Powered Grading Systems: These systems assist in grading assignments, quizzes, and exams (especially multiple-choice or short-answer questions) with high accuracy. For instance, AI-based systems can grade assignments or essays by analyzing key elements like structure, grammar, and content relevance, significantly reducing the administrative burden on teachers.

Data Capture from Physical Documents: OCR (Optical Character Recognition) and AI-powered scanning tools can automatically digitize handwritten or printed exam papers and homework, which reduces manual data entry errors (Retrieved from <https://discover.aveva.com>).

Data Analytics and Reporting

AI integration into school records management is also crucial in data analysis and reporting, involving the following:

Performance Analysis: AI can be used to analyze ** large volumes of student performance data**, identifying trends, patterns, and areas where students are excelling or struggling. This is accomplished through predictive analytics, which forecasts student performance, and clustering algorithms, which group students based on similar learning needs.

Personalized Reports: AI can generate custom reports for students, teachers, and administrators, providing valuable insights into academic progress. These reports can be tailored to individual needs, highlighting areas for improvement, strengths, and performance trends over time.

Early Warning Systems: Machine learning algorithms can predict students at risk of underperforming or dropping out by analyzing past results, attendance, and behavior. These early alerts can then trigger timely interventions such as tutoring or counseling (Retrieved from <https://discover.aveva.com>).

Applications of Artificial Intelligence in School Record Management

The importance of feedback is imperative in all data management systems as it serves to validate system responses and maintain their integrity. Natural Language Processing (NLP) is a key technology for deriving meaningful feedback, employing several forms in an educational context:

Automated Feedback Generation: AI, utilizing NLP, can generate personalized feedback for students based on their performance in assignments or examinations. This feedback is designed to be specific, actionable, and insightful, directly helping students identify areas for improvement.

Sentiment Analysis: NLP enables AI to assess student responses and performance data to determine emotional or behavioral trends. This includes identifying indicators of disengagement or anxiety, providing valuable, early information for teachers to act on (Avena, 2024).

Adaptive Learning Platforms

Adaptive learning platforms refer to AI-powered software capable of performing complex human-like instructional characteristics. These systems include the following applications:

Personalized Learning Paths: AI-powered platforms leverage student performance data to create individualized learning pathways. These systems dynamically adapt to a student's learning style, performance, and pace, ensuring the student receives the appropriate level of challenge and support.

Intelligent Tutoring Systems (ITS): ITS can design personalized tutoring experiences based on real-time student performance data. These systems adjust their teaching strategies and content delivery to meet the student's evolving needs (Avena, 2024).

Predictive Analytics for Course Planning

Effective education relies on proper planning and forecasting of essential curriculum and resource needs. This process can be significantly enhanced through various AI predictive analytics applications:

Curriculum Optimization: AI analyzes trends in academic performance to help educators adjust their curriculum based on what is proving most effective for students. For instance, if a large number of students struggle with a specific topic, the curriculum can be modified to better address those learning gaps.

Enrollment Predictions: AI systems can forecast future enrollment trends based on historical performance data. This allows school administrators to better allocate resources and plan staffing levels for upcoming academic terms (Avena, 2024).

Secure and Efficient Data Management

Ensuring data security is of paramount importance and must be prioritized by any organization managing sensitive data. AI-powered platforms are essential for both efficient and secured data management:

Data Security: AI-driven systems are deployed to secure sensitive student data, ensuring compliance with privacy regulations like GDPR or FERPA. These systems utilize encryption, access control, and automated auditing to protect personal and academic information.

Data Integration: AI can seamlessly integrate with existing Learning Management Systems (LMS) and Student Information Systems (SIS), creating a unified platform for managing, storing, and analyzing student performance data (Avena, 2024).

Automated Data Cleaning and Consistency Checks

Ensuring qualitative data is essential for informed decision-making. AI is integrated into data cleaning processes to maintain the integrity of school records:

Data Cleaning: AI can automatically identify inconsistencies, errors, or duplicates in student data, ensuring that records are up-to-date and accurate. This significantly helps in eliminating human errors during data entry or processing.

Anomaly Detection: AI algorithms are trained to spot anomalies or outliers in student performance, such as unexplained spikes or drops in grades, ensuring that such issues are flagged for immediate review (Avena, 2024).

Communication and Collaboration

Peer-to-peer learning is a valued teaching method that improves learning ability among students. AI-powered platforms support communication and collaboration through:

Chatbots for Student Support: AI chatbots can handle routine queries from students, parents, and teachers related to results, grading policies, schedules, and academic performance. This provides faster responses and reduces the administrative workload.

Collaboration Tools: AI can assist in creating platforms for teachers, parents, and students to collaborate on academic progress. Examples include automated progress tracking, discussion boards, or virtual parent-teacher meetings to improve overall communication (Avena, 2024).

Customizable Dashboards for Stakeholders

AI enables the creation of tailored dashboards for school administrators, teachers, and students to capture information relevant to their specific roles. AI platforms facilitate such customization:

Dashboards for Administrators: AI provides administrative dashboards that visualize trends in student performance, attendance, and behavior. Administrators leverage this data to make informed decisions regarding resource allocation, faculty development, and school policies.

Teacher Dashboards: Teachers use AI-enhanced dashboards to quickly identify students who require additional support or enrichment. They can track individual or class-wide performance trends and adjust their instructional strategies accordingly (Avena, 2024).

Scalable and Cloud-Based Systems

Facilitating scalable and cloud-based systems is critical for modern data management. AI-powered solutions enable:

Cloud Integration: AI-powered data management systems are often hosted on the cloud, ensuring scalability, easy access, and data sharing across different stakeholders (teachers, students, administrators). This also allows for real-time updates and instant feedback.

Data-Driven Decision-Making: AI empowers school administrators to make data-driven decisions regarding academic performance, resource allocation, and even staff recruitment based on the evolving needs of the school (Avena, 2024).

Benefits of AI Integration in School Record Management

The integration of AI into school record management yields numerous benefits (Lessonbud, 2024):

Efficiency: AI promotes efficiency through the automation of tedious data entry and grading tasks, allowing teachers and administrators to focus on more meaningful interactions with students.

Accuracy: It significantly reduces human errors in data entry and analysis, ensuring more reliable results and reports.

Personalization: AI offers tailored learning experiences and feedback, fostering a more individualized approach to education.

Predictive Power: It anticipates future trends, helping educators proactively address academic challenges before they become significant issues.

Real-Time Insights: It provides instant access to data insights, enabling quicker decision-making and timely interventions.

Challenges of Using AI in School Record Keeping

The major bottlenecks in using AI for school record keeping include:

Data Privacy and Security: Schools must ensure that AI systems comply with data privacy laws (e.g., GDPR, FERPA) and securely manage sensitive student data. The risk of data theft remains a serious concern on most AI platforms (Run:AI, 2024).

Teacher Training and Integration Time: Teachers may require extensive training to effectively utilize AI tools in the classroom and for data management. This need for upskilling can lead to a longer time for the full integration of AI into the school system (Run:AI, 2024).

Algorithmic Bias: AI models must be monitored for fairness, as algorithms can sometimes perpetuate bias, particularly if the training data lacks diversity.

Implementation Cost: While AI can lead to long-term cost savings, the initial investment in AI infrastructure, software, and training can be substantial.

Suggestions on the Effect of Using AI on School Record Keeping

Based on the complex landscape of integrating AI into education and school data management, the following recommendations are offered to harness the benefits while mitigating the challenges (Ayeni et al., 2024):

Promote Ethical Guidelines and Standards: Establish clear ethical guidelines and standards for the application of AI in education. Emphasize the importance of security, fairness, transparency, and accountability in AI systems to proactively address concerns related to biases and discrimination. Educational institutions should be encouraged to adopt and adhere to these standards.

Invest in Teacher Technical Training: Provide extensive training programs for educators to enhance their understanding and utilization of AI tools. This training should encompass not only technical skills but also ethical considerations, ensuring teachers can effectively and responsibly integrate AI into their teaching methodologies.

Facilitate Interdisciplinary Collaborations: Foster collaborations between educators, technologists, ethicists, policymakers, and other stakeholders. Interdisciplinary partnerships provide holistic perspectives, ensuring that the implementation of AI in education is well-rounded and addresses various dimensions, including pedagogical, ethical, and technological considerations.

Conclusion

The integration of artificial intelligence into school records and data management represents a compelling evolution in educational systems—offering both transformative benefits and critical challenges. On the upside, AI can dramatically

streamline administrative tasks: from automating grading and attendance tracking to synthesizing performance data into actionable insights. This alleviates teacher workload, supports timely interventions, and empowers administrators with real-time visibility into trends and resource needs. AI's capacity to recognize patterns enables tailored learning paths that adapt to individual student needs, from pacing to content focus, thereby enhancing engagement and fostering academic growth—ultimately improving learning outcomes and institutional efficiency.

However, the path forward must be trodden thoughtfully. Foremost among the concerns are data privacy and security. As AI systems collect and process vast, sensitive student information, they become prime targets for cyber-attacks, breaches, or misuse by third parties. Risks such as inadvertent exposure, over-collection of data, and opaque data-sharing practices can compromise student privacy. Equally critical is the threat of algorithmic bias. Without diverse, carefully audited datasets, AI systems can reinforce existing inequities—delivering skewed assessments, placements, or recommendations that disadvantage certain student populations. Added to this, concerns about over-dependence on technology remain valid: AI should augment, not replace, the human connection and empathy that educators bring.

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