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Cataloguing in the Digital Era: Application of Systems and Standards in Ghanaian Academic Libraries

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ABSTRACT

Academic libraries in Ghana have made progress in the adoption of integrated library management systems. This study sought to find out the application of systems and standards in cataloguing information resources in Ghanaian Academic libraries. Interviews and questionnaires were used to solicit response from four academic libraries in Ghana. The study identifies lack of implementation of the current international cataloguing standard; Resource Description and Access (RDA) and also low level of knowledge and use of BIBFRAME and Dublin Core metadata standards.

KEYWORDS

Academic libraries; cataloguing systems and standards; digital cataloguing

Introduction

Cataloguing, a fundamental process in libraries, involves the creation of descriptive and subject access points for library resources to aid in their retrieval and use (Alemu, 2023 and Sangam, 2015). With the advent of digital technologies, cataloguing practices have evolved to accommodate the new digital resources that are being created and used in libraries; e-books, electronic journals, and online databases are some notable examples (Wang, 2021). This has been made possible with various digital technological platforms widely available in libraries. This phenomenon has been described by Otike et al. (2024) as an innovative trend in libraries.

Digital technology has therefore become a significant tool employed by librarians to improve their service delivery. The internet and the web have brought about changes in technology that have transformed cataloguing practices and reorganized cataloguing standards. There has been a drastic change in cataloguing practices, from the publication of Panizzi's 91 Rules for the British Museum in 1841, which marked the beginning of the advancement of modern cataloguing goals and concepts. This momentum continued to grow, culminating in Charles Cutter's Rules for Descriptive

Cataloguing in 1904. The first Statement of International Cataloguing Principles (ICP) was also formally adopted in 1961 and remained applicable throughout the 1970s and 1980s when new cataloguing standards such as AACR and AACR2 were developed. With the release of the first three Functional Requirements (FR) models in 2003, the rate of change increased (Miksa, 2021).

With the current trend of change, which is with the adoption of digital technology, libraries are utilizing Library Management Systems/Integrated Library Systems/Library Service Platforms (ILS/ILMS/LSP) to catalog information resources. ILS/ILMS have transformed into Library Service Platforms (LSP) and keep evolving to accommodate the changing needs of the information environment (Liu & Shao, 2024). LSPs are mostly cloud-based platforms that support the integration of print and electronic resources management with a unified platform (Cote & Ostergaard, 2017; Katulić & Katulić, 2025). Creating and modifying bibliographic records, automating procedures like data validation and authority control, and controlling the overall cataloguing process are all capabilities provided by these tools that simplify the cataloguing process. Popular LSPs, including Koha, Innovative Interface's Sierra, and Ex Libris' Alma, have been implemented across academic libraries in Ghana (Ocloo & King, 2022b). However, the concepts, Library Management Systems/Integrated Library Systems/Library Service Platforms (ILS/ILMS/LSP) are used in this study interchangeably.

However, in the rapidly evolving landscape of information management, Ghanaian Academic libraries are faced with challenges that prevent them from exploiting the full potential of the LSPs that have been implemented for cataloguing practices to meet the demands of the digital era. The twenty first century Academic Libraries are moving away from traditional service provision (physical/hard) to a more contemporary service provision (ICT/virtual). Academic libraries' new approach to service delivery is motivated by the increasing demand of users from different geographic locations and convenience. To meet these changing demands, libraries are implementing new strategies to aid the discovery of information resources. One of such major changes is the move from Anglo American Cataloguing Rules (AACR2) to Resource Description and Access (RDA) as the recommended cataloguing standard (Li, 2013), which has extended the scope of descriptive cataloguing. Despite these changes, very few studies have discussed how academic libraries are leveraging LSPs and standards in relation to current cataloguing practice globally and in Ghana (Dzandza, 2019; Ocloo & King, 2022a; Yeboah, 2018). This study seeks to investigate current cataloguing practices in selected academic libraries in Ghana in relation to how they utilize available LSPs for cataloguing, identifying challenges faced during their implementation and proposing some strategies to

enhance the effective application of LSPs and standards in the digital era, with the following objectives:

- To examine the current cataloguing systems and standards employed by the selected Ghanaian Academic libraries.
- To assess the extent of use of Integrated Library Systems (ILS)/Library Service Platforms (LSPs) for cataloguing in Ghanaian Academic libraries.
- To determine the extent of adoption of international metadata standards in cataloguing processes within Ghanaian Academic libraries.
- To ascertain the benefits realized by Ghanaian Academic libraries through the application of ILMS/LSPs and standards.

By addressing these issues, the researchers have contributed valuable insights that can guide libraries in Ghana toward enhancing their cataloguing efficiency and bring to bear some benefits in adopting these digital technologies as far as information organization and retrieval is concerned.

Literature review

The adoption of Integrated Library Systems/Library Management Systems/Library Service Platforms (ILS/LMS/LSP) has streamlined cataloguing workflows. Automation and machine learning techniques, such as artificial intelligence, have also shown promise in improving metadata creation and quality control processes (Hider, 2014). As technology evolves and user needs change, cataloguing practices have also adapted to meet the demands of the digital age. There are several such trends of technology within the cataloguing profession.

Cataloguing standards and schemas in the digital era

Cataloguing Standards and Schemes are the tools and resources used by cataloguers in carrying out their duties. Metadata standard is a set of rules and guidelines that are used to govern the structure, content and encoding of metadata. They help define the elements, attributes and values that are used to describe and represent information materials. In addition, they ensure interoperability, consistency and metadata exchange across different platforms (Alemu, 2023).

Metadata standards play a crucial role in facilitating efficient access and retrieval of digital resources in academic libraries. Inadequate description of data resources in the electronic environment prevents the resources from being retrieved and indexed. The use of metadata lays the foundation for effective retrieval (Ostani et al., 2024). The International Standard

Bibliographic Description (ISBD) from IFLA provides specific requirements to guide how both published and unpublished resources are to be described for identification in library collections (Escolano et al., 2021). The ISBD stipulates data elements and the sequence in which they should be described, and it is the basis on which all cataloguing rules should be established (Escolano et al., 2021). The adoption of standardized metadata schemas, such as MARC, PREMIS, LIDO, SPECTRUM, MODS, MIX, ISAD, METS, TextMD, OAI-PMH, EAD, OAIS, FRBR, VRA Core, CIDOC-CRM, RiC, Dublin Core, and Resource Description and Access (RDA), etc., are some of the metadata standards for managing electronic resources to enable consistency and interoperability in different environments (Ostani et al., 2024; West et al., 2011).

These standards allow libraries to provide accurate and comprehensive descriptions of resources, including authorship, subject classification, and other relevant information. Cataloguing standards have been noted to have evolved alongside technological trends (Wahid et al., 2018). Salse et al. (2024) noted the main metadata standards used in libraries as data structure standards (MARC and BIBFRAME) and data content standards (Anglo-American Cataloguing Rules (AACR) and Resource Description and Access (RDA), which are discussed as follows:

Resource Description and Access (RDA): In 2004, the Joint Steering Committee for Development initiated the development of a new standard to meet the changing requirements and behaviors of library users, as well as addressing the limitations of AACR2 in accurately defining the various types of resources offered by libraries (Nwachi, Ihekwaaba and Nwafor, 2021).

Monyela (2020) recorded that, RDA is a new cataloguing standard built for the digital world, which was basically designed on the foundations of the principles of the Anglo-American Cataloguing Rules (AACR). RDA offers an all-inclusive set of instructions and guidelines on resource description and access covering all types of content and media in cataloguing, especially in this digital era.

Monyela (2020) investigated the challenges associated with RDA implementation in libraries in Sub-Saharan Africa and found that AACR is still used in many libraries in Africa. The study revealed that in Sub-Saharan Africa, RDA is gradually being implemented. However, its challenges are mainly related to power and internet connectivity supply, ICT skills, ILS systems, training and funding. This led to recommendations such as consortia formation, alternative power supply, and offering of training opportunities, among others (Monyela, 2020). To aid in the effective implementation of RDA in Africa. The above is confirmed by

Yeboah (2022), who identified that financial investment in the practice of RDA is low and recommends an increased financial allocation, collaboration and networking among cataloguers in Ghanaian academic libraries.

MARC (Machine-Readable Cataloguing): MARC is a format widely used for encoding bibliographic data. It has been adapted for digital resources and is commonly used in library systems to create and exchange catalog records. By 1971, MARC formats had become the official national standard for disseminating bibliographic data in the United States, and two years later, they were adopted as the international standard. Over time, the MARC 21 family of standards has expanded to encompass formats for authority records, holdings records, classification schedules, and community information, in addition to the original bibliographic records format (Khurshid, 2002). Yeboah (2018), observed that the usage of MARC format has enhanced accuracy and provided greater flexibility compared to other forms of library catalogues. It allows the OPAC records to be created and customized to meet the specific needs of a library while maintaining cataloguing quality and adhering to established standards.

Dublin Core: Dublin Core has been noted as a data structure standard for interoperability (Salse et al., 2024). As information increasingly moves to the web, it's no surprise that the concept of metadata is becoming popular beyond the realm of libraries. This shift has led to the emergence of numerous new metadata standards, with Dublin Core being a notable example. In digital library projects, several of these newly introduced metadata standards have been put into practice and evaluated. Among them, the Dublin Core metadata standard has been frequently chosen. The basic or "core" qualities of an information object are described by the 15 simple parts that make up the Dublin Core metadata standard. Its simplicity is deliberate, in part to make it simple for content creators outside of libraries to use this standard on the web. While many people value the simplicity of Dublin Core, some people would prefer a more complex and structured approach to metadata (Guinchard, 2002).

BIBFRAME (Bibliographic Framework Initiative): BIBFRAME is an initiative by the Library of Congress to develop a new data model for bibliographic data in the digital age (Alemu, 2023). It aims to replace the MARC format and transition to a linked data environment, allowing richer and more flexible resource description. There are a number of limitations associated with MARC21 that necessitate its replacement. MARC 21 has a usage limitation as it is used by only the library

community and largely ignored by outsiders. Again, MARC21 structure is rigid, and until a specific tool is built to work with it, it is often challenging to efficiently extract metadata from MARC 21 records. These difficulties hinder the unified integration of MARC 21 metadata with metadata originating from other sources. Additionally, records encoded in MARC 21 are entirely self-contained. This means that even when multiple resources share identical metadata elements, these elements must be encoded individually and separately for each record, which can be quite tedious (Marcum, 2011).

Balster (2018) explained that BIBFRAME is built using ontology web technology and Resource Description Framework (RDF). BIBFRAME has a wider scope, which covers the library, museum and archives world, though it is similar to MARC 21's scope. BIBFRAME is built to support interoperability with outside ontologies or data models and is planned to allow metadata to exist on the web in a linked data environment (Fortier et al., 2022). The adoption of BIBFRAME in the context of African libraries presents both opportunities and challenges. A study focusing on Nigerian cataloguers revealed that while there is significant interest in BIBFRAME, its practical application remains in the early stages. The study emphasizes the need for comprehensive training and development programmes to fully leverage BIBFRAME's capabilities in improving information resource discovery and integrating cataloguing data into the World Wide Web (Haliru, 2021).

Library management systems (LMS) for cataloguing in academic libraries

Lwoga et al. (2010) stated that libraries, as information management organizations, require systems that operate with a business-like approach to support, manage, and deliver services efficiently. The establishment of an information and communication technology infrastructure is considered the ideal foundation for managing information within these information centers. Consequently, libraries have embraced information systems (ISs) to enhance the visibility of their resources and facilitate their development efforts. One major information system that has been implemented in libraries for cataloguing and other activities is the Library Management System.

Ocloo and King (2022b) elucidated that the Library Management System is a computerized software or application designed to help manage and organize various tasks and activities in a library. It serves as a digital tool to handle library operations efficiently and provide better services to library users. A Library Management System's main goal is to facilitate the seamless integration of various library functions, which encompass activities such as circulation, cataloguing, serials management, indexing, acquisitions and the OPAC to streamline and automate tasks that were traditionally

done manually, making library operations more efficient and accessible. LMS/ILMS have become cloud-based services with multiple functionalities that enable integration of work in a virtual environment and the discovery of information resources using advanced search features (Katulić & Katulić, 2025 and Liu & Shao, 2024). Thus, the application of Library Management Systems in academic libraries has reached a highly advanced stage, especially in the developed nations where a collaborative approach has allowed member libraries to adopt common Library Management Systems, ensuring consistency and standardization in the way they manage and provide access to their resources and services (Ocloo and King, 2022a). These automated systems not only save users valuable time but also allow libraries to achieve cost savings in their operations (Dzandza, 2019). Also, Yeboah (2022) noted that the availability and use of Integrated Library Management Systems have been a major enabler of the adoption of online cataloguing methods in university libraries in Ghana. The inconsistent and patchy success in library automation initiatives has now been adequately handled. Furthermore, this observation aligns with the findings of Abdussalam and Saliu (2014), who noted that the implementation of an ILMS has enabled academic libraries in Africa to enhance their collaboration with libraries in more advanced countries. This collaboration is achieved through the contribution of MARC (Machine-Readable Cataloguing) records to bibliographic utilities like OCLC, thereby facilitating greater access to global library resources and knowledge sharing.

Benefits of cataloguing with LMS/ILMS/LSP in academic libraries

LMSs/ILMSs/LSPs have transformed the landscape of information access and management, providing users with unprecedented opportunities to explore, discover, and utilize vast collections of digital resources. Cataloguing with ILMSs enables libraries to provide seamless access to their collections and enhance the discovery of resources through search functionalities, as opined by Dadzie (2005). Holcombe-James (2022) asserts that cataloguing with ILMSs provides enhanced accessibility and discoverability of library resources, benefiting both libraries and users. Online catalogues enable users to access library collections remotely, facilitating 24/7 availability of resources. Schönfuß et al. (2021) also hold the view that digital catalogues offer advanced search capabilities, allowing users to locate materials quickly based on various criteria such as author, title, subject, and keyword. Additionally, these systems often incorporate metadata and tagging features that improve resource discoverability, leading to a more efficient and personalized search experience.

Jasiewicz et al. (2015) also hold the view that cataloguing with ILMSs enables academic libraries to showcase their entire collection, including

physical and digital resources. By integrating digital materials such as e-books, electronic journals, and multimedia content into the catalog, it provides users with a comprehensive view of available resources. Additionally, using linked data, cataloguing systems provide real-time available information for physical materials (Hallo et al., 2016). This view by Hallo et al. (2016) is buttressed by Bamgbade et al. (2015) who also intimated that users can easily determine whether a specific item is on the shelf, on loan, or reserved, enabling them to plan their research or study effectively. Such information reduces frustration and improves the efficiency of resource utilization, enhancing the overall user experience.

Another benefit of cataloguing with ILMs as exposed by Hamzat and Mabawonku (2018) and Ayoku, Okafor, (2015) is its ability to often integrate collaboration and social features, enabling users to interact with others and share resources. Features such as user reviews, ratings, comments, and sharing options facilitate knowledge exchange and collaborative learning. These social functionalities contribute to a sense of community within the academic library, fostering collaboration and engagement among users.

Methodology

This research was developed through the following stages. First, a list of academic libraries in Ghana was compiled, and the identification of universities was conducted in consultation with secondary data provided on the universities' websites in Ghana. The researchers purposefully selected four academic libraries based on their high level of LMS implementation. The information obtained from the websites helped in identifying the number of staff in each library. The selected libraries are: the Balme Library of the University of Ghana (UG), Prempeh II Library of Kwame Nkrumah University of Science and Technology (KNUST), the Main Library of the University of Development Studies (UDS) and the Sam Jonah Library of the University of Cape Coast (UCC).

The second stage entails contacting the librarians to identify staff members involved in cataloguing at both the operational and policy levels of the academic libraries. As a result, a list was compiled of 90 staff who were identified with roles that directly relate to this study and served as the target population and sample size for the study (Table 1).

Both qualitative and quantitative data were collected. The researchers interviewed four heads of the cataloguing unit or their representatives and administered a questionnaire to the rest of the 86 staff. Out of the total of 86 participants who were sent the questionnaire, 62 responded.

The quantitative data was analyzed using frequencies represented with tables and charts, whilst the qualitative data, derived from interviews, were subjected to content thematic analysis. The answers were divided into

Table 1. Population of the respondents in the four academic libraries.

Respondents' institutions	Balme library (UG)	Prempeh II library (KNUST)	The main library (UDS)	Sam Jonah library (UCC)	Total
Head cataloguers	1	1	1	1	4
Deputy cataloguers	1			1	2
Reader/reference/Student support services	11	1	25	11	58
Staff of the cataloguing sections	4	8	6	8	26
Totals	17	20	32	21	90

specific themes that connected the gathered data with the research objectives.

Interviewees from the four libraries were represented with the following codes:

Interviewee 1: Librarian from the University of Cape Coast (UCC)

Interviewee 2: Librarian from the University of Development Studies (UDS)

Interviewee 3: Librarian from the Kwame Nkrumah University of Science and Technology (KNUST)

Interviewee 4: Librarian from the University of Ghana (UG)

Findings

Background information of respondents

The breakdown of the 62 respondents to the questionnaires according to institutions use for the study is as follows: University of Ghana (UG) 13(21%), Kwame Nkrumah University of Science and Technology (KNUST) 11(17.7%), University for Development Studies (UDS) 28(45.2%), University of Cape Coast (UCC) 10(16.1%).

With regards to the section in which the respondents work, twenty-nine (46.7%) of the respondents of the study were in the cataloguing sections/departments (UG 4, KNUST 9, UDS 7, UCC 9). The circulation/reference hall/student support services/Reader Services/client services had 33 respondents, which represented 53.2% (UG 9, KNUST 2, UDS 21, UCC 1).

The years of work of the respondents to the questionnaire are classified into five distinct groups, as shown in [Table 2](#).

Use of a manual or automated cataloguing system

The researchers enquired from participants through the quantitative data collected whether the libraries are using manual or automated cataloguing systems. The findings indicate that, out of the 62 responses, 12(19.4%) of the participants indicated they are using manual cataloguing processes for some materials (UDS 4, UG 3, UCC 4, KNUST 1). While 44(80.0%) reported that their library heavily relies on automated cataloguing systems

Table 2. Number of years of work of respondents.

Working experience	Frequency	Percent
1-2 years	9	14.5
3-5 years	20	32.3
6-10 years	10	16.1
More than 10 years	23	37.1
Total	62	100.0

for efficient processing of library resources (UG 10, KNUST 9, UDS 20, UCC 5). Six (9.7%), however, reported that they combine both manual and automated processes depending on the type of materials or collection being processed (UDS 4, UCC 2).

Implementation of integrated library system (ILS)/ library service platforms (LSPs)

According to the findings based on the questionnaire, 100% of the respondent agreed that their libraries have an Integrated Library System in place. The result from the interviews also gathered that all four librarians acknowledged that an Integrated Library System have been duly implemented. All four (4) interviewees from the four institutions that responded to this question affirmed this statement by providing information on the various years of implementation, that is, between 2009 and 2017, as can be seen in the statements below:

Interviewee 1: University of Cape Coast (UCC) Library

Implementation of the integrated library system began around 2010. By the time I joined the university in 2012, the system was already in use

Interviewee 2: University of Development Studies (UDS) Library

Integrated library management practices were introduced more recently, around 2016/2017

Interviewee 3: Kwame Nkrumah University of Science and Technology Library

Digitisation and automation efforts had been undertaken before 2014. That was before I joined the University

Interviewee 4: University of Ghana (UG) Library

Automation efforts date back as far as the 1990s, and by 2009, the library was fully automated.

Library management systems in use

From the findings of the study, responses from the respondents through the questionnaire about the library management system or software used

revealed that thirty-eight (58.9%) respondents indicated they use Koha (UDS 28, UCC 10), 13 (27.8%) use Sierra (UG), 11 (13.3%) use Alexandria (KNUST). Findings from the four interviewees revealed that the University of Cape Coast Library uses Koha, the University for Development Studies (UDS) uses Koha as their ILMS, and this aligns with the trends among Universities in Ghana to adopt flexible and cost-effective open-source systems. However, Kwame Nkrumah University of Science and Technology (KNUST) and the University of Ghana, as at the time of the interview, were using proprietary systems; Alexandria and Sierra ILMSs, respectively. The librarian at KNUST, however, gave a hint that plans are far advanced to migrate to the Koha system due to the challenges they face with their current system.

Modules of the LMS/LSP used in the various libraries

The three Integrated Library Management Systems (ILMS) in use across the University libraries, Koha, Alexandria and Sierra, offer a wide range of modules designed to support different aspects of library operations. Koha provides modules such as Cataloguing, Acquisition, Circulation and Patron Management, Serials Management, OPAC/Discovery, Reporting and Analytics, as well as Standards and Integration tools that enable interoperability with other systems. Sierra, on the other hand, offers a similar suite of modules, including Cataloguing, Acquisition, Circulation, User/Patron Management, Serials/Periodicals, OPAC/Discovery, Reporting, and Administration and Settings, reflecting its comprehensive proprietary structure. Alexandria also integrates multiple modules, among them Cataloguing, Circulation, Acquisition and Serials Management, Patron Management, OPAC/Discovery, Reporting and Analytics, Inventory Management, Custom UI and External Integration, and Mobile and Self-Service features. Respondents were asked to indicate which modules in the LMS are being used in their various libraries. From the quantitative data, 38 (61%) of the respondents from the cataloguing sections indicated they use the cataloguing module, whilst 13(21%) use the circulation module, and lastly, 11(18%) of the studied population use the OPAC system. This is shown in [Figure 1](#).

When the interviewees were asked about the specific modules used in the LMS in their various sections in the libraries, they provided the following responses:

Interviewee 1:

The library is automated, and we use the library management software for cataloguing and circulation purposes

Interviewee 2:

The LMS is used for cataloguing and circulation

Interviewee 3:

You know Koha is integrated, so acquisition have their modules, periodicals have their modules, cataloguers have their modules, the client services have theirs, but we use the cataloguing module in our operations

Interview 4:

Our library management system is integrated, so we use the cataloguing and circulation modules mostly

From the above narrations, the four libraries use cataloguing, circulation and OPAC modules. Cataloguing sections/departments use the cataloguing module, whilst the circulation, reference and student support use the circulation module.

Types of cataloguing standards used in the libraries studied

Descriptive cataloguing standards

The quantitative data collected for this study revealed that with regard to descriptive cataloguing standards, AACR2 is the most used cataloguing standard by 55 (88.7%) of the respondents, followed by RDA, which recorded 7(11.3%) responses. From the interviews, the four librarians emphasized the use of AACR2 by their libraries, even though they indicated that their libraries are fully aware of RDA as a cataloguing standard

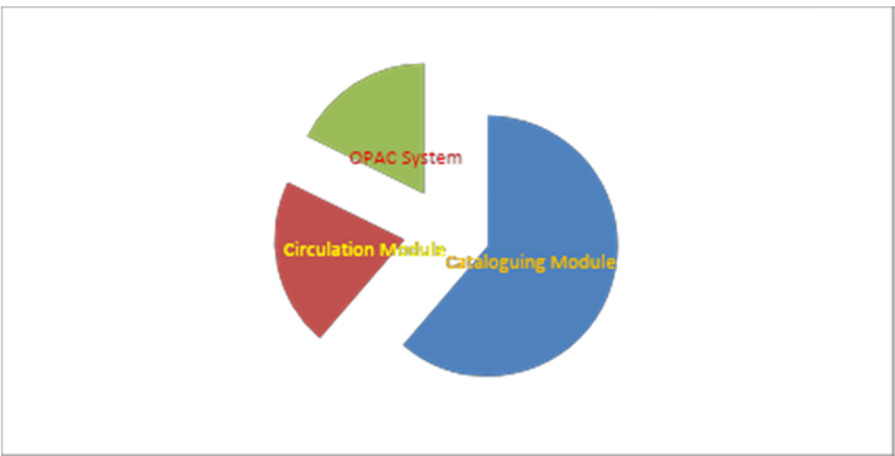


Figure 1. Modules used in LMS use.

that supports cataloguing in this digital era, they have not implemented the use of RDA due to financial challenges.

Comments are seen below:

Interviewee 1:

...the base of everything is finances, yes, I would love for us to start RDA, but when I go to my university librarian and tell him about this, he's going to ask me what it involves, does it involve money? and the answer to that question is yes ...

Interviewee 2

We have not thought of considering RDA and other new trends due to financial challenges, but we know it will soon take over since it has been adopted by other academic libraries in advanced countries and even parts of Ghana.

Interviewee 4

We are still using the AACR2, but when we generate the cataloguing data online, some come in the RDA format.

Metadata standards use

Metadata standards are a set of guidelines, rules, or specifications that define how descriptive information about data or resources is structured, formatted, and managed. These standards ensure consistency and interoperability in how metadata is created, stored, exchanged, and used across different systems. The integrated library systems used by the four universities under study, Koha, Sierra and Alexandria, support different metadata standards to facilitate resource location and bibliographic description. Koha, Sierra and Alexandria all strongly support the use of MARC21 and allow integration of Dublin Core for digital resources, except Alexandria, because its core metadata support is built around MARC records, particularly MARC21.

With regards to the use of MARC and BIBFRAME, the quantitative data shows that 28 (45.2%) use MARC (Machine-readable Cataloguing) as their metadata standard consistently, while 1(1.6%) indicated the use of BIBFRAME. Eighteen (29%) of respondents are unsure about their cataloguing practices regarding the use of metadata standards, as represented in [Table 3](#).

Interviews with all four librarians indicated that they all use the MARC records, but have not yet started using the BIBFRAME.

With regards to the use of metadata standards for digital resources, 1(1.6%) of the respondents have used Dublin Core as a cataloguing standard. Sixty-one (98.4%) recorded no response to the use of Dublin Core.: The result is presented in [Table 4](#).

Impact of standardized metadata

Well-defined metadata enables efficient search and retrieval of data or resources by providing descriptive information that helps users locate and understand the content. Respondents to the questionnaire were asked to indicate, per their personal assessment, the level of impact the use of standardized metadata has on search and retrieval of their resources. to this, 50(80.6%) of respondents reported a significant improvement in the retrieval of resources. Ten (16.1%) of the respondents reported some improvement, with 2(3.2%) recording a negligible impact on user access. The result is presented in [Table 5](#).

Cataloguing of electronic material

The researchers sought to find out if the libraries use their LMS to catalog their electronic materials. The quantitative data indicate that, among the 62 respondents, the majority, 40(64.5%), acknowledged that their libraries catalog electronic resources, while the remaining 22(35.5%) indicated that they do not catalog electronic resources.

The researchers also investigated whether the catalog records pertaining to electronic materials are included in the OPAC. Out of the 62 participants administered the questionnaires, 28(45.2%) acknowledged the existence of records of electronic materials in their OPACs, whereas 34(54.8%) reported their nonexistence.

Table 3. Metadata standards use.

Metadata standards	Frequency	Valid percent
BIBFRAME	1	1.6
MARC	43	69.4
Not sure	18	29
Total	62	100

Source: Field Data (2023).

Table 4. Integrated library system standards usage.

Standards	Frequency	Valid percent
Dublin core	1	1.6
No response	61	98.4
Total	62	100

Source: Field Data (2023).

Table 5. Impact of standardized metadata.

Standardized metadata	Frequency	Valid percent
Significant improvement in retrieval	50	80.6
Some improvement, but not a major factor	10	16.1
Negligible impact on user access	2	3.2
Total	62	100

Source: Field Data (2023).

The researchers enquired through the interviews if electronic resources are integrated in the various OPACS used in the various libraries. Below are some narrations gathered from the interviews:

Interviewee1:

So, Koha now allows us to host our e-books (electronic books), so we certainly will be able to bring the e-book onto the Koha system. It is just all about uploading the resources and also cataloguing them, just like we do with the physical books and in fact, you can even get a copy cataloguing record from the Library of Congress or OCLC. So, in this case, you just upload or import, and it adds up to the physical book from your own system. The OPAC will indicate which particular resources are e-books and which are not

Interviewee 2:

Electronic resources are not integrated into the records in our OPAC, but we are considering it soon. We have not yet started cataloguing them.

Interviewee 3:

We catalogue and upload records of our e-materials in the LMS.

Interviewee 4:

We subscribe to several e-books; we have put in efforts to catalogue them. So, they are part of our OPAC

With regards to whether electronic resources are integrated into the various OPACs used, the interviews revealed that two of the libraries catalogue their electronic materials, while the other two indicated it is possible to integrate electronic materials into the OPACs now, since Koha accepts it. They were quick to add that plans are far advanced enough to add electronic resources to their OPAC, which now contains only physical books.

Respondents' evaluation of the Integrated Library Systems used in the libraries

The researchers enquired from respondents their views on how effective their Integrated Library Systems have been and the improvement they have observed in cataloguing practices with the use of the Integrated Library Systems.

Efficiency of cataloguing practices

In relation to enhancements in the efficiency of cataloguing with the introduction of ILMSSs, the researchers asked respondents if they had

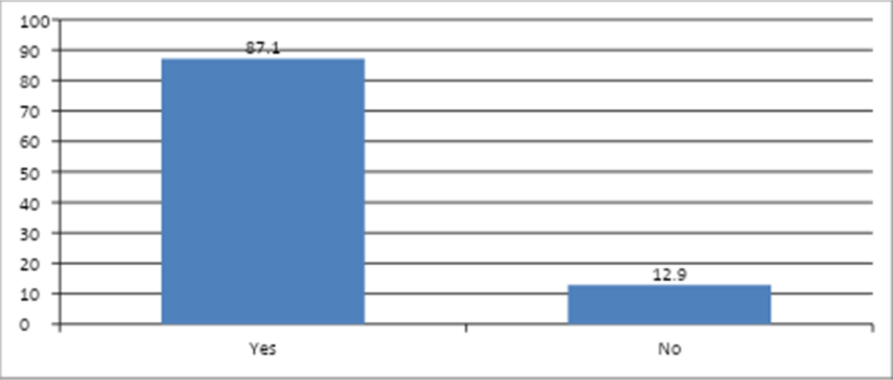


Figure 2. Enhancements in the efficiency of cataloguing processes.

observed an improvement in the efficiency level of cataloguing practices since the adoption of the ILMs. A majority of the respondents, namely 54 (87.1%) individuals, reported experiencing favorable developments in cataloguing efficiency. Eight (12.9%) individuals did not see such improvements as shown in [Figure 2](#). All four librarians interviewed also affirmed that ILMs have improved the efficiency of their operations.

Interviewee 1:

Yes, we have experienced much efficiency, especially in terms of time spent on work; the number of hours staff spend working on some books has reduced drastically because we now enjoy cataloguing with the ILMs.

Interviewee 2:

The output of the cataloguing section is the input used by the reader services, so any improvement seen at one end affects the others. Cataloguing with ILMs has improved and is positively affecting the academic library as a whole.

Interviewee 3:

Information retrieval has improved since users can interrogate the OPACs”

Interview 4:

Users are happy to interact with the OPAC, and it makes them search for diverse resources, and it’s like a gateway to other resources.

A follow-up question was asked, and respondents were to indicate the specific improvements they have seen. Participants indicated enhanced efficiency in areas such as faster cataloguing/saving of time 14(22.6%), accurate/fewer errors in cataloguing records 19(30.6%), easy accessibility/retrieval 11(17.7%), very efficient 10(16.1%), and no response 8(12.9%). The results are shown in [Table 6](#).

Table 6. Improvement respondents have seen.

Improvement seen	Frequency	Valid percent
Accurate /fewer errors in cataloguing records	19	30.6
Easy accessibility/Retrieval	11	17.7
Fast cataloguing/saving of time	14	22.6
Very Efficient	10	16.1
No response	8	12.9
Total	62	100

Source: Field Data (2023).

Effectiveness of ILMS in facilitating information retrieval

The findings from the quantitative data gathered indicate that the majority of respondents, 42(67.7%), perceive the Integrated Library Management Systems as very effective in facilitating information retrieval. Another proportion of respondents, 20(32.3%), consider the system effective.

Responses from the interviewees explain further that the purpose of cataloguing information resources is to facilitate information retrieval, and ILMS is making it very effective, as indicated by users' confirmations recorded.

Interview 4:

The purpose of the cataloguing processes is to make information retrieval easy. The ILMS makes information retrieval very effective.

Interviewee 3:

Information we hear or get from our users or patrons before the integrated library systems is that, they cannot find what they want, sometimes I am sure it has to do with the fact that they are not very conversant with the use of the manual catalogue so they go there and they are not able to get the kind of information they are looking for but I can say we haven't had so much challenges since we started using OPAC

Improvement in user access to information

The results from the questionnaires indicate that after the introduction of Integrated Library Management Systems, there was a reported improvement in user access to information by all respondents (100.0%).

This was supported by all the interviewees, as can be seen in the responses below.

Interviewee 3:

We have observed improvement in user access to information. We used to spend so much time, both the staff and the patrons, when looking for information, but recently, because the system Alexandria is online, we have shared the link out to almost all users, including prospective students, so they could just go online and access our materials from home or wherever they find themselves.

Interviewee 4:

Much improvement... as we see users searching for information with ease and even using the system to do other searches

Thus, the qualitative data collected affirms that there has been immense improvement in user access to information resources in the libraries.

Improvement in discovering relevant resources through the Integrated Library System

Also, the study went further to find out if users of the Integrated Library System have reported an improvement in discovering relevant resources with the implementation of the digital cataloguing system. Fifty-three (85.5%) of the respondents who took part in responding to the questionnaires indicate that users have reported an improvement in discovering relevant resources through the digital cataloguing system. A proportion of respondents, 9(14.5%), did not agree to the above.

The question of whether there is improvement in discovering relevant resources through the digital cataloguing system was posed directly to the respondents interviewed. They responded affirmatively.

Interviewee 1:

Yes, of course, they do perform their own searches and get results

Interviewee 2:

Yes, we get positive responses from them always

Ease of locating materials

The researchers went further on to find out the ease of locating materials using the digital cataloguing system. A total of 27(43.5%) of users are very satisfied. Additionally, 32(51.6%) reported being satisfied with 3(4.8) being neutral. The result is presented in [Table 7](#).

Table 7. Ease of locating materials using the Integrated Library System.

Ease of locating materials	Frequency	Valid percent
Very satisfied	27	43.5
Satisfied	32	51.6
Neutral	3	4.8
Total	62	100

Source: Field Data (2023).

Remote access

When the studied population was asked if their users find it easier to access resources remotely through the Integrated Library System, the quantitative data gathered show a vast majority of users, 59(95.2%), responding yes. Whilst 3(4.8%) indicated no.

The interview also confirmed that resources can be accessed remotely through the digital cataloguing system. Two comments from the interviewees are as follows:

Interviewee 1:

Yes, remote access is possible.

Interviewee 2:

Yes, once the user is connected to the internet, our OPAC is accessible on the web, which makes it easy to use from anywhere you are located.

Improvement in the efficiency of the library

Again, an important question was asked to find out if cataloguing with ILMs has improved overall efficiency in the academic libraries studied. The results from the quantitative data show that the majority of respondents, 52(83.9%), believe that cataloguing with ILMs has improved overall efficiency in their academic libraries to a great extent. A proportion of respondents, 10(16.1%), acknowledge that cataloguing with ILMs has improved efficiency in their academic library to some extent.

From the interviews conducted, all respondents reported on how academic libraries have seen improved efficiency as a result of the use of ILMs to catalog their resources.

Interviewee 1:

Information retrieval has improved since users can interrogate the OPACs.

Interview 2:

Users are happy to interact with the OPAC, and it makes them search for diverse resources, and it's like a gateway to other resources.

Increased visibility

Responses from the 62 staff who answered the question on whether the use of the Integrated Library Systems has increased the visibility of library resources show that the majority of respondents, 61(98.4%), agreed to an increased visibility of library resources. 1 (1.6%) does not agree.

This was confirmed through the interviews with all respondents, who confirmed that the use of ILMS for cataloguing enhances the visibility of their library resources.

Interviewee 1:

Yes, remote access is possible.

Interviewee 2:

Yes, once the user is connected to the internet, our OPAC is accessible on the web, which makes it easy to use from anywhere you are located.”

Interviewee 3:

Yes, because the OPACs are online and accessible remotely.

Interview 4:

It’s a big yes, remote access is high since searches can be done from anywhere, away from the library premises, to discover resource availability in the library.”

ILMSs have improved the overall user experience

Respondents to the questionnaire were asked to indicate if, in their assessment, the use of an Integrated Library System for cataloguing purposes has improved the overall user experience of library patrons in the libraries studied. The findings indicate that all 62 (100.0%) respondents affirmed yes.

Discussions

Implementation of Integrated Library Management Systems

Cataloguing of information resources has been noted by Wang (2021) to have evolved to accommodate technological trends as an innovative process (Otike et al., 2024). The adoption of technology has been noted in this study, as the research findings clearly confirm a 100% implementation rate of the Integrated Library Management Systems across the academic libraries studied, highlighting the widespread integration of technology to improve accessibility. The Integrated Library Management System were installed between the periods of 2009 to 2016, meaning that they have been in use for over Twenty (20) years. This indicates that all the academic libraries studied have implemented an Integrated Library Management System, as is the trend in other African countries and the developed world, to enhance cataloguing practices (Ankrah et al., 2019). This high implementation rate among libraries affirms the claims in the literature by

researchers like (Cannell and Guy (2001); Li (2013); Ocloo and King (2022b) that libraries use ILMS due to the associated benefits it comes with. Thus, academic libraries in Ghana are in tune with the global trend of adoption of ILMS for cataloguing toward the achievement of universal bibliographic control.

The study noted that different library management systems have been adopted by libraries for the digitization of the cataloguing process. These include Koha, Innovative Interfaces' Sierra, and Alexandria. From the findings of the study, the majority of respondents indicated the use of Koha, a significant majority use Sierra, and a proportion of respondents said they use Alexandria. This is confirmed by Dzandza (2019) and Siddique and Mahmood (2015), who found that Koha is the most widely utilized library management system, especially in Africa.

Cataloguing standard use

With regards to descriptive cataloguing standards, the analyzed result shows that the majority of the respondents use ACCR2 as the descriptive cataloguing standard in their line of duty. RDA drew a very low rate of use, though the librarians had knowledge about it. Thus, this finding agrees with research conducted by Monyela (2020), who found that AACR2 is still used in many libraries in Africa, with the gradual implementation of RDA in Sub-Saharan Africa.

The inability to maximize the use of RDA is explained by Nwachi and Nwafor (2021) in that, since the inception of RDA, cataloguers are preparing for the transition but are frequently intimidated by the difficulties of planning to change and delivering training at a time of limited resources.

It has been noted that academic libraries may adopt and adapt cataloguing standards based on their specific needs, the types of materials they handle, and the technological infrastructure available to them. Some libraries might even use a combination of these standards to accommodate various types of resources and user needs. Atkinson (2017) affirms this in literature and explains that these frameworks help academic libraries organize their resources in an orderly way, improving accessibility for their users. The libraries studied concentrate on the use of ACCR2 since RDA is not fully operational; the few records that are available based on the RDA standard are possibly a result of copy cataloguing records imported from other libraries that fully comply with RDA.

The analyzed data on the awareness and knowledge of current digital cataloguing trends indicated that the head cataloguers were fully aware of digital cataloguing systems and RDA; unfortunately, they had limited knowledge about other digital cataloguing standards such as BIBFRAME and Dublin Core. This is confirmed by a study by Fortier et al. (2022)

on assessing the readiness for and knowledge of BIBFRAME in Canadian Libraries. Wahid et al. (2018) noted that the field of cataloguing has evolved and is experiencing significant changes in the adoption of cataloguing standards due to emerging trends like linked data and semantic web technologies, as they offer new possibilities for connecting and enriching library data. Unfortunately, this is not the case in the libraries in which the study was conducted, as not much application of more current digital cataloguing standards aside from MARC21 was identified. The current lack of extensive adoption of digital cataloguing standards may not allow Ghanaian academic libraries to fully benefit from the benefits associated with digital cataloguing, such as discoverability and linked data, as has been outlined by (Alemu, 2023 and Ostani et al. (2024).

Impact of digital cataloguing practices on library services

Respondents' view on the impact of cataloguing with ILMS was assessed on various issues. Chief among these was their view on how efficient they deem their ILMSs to be in terms of, system's effectiveness in facilitating information retrieval, improvement in user access to information, improvement in the efficiency of the library, improvement in discovering relevant resources, ease of locating materials, increased visibility, remote access to the collection and improvement in the overall experience of users of the library.

Available literature (Ayoku & Okafor, 2015; Hamzat & Mabawonku, 2018; Hartog, 2018) abound with numerous benefits that are associated with cataloguing with ILMSs. Due to their benefits, they have been embraced by the majority of libraries across the globe. Though the data from this study indicate that the libraries are not implementing their cataloguing practices with the current cataloguing standards, the respondents' view on the positive impact of the use of ILMS for cataloguing on their practices is very high.

With regards to the efficiency of the digital cataloguing system, from their perspective, a large majority of the respondents evaluated their digital cataloguing system to be very efficient and effective, as they have noticed specific benefits such as the provision of more accurate data, accessibility, and fast cataloguing, among others. The extent of efficiency and effectiveness identified agrees with the assertion of Dadzie (2005) that Integrated Library Management System enables libraries to provide seamless access to their collections.

As noted by Holcombe-James (2022), accessibility and discoverability of library resources are two major advantages of any Integrated Library Management System, in addition to enabling users to access library collections remotely, facilitating 24/7 availability of resources. The Integrated

Library Management System of the libraries studied in the research were found by a significant majority of librarians to have improved the discoverability of relevant resources through the digital cataloguing system. This suggests that a large portion of the individuals involved in the study have received positive feedback from users, who have found the system to be beneficial in locating the resources they need. Similarly, a large majority of respondents agreed that the implementation of digital cataloguing has enhanced the search capabilities for library users. The results highlight a positive perception among the majority of respondents regarding the impact of the digital cataloguing system on users' ability to discover relevant resources, although there is a minority who may not share this view or have different experiences. Thus, the catalogues of the libraries in Ghana can be deemed to provide advanced search capabilities, allowing users to search the content of the libraries' collection, which has been noted by Schönfuß et al. (2021) as a feature of an electronic catalog.

Electronic cataloguing systems are well known for their effective retrieval function. This enables users to know which materials are in the possession of the library and gain access to the materials. It is well known that adherence to standards promotes effective retrieval. However, though this study revealed that the adoption of the current international bibliographic description standard is quite low among libraries, all the respondents agree on the effectiveness of the system in retrieving relevant information. Again, all respondents reported that the Integrated Library System have improved access to information materials by users.

Aside from reported improvements in retrieving and accessing relevant information resources, the majority of the respondents assessed their Integrated Library System as having helped improve the discovery of relevant resources. The use of the catalog as a discovery tool is essential in this age of abundance of information materials. This means that it is never possible for users to be aware or knowledgeable about all the information materials that may meet their needs. The catalog is therefore to help users get to know about what they do not already know.

The majority of respondents were either satisfied or very satisfied with the ease with which the catalog helps in locating the materials. The satisfaction of the library professional is mostly derived from being able to locate information resources in a library collection to meet users' needs. This is very important because that is the ultimate function of the catalog (a finding aid). This is an indication of the provision of adequate and accurate bibliographic descriptions in the catalog to help in locating the actual materials.

Another level of impact identified is the improvement in library services. Users have reported an improvement in discovering relevant resources

through the digital cataloguing system. This suggests that a large portion of the individuals involved in the study have received positive feedback from users, who have found the system to be beneficial in locating the resources they need. The results highlight a positive perception among the majority of respondents regarding the impact of the digital cataloguing system on users' ability to discover relevant resources. Similarly, the majority of respondents agreed that the implementation of Integrated Library Management Systems enhanced the search capabilities for library users. This confirms the assertion of Schönfuß et al. (2021) that seamless access to collections and enhanced discoverability of resources are benefits associated with the use of ILMs for cataloguing purposes.

These noted levels of improvement in library services led to unanimous agreement among the respondents that ILMs had a positive impact on the user experience in the various academic libraries studied. It implies that the Integrated Library Management System has effectively enhanced various aspects of the users' experience, such as ease of access, resource discoverability, and overall satisfaction. This high level of agreement underscores the perceived value and effectiveness of the system in improving the library's services and user satisfaction, and agrees with the research conducted by Holcombe-James (2022) and Schönfuß et al. (2021).

Conclusion

This study has provided valuable insights into the current trends surrounding cataloguing in the digital era in Ghana. The study aimed to achieve a comprehensive understanding of current cataloguing practices, the benefits of using an Integrated Library Management System and emerging trends in academic libraries in Ghana.

The findings reveal that academic libraries in Ghana are navigating a transformative journey in response to the digital revolution. The academic library environment in Ghana has been noted to have made progress in the adoption of Integrated Library Management Systems, and current cataloguing practices showcase a mix of manual and digital approaches, with varying degrees of integration. The Integrated Library Management Systems adopted among the various libraries are internationally recognized systems. The researchers believe that this has laid a solid foundation for the possible establishment of a national bibliographic network in Ghana due to the interoperability functions of such systems. The findings of the study project a positive outlook on cataloguing with ILMs, with some outlined positive impacts: enhanced accessibility, efficiency, and retrieval of information. There was, however, a very significant shortfall in the digital cataloguing trend in Ghana- lack of implementation of the current international cataloguing standard, Resource Description and Access (RDA),

coupled with a low level of knowledge and use of BIBFRAME and Dublin Core metadata standards. The non-adherence to international cataloguing practices does not position the academic library environment in a state of readiness to be part of the international network cataloguing initiatives.

Recommendations

To overcome the challenges faced in digital cataloguing, academic libraries in Ghana should adopt the best strategies. Firstly, libraries should adopt modern international cataloguing standards such as RDA, BIBFRAME and Dublin Core to ensure interoperability and accessibility of their digital catalogues.

Also, the libraries can engage in collaborative efforts in the adoption and implementation of these international standards as a means to share knowledge on common practices.

These recommendations collectively will guide academic libraries in Ghana toward harnessing the full potential of cataloguing with Integrated Library Management Systems to provide enhanced services and access to information in the rapidly evolving digital era.

Disclosure statement

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