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CHALLENGES OF AUTOMATION AND RETROSPECTIVE CONVERSION OF DATA IN PROF. KENNETH DIKE E-CENTRAL LIBRARY: THE WAYS-FORWARD

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Abstract

This study examined the challenges of automation and retrospective conversion of data in Prof. Kenneth Dike E-Central Library, Anambra State, Nigeria, and proposed practical ways forward. The research adopted a case study design. The study area covered the Awka and Onitsha branches of the library. A population of 23 librarians and ICT staff involved in library automation and retrospective conversion was studied. A structured questionnaire and an observation checklist were used for data collection. Four research questions guided the study, and data were analyzed using mean scores (benchmark 2.5). Findings revealed that available resources included computers, printers, scanners, electronic document delivery devices, institutional repository services, audiovisual devices, and email services. However, electronic journal and e-book resources were lacking. Methods employed included keying manually, Optical Character Recognition (OCR), resource database use, and editing. Methods not used included in-house conversion, outsourced in-house conversion, outsourced off-site conversion, and retrospective catalogue conversion (RCON). Major challenges identified were lack of proper planning, inadequate funding, and insufficient technology, lack of skilled staff, frequent technological changes, poor internet connectivity, and inadequate power supply. The study concluded that despite some infrastructure, significant barriers hinder full automation and retrospective conversion. Recommendations include adequate funding, continuous staff training, enhanced internet bandwidth, adoption of modern cataloguing tools (metadata, RDA), and establishing a cooperative online resource catalogue among Nigerian libraries.

Keywords: Automation, Retrospective, Conversion, Data, Library Automation, Challenges.

Introduction

The introduction of computers into library operations has been a transformative turning point, enhancing the performance of library activities worldwide. The global trend in information technology compels librarians to transition from analogue to digital systems a process widely referred to as library automation. Library automation involves the mechanization of traditional library activities, including acquisition, serials control, cataloguing, circulation, and reference services. Computers play a central role in this process, while telecommunications and reprographic technologies also provide essential support (Arkoful, 2017). Nwachukwu (2015) defined library automation as the application of computers and associated tools to process data in a library or group of libraries. Automation enhances the efficiency of information management and dissemination and is now considered a global best practice. Ideally, bibliographic records become digitized and accessible via institutional web-based catalogues, free from time and space limitations.

Despite increasing awareness and technological advancements in library automation and retrospective conversion, many libraries, including Prof. Kenneth Dike E-Central Library, still rely on card catalogues and manual circulation systems. From observation, many users do not fully utilize library resources. This situation raises critical questions about the adequacy of available resources, the methods employed, and the specific challenges hindering progress. Against this backdrop, this study examines the challenges of automation and retrospective conversion of data in Prof. Kenneth Dike E-Central Library and proposes viable ways forward.

Automation of library may be defined as the application of computers to perform traditional library housekeeping activities such as acquisition, circulation, cataloguing, and reference and serials control. Automation is used to reduce the amount of time staff devote to repetitive (and often less challenging) activities that must be done in any properly functioning library. Automation of library can also be seen as the application of computers and also connected tools to the processing of data in a library or libraries (Nwachukwu, 2015). Automation enhances the efficiency of information management and dissemination. It is now global best practices and standards to have libraries automated such that bibliographic records are digitized and accessible on institutional web-based catalogues devoid of time and space limitations. The library catalogue is an essential tool. It is an index or a key to the collection, containing an entry representing each item (Clark, 2012).

Retrospective conversion refers to the process of converting a library's existing database from non-machine-readable form (e.g., card catalogues) into machine-readable form, specifically for records not created during day-to-day operations (ALA Glossary of Library and Information Science, 2013). This process requires substantial infrastructure: efficient electrical wiring, reliable power supply, computers and accessories, telecommunication gadgets, Local Area Networks (LAN), software, and adequate bandwidth (Arkoful, 2017). Human resources skilled library staff are equally indispensable.

Despite increasing awareness and technological advancements in library automation and retrospective conversion, many libraries, including Prof. Kenneth Dike E-Central Library, still rely on card catalogues and manual circulation systems. From observation, many users do not fully utilize library resources. This situation raises critical questions about the adequacy of available resources, the methods employed, and the specific challenges hindering progress. Against this backdrop, this study examines the challenges of automation and retrospective conversion of data in Prof. Kenneth Dike E-Central Library and proposes viable ways forward.

Statement of the Problem

Prof. Kenneth Dike E-Central Library (including its Awka and Onitsha branches) continues to operate with significant reliance on manual systems such as card catalogues and manually assigned due dates. This practice negatively affects information access, retrieval speed, and overall user satisfaction. The current information age demands a shift to digital systems to enhance efficiency, yet the library appears constrained. Observations suggest that despite some automation efforts, most users do not fully exploit the library's resources. Could this be attributed to incomplete automation, inadequate resources, or ineffective retrospective conversion methods? This study therefore investigates the specific challenges of automation and retrospective conversion in Prof. Kenneth Dike E-Central Library and proposes actionable ways forward. However, in spite of the awareness and the technological advancement in automation of library and retrospective conversion of data, from observation, most users still don’t use the library resources as

they should, could this be traced to the resources been automated and retrospective conversion of data? It is against this background that the study seeks to examine automation of library and retrospective conversion of data in Kenneth Dike Digital Library Awka, Anambra State

Objectives of the Study

The aim of this study is to examine automation of library and retrospective conversion of data in Kenneth Dike Digital Library Awka, Anambra State. Specifically, are to:

1. Identify the resources used for retrospective conversion of data and automation in Kenneth Dike Digital Library Awka, Anambra State.
2. Ascertain the methods employed in retrospective conversion of data and automation in Kenneth Dike Digital Library Awka, Anambra State.
3. Identify the problems militating against retrospective conversion of data and automation of library in Kenneth Dike Digital Library Awka, Anambra State.
4. Proffer solution to the problems militating against retrospective conversion of data and automation in Kenneth Dike Digital Library Awka, Anambra State.

Research Question

The following guided the researchers:

1. What are the resources available for retrospective conversion of data and automation in Kenneth Dike Digital Library Awka, Anambra State?
2. What are the methods employed in retrospective conversion of data and automation in Kenneth Dike Digital Library Awka, Anambra State?
3. What are the problems militating against retrospective conversion of data and automation of library in Kenneth Dike Digital Library Awka, Anambra State?
4. What are the solution to the problems militating against retrospective conversion of data and automation in Kenneth Dike Digital Library Awka, Anambra State?

Literature Review

Retrospective Conversion of Data

Retrospective conversion is the process of turning a library's existing paper catalog record into a machine-readable form. Retrospective conversion usually entails using catalog cards (with a minimum of data like call number, author, title, ISBN and / or LCCN information) to find or create bibliographic record in a database of machine-readable record such as Online Computer Library Center (OCLC) and bringing those records into the existing local database (Ola, 2011). Usually retrospective conversion is done to obtain the full machine-readable cataloguing (MARC) records on each item. A full MARC record contains valuable information such as summary information that can be key-worded and searched using the electronic catalogue (Coffman, 2012). MARC records are a standard format that allows exchange of data between various sites or systems. The local database then allows electronic access to the catalogue and automated circulation using patron and item bar codes (Adeleke and Olorunsola, 2017). Thus, retrospective conversion in library and information center means changing already existing catalogue from existing traditional form to a machine-readable form, from non-machine-readable form to machine-readable form; that are not created during day to day process.

Library Automation

Automation is the technology concerned with a design and development of the process and systems that minimize the necessity of human intervention in their operation (Nikko, 2014). According to Swihart and Hefley, (2016), library automation is the processing of certain routine clerical function in the library with the assistance of computer or other mechanized or semi-automatic equipment. It may also be defined as a process of mechanization of all the housekeeping operation of a library which is repetitive in nature. The housekeeping operation includes acquisition, cataloguing, circulation, serial control, references and administration work (Swihart and Hefley, 2016).

Resources Required for Retrospective Conversion and Automation

Key resources include:

- Scanners for digitizing print materials (Siror, 2012)
- Computers, printers, and networking equipment
- Institutional repository software
- E-journal and e-book platforms
- Email and electronic document delivery systems
- Stable power supply and internet connectivity (Clark, 2012)
- Methods of Retrospective Conversion

Dabas (2014) identified several methods:

- In-house conversion (by library staff)
- Outsourced in-house conversion
- Outsourced off-site conversion
- Keying manually (most accurate)
- Optical Character Recognition (OCR) (scanning-based)

Challenges of Automation and Retrospective Conversion

Oketunji (2010) summarized major challenges as:

- Inadequate infrastructure (telecommunications, power)
- Poor after-sales maintenance and support
- Shortage of technical staff
- Staff resistance to technology
- User resistance to online systems
- Database conversion problems
- Frequent technological changes

Methodology

The study adopted a case study research design, which was considered appropriate for an in-depth, context-specific investigation of automation and retrospective conversion practices within a defined library system. The research was conducted at the Kenneth Dike Digital Library, specifically at its Awka and Onitsha branches in Anambra State, Nigeria. These branches were purposively selected as they represent the primary sites where automation and retrospective conversion activities are currently being undertaken.

The target population comprised twenty-three (23) librarians and ICT staff directly involved in library automation and retrospective conversion of data across the Kenneth Dike Digital Library branches in Awka, Nnewi, and Onitsha, Anambra State. The relatively small population size is attributable to the fact that retrospective conversion of catalogue records remains a relatively recent and specialised practice within the library, involving only a limited number of personnel. Two instruments were employed for data collection: A structured questionnaire developed in alignment with the research objectives and the specific research questions guiding the study. An observation checklist, used specifically to address Research Question One (regarding available resources). The questionnaire was constructed using a four-point Likert scale as follows: A total of twenty-three (23) copies of the questionnaire were administered to respondents through direct contact (hand delivery). After retrieval, twenty-one (21) questionnaires were found to be correctly completed and were subsequently returned, representing a response rate of approximately 91.3%. Data collected from the questionnaire were analysed using mean scores. A benchmark mean of 2.5 was adopted as the criterion for decision-making: Any item with a mean score of 2.5 or above was interpreted as agreed (i.e., accepted by respondents as characteristic of the library). Any item with a mean score below 2.5 was interpreted as disagreed (i.e., rejected by respondents). This decision rule ensured a consistent and objective basis for interpreting respondents' perceptions regarding resources, methods, challenges, and solutions related to automation and retrospective conversion.

Results and Data Analysis

Table 1: Observational checklist on the resources available for retrospective conversion of data and automation in Kenneth Dike Digital Library Awka and Onitsha branches, Anambra State

S/N	Items	Available/not Available
1	Computer	Available
2	Printer	Available
3	Electronic Journals Resources	Not Available
4	Document Scanning Devices	Available
5	Electronic Document Delivery Devices	Available
6	Institutional Repository Service	Available
7	Audio-Visual Devices	Available
8	Electronic Books Resources	Not Available
9	Electronic Mail (E-mail) Service or Email Publishing Resources	Available

Table 1 shows that the respondents agreed that the resources available for retrospective conversion of data and automation in Kenneth Dike Digital Library are computer, printer, document scanning devices, electronic document delivery devices, institutional repository service, audio-visual devices, electronic mail (e-mail) service or email publishing resources and electronic journal resources, electronic book resources was found to be lacking at Kenneth Dike Digital Library Awka and Onitsha branches, Anambra State

Table 2: Mean scores of responses on the methods employed in retrospective conversion of data and automation in Kenneth Dike Digital Library Awka and Onitsha branches, Anambra State

S/N	Items	$\bar{x}$	Decision
1	Keying Manually	4.0	Agreed
2	Optical Character Recognition (OCR)	3.6	Agreed
3	Resource database	3.5	Agreed
4	Editing	4.0	Agreed
5	In-House Conversion,	1.0	Disagreed
6	Outsourced In-House Conversion	1.0	Disagreed
7	Outsourced Off-Site Conversion	1.9	Disagreed
8	Retrospective catalogue conversion (RCON)	1.8	Disagreed

Table 2 shows that the methods adopted in Kenneth Dike Digital Library are keying manually, Optical Character Recognition (OCR), resource database, editing and the methods that are not being used are; in-house conversion, outsourced in-house conversion, outsourced off-site conversion, and retrospective catalogue conversion (RCON). This further shows that more method should be introduce in order to ease and make the work more effective.

Table 3: Mean score of the problems militating against retrospective conversion of data and automation of library in Kenneth Dike Digital Library Awka and Onitsha branches, Anambra State.

S/N	Items	$\bar{x}$	Decision
1	Lack of Proper Planning	3.0	Agreed
2	Lack of Fund/Economical Resources	3.0	Agreed
3	Lack of Resources and Technology	3.3	Agreed
4	Lack of Competent and Willing Manpower	3.0	Agreed
5	Lack of Skilled or Trained Staff /Professional	3.7	Agreed
6	Frequent change in technology	3.5	Agreed
7	Poor internet connectivity;	3.7	Agreed
8	Lack of an internationally accepted cataloguing code for machine readable cataloguing record.	1.1	Disagreed
9	Lack of agreement among different bibliographical communities	1.4	Disagreed
10	Inadequate power supply	3.2	Agreed

Table 3 reveals that the problems militating against retrospective conversion of data and automation of library in Kenneth Dike Digital Library are lack of proper planning, lack of fund/economical resources, lack of resources and technology
lack of competent and willing manpower, lack of skilled or trained staff /professional, frequent change in technology, poor internet connectivity, Inadequate power supply and Lack of an internationally accepted cataloguing code for machine readable cataloguing record and Lack of agreement among different bibliographical communities are not common problems in the library.

Table 4: Mean score of the solution to the problems militating against retrospective conversion of data and automation in Kenneth Dike Digital Library Awka and Onitsha branches, Anambra State

S/N	Items	$\bar{x}$	Decision
1	Provision of computer systems by library administration	4.00	Agreed
2	Training and retraining of cataloguing staff	4.00	Agreed
3	Increasing internet bandwidth by the administration	3.90	Agreed
4	Budget Saving	3.90	Agreed
5	Speeding up the Operation	3.54	Agreed
6	Establishing a cooperative online resource catalogue among Nigerian libraries	3.90	Agreed
7	Automatic statistics generation	1.00	Disagreed
8	Stock taking	1.27	Disagreed

Table 4 reveals that the suggested solutions that were accepted by staff in Kenneth Dike Digital Library are provision of computer systems by library administration, training and retraining of cataloguing staff, increasing internet bandwidth by the administration, budget saving, speeding up the operation and Automatic statistics generation, while stock taking was not accepted as solutions. This shows that more needs to be done in tackling problems militating against retrospective conversion of data and automation in Kenneth Dike Digital Library from the library.

Discussions of Findings

The results presented in Table 1, derived from the observation checklist, indicate that the facilities and resources available for retrospective conversion of data and automation at the Kenneth Dike Digital Library include the following: computers, printers, document scanning devices, electronic document delivery devices, audio-visual devices, electronic mail (e-mail) services or email publishing resources, as well as electronic journals and electronic books resources. However, the observation checklist revealed that an Institutional Repository Service was notably lacking at the Kenneth Dike Digital Library. This finding is consistent with the observations of Ihejirika and Ekere (2016), who reported that basic resources for retrospective conversion—such as networked computers, scanners, and printers are available in these libraries. Nevertheless, they further noted a poor knowledge of requisite skills, including competencies in MARC record creation, retrospective catalogue conversion, database management, and metadata creation.

The results presented in Table 2 sought to ascertain the methods employed in retrospective conversion of data and automation at the Kenneth Dike Digital Library. The findings revealed that the following methods were practiced: keying manually, Optical Character Recognition (OCR), resource database utilisation, editing, in-house conversion, outsourced in-house conversion, outsourced off-site conversion, and retrospective catalogue conversion (RCON). This outcome aligns with the

findings of Adeyemi (2011), who identified three principal methods for retrospective catalogue conversion: Retrospective Conversion (RECON) by an Outside Agency (i.e., contracting an external bureau to undertake the comprehensive task), deriving records from external databases (i.e., utilising existing databases from outside the library), and in-house conversion (which Adeyemi suggests may be the most viable option available to libraries in this region).

The results presented in Table 3 revealed the problems militating against retrospective conversion of data and automation at the Kenneth Dike Digital Library. These challenges included: lack of proper planning, lack of funds or economic resources, lack of resources and technology, lack of competent and willing manpower, lack of skilled or trained staff or professionals, frequent changes in technology, poor internet connectivity, lack of an internationally accepted cataloguing code for machine-readable cataloguing records, lack of agreement among different bibliographic communities, and inadequate power supply. These identified problems are consistent with the assertions of Oketunji (2010), who opined that the major challenges facing libraries as they progressively adopt technologies may be summarised as follows: general inadequacy in the level of relevant infrastructure, particularly telecommunication facilities and human resource supply; an unsatisfactory, exploitative local computer market with poor after-sales maintenance and support; an inadequate pool of relevant technical staff coupled with problems of recruitment and retention; the potential for library staff resistance to the introduction of computer technology; the potential for user resistance and failure to adapt to online information systems; database conversion problems; and frequent changes in technology.

The results of data analysis in response to Research Question Four, as shown in Table 4, indicate the suggested solutions to the problems militating against retrospective conversion of data and automation at the Kenneth Dike Digital Library. These solutions include: provision of computer systems by library administration, training and retraining of cataloguing staff, increasing internet bandwidth by the administration, budget saving, speeding up the operation, establishing a cooperative online resource catalogue among Nigerian libraries, power supplementation using standby generators, and outsourcing retrospective conversion (RECON) activities. These proposed solutions are in line with Ihejirika and Ekere (2016), who similarly placed emphasis on the training and retraining of staff for efficient and effective cataloguing. The findings also relate to Okoroma (2010), who asserted that adequate and appropriate skilled human resources are a prerequisite for successful retrospective conversion of catalogue records.

Ways-forwards

Conclusion

The transition from traditional library operations to fully automated systems is no longer a matter of choice but an imperative for academic libraries seeking to remain relevant, efficient, and user-centred in the digital age. This study has critically examined the challenges associated with automation and retrospective conversion of data at Prof. Kenneth Dike E-Central Library, Anambra State, Nigeria. The findings reveal that while the library has made commendable efforts in acquiring basic technological infrastructure—including computers, scanners, printers, and institutional repository services—significant gaps remain. Notably, the absence of electronic journal and electronic book resources undermines the library's capacity to offer a truly comprehensive digital collection. Furthermore, the study established that the methods currently employed for retrospective conversion—namely manual keying, Optical Character Recognition (OCR), resource database utilisation, and editing—are predominantly labour-intensive and time-consuming. More efficient and widely recognised methods such as in-house conversion, outsourced in-house conversion, outsourced off-site conversion, and retrospective catalogue conversion (RCON) remain largely unexploited. This methodological limitation constrains the pace and quality of the conversion process.

The findings also underscore a range of systemic challenges that collectively impede progress. These include inadequate funding, lack of skilled and technically competent personnel, frequent technological obsolescence, poor internet connectivity, and unreliable power supply. Notably, issues related to the absence of internationally accepted cataloguing codes or disagreement among bibliographic communities were not identified as significant barriers, suggesting that technical standards are not the primary obstacle in this context. Given these findings, it is evident that no single method of retrospective conversion offers a complete or entirely satisfactory solution. Instead, a hybrid or "via-media" approach—combining in-

house efforts with selective outsourcing, sustained staff training, improved infrastructure, and collaborative resource sharing—presents the most pragmatic pathway forward. The dedication of increased internet bandwidth to library services, as recommended by respondents, emerges as a particularly critical strategy for enhancing online visibility and user access.

In conclusion, while Prof. Kenneth Dike E-Central Library has taken initial steps toward automation and retrospective conversion, the journey to full digital transformation remains incomplete. Overcoming the identified challenges requires a multi-pronged, institutionally committed strategy that prioritises strategic funding, human capacity building, technological upgrades, and inter-library cooperation. Ultimately, the successful retrospective conversion of the library's catalogue is not merely a technical exercise but a foundational step toward ensuring the library's continued relevance, visibility, and service excellence in an increasingly digital information ecosystem.

The following are recommendations:

1. Continuous Training and Retraining: Cataloguing and ICT staff should be regularly exposed to workshops, seminars, and skill acquisition platforms focusing on MARC record creation, metadata standards, Resource Description and Access (RDA), and emerging cataloguing tools.
2. Improved Internet Infrastructure: The library administration should increase internet bandwidth and establish a dedicated, high-speed connection exclusively for library automation tasks. Collaboration with university ICT units or external service providers may be necessary.
3. Reliable Power Supply: The library should invest in alternative power sources, including solar inverters and backup generators, to ensure uninterrupted automation workflows.
4. Adoption of Modern Cataloguing Tools: Staff should be trained and equipped to use metadata schemas, RDA, and other internationally recognized cataloguing standards to ensure interoperability and global visibility of library records.
5. Establish a Cooperative Online Catalogue: Nigerian libraries, beginning with those in Anambra State, should collaborate to create a shared online resource catalogue. This would reduce duplication of effort, lower costs, and improve access to bibliographic records.
6. Consider Outsourcing for Retrospective Conversion: Given the current staff and resource constraints, the library should consider outsourcing retrospective conversion projects to specialized vendors, while maintaining quality control through contractual agreements.
7. Regular Technology Audits and Upgrades: The library should conduct biannual technology audits to identify obsolete equipment and software, with a planned replacement and upgrade schedule to keep pace with technological changes.

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