DATA-DRIVEN COLLECTION DEVELOPMENT IN LIBRARIES: A CASE STUDY OF FEDERAL COLLEGE OF EDUCATION, YOLA, AND COLLEGE OF EDUCATION, HONG LIBRARIES. ADAMAWA STATE

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Abstract

This study explores the implementation of data-driven collection development (DDCD) practices in academic libraries in Nigeria, specifically at the Federal College of Education, Yola, and the College of Education, Hong. However, challenges persist, including the underutilization of borrowing statistics and mixed confidence in data analysis skills. In the contemporary landscape of library and information science, data-driven collection development (DDCD) represents a significant advancement in resource management. By utilizing both quantitative and qualitative data, libraries can align their collections with user needs, a necessity given the exponential growth of information resources and evolving user expectations. Research Questions include: To what extent are data-driven collection development practices applied in the libraries? What challenges affect the implementation of data-driven collection development in the selected libraries? This study employs a descriptive survey methodology, utilizing questionnaires to gather insights from library staff regarding the application and challenges of DDCD practices. The findings reveal a significant reliance on data analytics tools, with 71.21% of respondents employing them frequently, while 75.75% analyze user feedback. In conclusion, by addressing these challenges, libraries can foster more effective, responsive collections that meet the evolving demands of their communities. Recommendations include enhancing training programs, improving borrowing statistics utilization, strengthening predictive analytics integration, upgrading technological infrastructure, and diversifying collections based on user feedback.

Keywords: Data-driven collection development, academic libraries, user feedback, predictive analytics, Nigeria

Introduction

In the contemporary landscape of library and information science, the transition to data-driven collection development (DDCD) represents a significant advancement in how libraries curate and manage their resources. DDCD utilizes both quantitative and qualitative data to inform decisions regarding the selection, assessment, and administration of library materials. This approach is increasingly essential due to the exponential growth of information resources, evolving user expectations, and budgetary constraints that many libraries face today (Johnson, 2018). As libraries strive to provide relevant and impactful resources, the adoption of DDCD practices enables them to align their collections with actual user needs rather than relying solely on traditional methods or librarian intuition (Booth, 2011). This study focuses on the implementation of DDCD in two academic libraries in Adamawa State: The Federal College of Education, Yola, and the College of Education, Hong. These institutions serve diverse educational communities but encounter various challenges that hinder effective resource management. Key variables influencing the implementation of DDCD practices include the use of data analytics tools, the incorporation of user feedback, the utilization of borrowing statistics, and the technological infrastructure available in the libraries.

The reliance on data analytics tools is critical for understanding user behavior and resource utilization. With 71.21% of library professionals reporting frequent use of such tools, it is evident that data analytics play a crucial role in shaping collection strategies (Crawford & Syme, 2018). However, despite this strong inclination, a significant portion of libraries still underutilizes borrowing statistics, indicating a gap that needs to be addressed (Booth, 2011). Furthermore, collaboration with educational institutions is vital, as 83.33% of library staff engage in aligning collections with curriculum needs, highlighting the importance of integrating academic requirements into collection practices (Cox, Pinfield, & Rutter, 2019). Additionally, the technological readiness of libraries is a pivotal variable that impacts the success of DDCD. Many libraries in Nigeria face infrastructural challenges, which can impede the effective collection and analysis of data.

Issues such as outdated systems and limited access to reliable data sources prevent libraries from fully capitalizing on the benefits of data-driven practices (Imburgia, 2020). Moreover, budgetary constraints further complicate the situation, with 12.12% of library staff reporting insufficient funding for acquiring necessary data-driven tools (Omeluzor & Ojukwu, 2024). This research will investigate the extent to which DDCD practices are applied in the Federal College of Education, Yola, and the College of Education, Hong, while also identifying the challenges faced in implementing these practices. By focusing on the variables of data analytics utilization, user feedback integration, borrowing statistics, and technological readiness, this study aims to provide insights that can enhance the collection development strategies of these libraries. Ultimately, the findings will contribute to ensuring that library resources are not only relevant and diverse but also effectively meet the evolving demands of their educational communities.

Statement of the Problem

Even though data-driven collection development is becoming more and more popular worldwide, many academic libraries in Nigeria continue to use antiquated techniques that do not fully represent the demands of their patrons. Implementing data-driven practices effectively is hampered at the Federal College of Education, Yola, and the College of Education, Hong, by issues such as restricted access to trustworthy data, a lacklustre technology infrastructure, and budgetary limitations. This condition often leads to poorly coordinated collections, underutilized resources, and challenges in justifying budget allocations. These libraries run the

risk of failing to satisfy the changing scholarly and research demands of their communities if they don't take a data-driven approach.

Research Questions

1. To what extent are data-driven collection development practices applied in the Libraries?
2. What challenges affect the implementation of data-driven collection development in the selected Libraries?

Literature review

One of the most important roles in libraries is collection development, which is the methodical creation of library collections to satisfy patron demands. Libraries are increasingly using data-driven methods to guide their collection development goals in the digital age (Crawford & Syme, 2018). In order to inform collections and collection development policy, data-driven decision making (DDDM) entails gathering and evaluating data (Pereira, 2021). This study of the literature looks at data-driven collection development in libraries from Nigerian, African, and international viewpoints. Libraries all throughout the world are using data to influence their decisions regarding the development of collections, the distribution of resources, and weeding initiatives (Breeding, 2024). To support the institutional curriculum, academic librarians make well-informed decisions based on their professional training, faculty input, and subject-matter expertise. One such source of information for determining subjects of significance for institutional curricula is the course catalogues of colleges and universities (Sutton et al., 2024).

Libraries employ a number of techniques to gather information for collection evaluation, such as focus groups, citation analysis, user surveys, circulation statistics, and collection analysis software (Spisak, 2021). Collection development processes are also being informed by altmetrics, which are data from the social web. Large volumes of data can be tapped into using big data analytics to learn about user preferences, resource usage trends, and new developments (Crawford & Syme, 2018). Additionally, libraries are employing data to support decisions on collection retention, space utilisation, and shared print and communal collections (Pereira, 2021). Libraries throughout Africa are helping their nations flourish. Libraries must gather quantitative data on their output, including services and usage, as well as user demographics, to become more visible as development partners. They can also present themselves as reputable, neighbourhood organisations that understand their areas and serve as resources for businesses in need of growth (Lynch et al., 2021).

Tools for capacity building have been created by the Digital Imaging Project of South Africa (DISA) to facilitate innovative approaches to research and education. In addition to giving South African archivists and librarians access to South African materials of high sociopolitical importance, DISA sought to provide them with expertise in digital imaging. In South Africa, collection development has been practiced in a central place and not by individual public libraries (Peters & Pickover, 2001; Andile, 2025). The planned, ongoing, economical, and preferred acquisition of high-quality, pertinent content to satisfy user needs is known as collection development in Nigeria. As stated by Omeluzor and Ojukwu (2024). In Nigerian university libraries, artificial intelligence (AI) may help with data-driven decision-making. AI is capable of analysing vast amounts of data to offer insightful information on resource popularity and usage patterns. The selection, ordering, payment, resource sharing, and culling of resources are all included in collection development. To meet the diverse information demands of patrons, academic libraries also seek to enhance the calibre of their collections.

Data can be used by libraries to show how they affect communities. AI may be used by libraries to examine vast amounts of data and learn about user preferences. (Emasealu, 2021). Data-driven methods offer libraries the chance to enhance their collection creation procedures. Libraries can work together to support choices about collection retention and manage their combined holdings. Library employees can learn how to use data visualisation tools and develop their data storytelling abilities (Stemper & Gibney, 2021). The growth of data-driven collections is revolutionising libraries around the world, and their adoption presents many potential opportunities for libraries in Nigerian and African contexts. Libraries can enhance their collection development procedures and better meet the requirements of their patrons by taking advantage of the opportunities that are accessible (Crawford & Syme, 2018).

Data-Driven Collection Development Practices Applied in the Libraries

One of the main responsibilities of collection development in libraries is to methodically create collections that satisfy patron needs. Libraries are increasingly using data-driven methods to guide their collection development goals in the current digital era. The extent to which libraries are using data-driven collection creation techniques is examined in this review, which also highlights the several ways that data is utilised to improve decision-making in this field (Pacific University Libraries, 2024).

Global Application of Data-Driven Collection Development

Data is being used by libraries all across the world to make educated choices about resource allocation, collection development, and weeding procedures. To make well-informed choices that complement the curriculum, academic librarians integrate their professional training, faculty insights, and subject-matter expertise. Additionally, they employ evidence-based acquisition techniques. Course catalogues from colleges and universities are excellent sources for finding subjects that fit the curriculum (Ashikuzzaman, 2025).

Methods and Tools for Data Collection and Analysis

Libraries use a variety of techniques to acquire information for collection evaluation, such as:

a. Surveys of users to learn about their needs and preferences.
b. Circulation data to monitor the use of resources.
c. Use focus groups to collect qualitative input.
d. Citation analysis to evaluate resource effect.
e. Tools for collection analysis to assess the advantages and disadvantages of the collection.
f. Altmetrics, which present information derived from social media usage (Morrisey, 2025).

Course description analysis is now simpler due to the development of data and text mining techniques. Additionally, several libraries are leveraging analytics technologies to create internal dashboards.

Specific Applications of Data-Driven Collection Development

Several facets of collection development are being approached using data-driven methodologies:

a) **Educating Acquisition Decisions:** Decisions about the purchase of library collections are informed by big data analytics.
b) **Collection Assessment:** Using usage analytics, big data approaches are used for collection assessment.
c) **Usage data:** Decisions about collection development and weeding are influenced by borrowing data.
d) **Recognising User Needs:** By gaining insight into user preferences, big data analytics enables better collection and development choices.
e) **Predictive analytics:** To foresee future developments in collections, libraries employ predictive analytics.
f) **Personalisation:** Information is utilised to create user-centred, customised collections.
g) **Optimising Resource Allocation:** Data helps librarians allocate funds across disciplines, topic areas, formats, and genres in an efficient manner.
h) **Managing Combined Holdings:** Libraries are working together to support collection retention decisions and manage their combined holdings (Bryant, 2024).

The Role of Analytics in Collection Management

Selectors can manage subscriptions for electronic resources and make decisions about buying or de-accessioning physical objects with the help of analytics-driven approaches. Libraries are re-evaluating their offerings and gaining fresh perspectives on the worth and applications of collections by utilising data and data visualisation. Future resource demand can be predicted with the use of statistical methods and predictive analytics (Scott and Vogus, 2019).

Case Studies and Examples

a) Texas Tech University uses a machine learning tool called ALIEN to predict how often particular volumes will be requested in the future based on interlibrary loan data.

b) A study at IGDTUW, Delhi, India, used circulation records to analyze the usage of books and develop a policy for selecting and removing books. The study found that a significant percentage of books were unused, and there was a gap between faculty-recommended titles and student needs (Sengar et al, 2025)

Skills and Training for Library Staff

Employees at libraries are upgrading their skills to handle and evaluate data more efficiently. They are learning how to use data visualisation tools and developing their storytelling abilities. In order to meet the demands of managing research data, organisations are also offering training courses.

The Transition to Data-Informed Choices

Libraries are realising more and more that evidence should be the basis for decisions and that data should be utilised as a tool to assist those decisions. The focus is on contextualising the use of data without sacrificing other qualitative methods of knowledge (Bryant, 2024).

Libraries are increasingly using data-driven collection building techniques to improve decision-making on purchases, evaluation, budget allocation, and user needs. Libraries can optimise their collections and services by using data-driven processes, which are bolstered by analytics tools and approaches. Libraries may make sure that their collections are current, easy to use, and in line with the changing requirements of their communities by utilising data (Shinde et al., 2024).

Challenges Faced by Data-Driven Collection Development in Libraries

By facilitating decisions based on empirical evidence, data-driven collection development (DDCD) has revolutionised the way libraries create and oversee their collections. Libraries can better match resources to user requirements by using citation data, circulation statistics, usage analytics, and user input. There are several serious drawbacks, from data integrity issues and a lack of data analysis skills to technological and financial ones. Implementing long-lasting and successful data-driven initiatives requires an understanding of these difficulties.

1. **Problems with Data Integrity:** Maintaining data integrity is quite difficult. Data integrity protects against unauthorised changes, deletions, or revisions by guaranteeing that data is correct and dependable throughout its existence. Typographical errors, scanning problems, inconsistent manual data entry, and inaccurate metadata can all jeopardise the accessibility and integrity of records. Reputable data sources, user access to personal information, frequent information updates, and the destruction of outdated or anonymous data are all ways that libraries can ensure data integrity (Imburgia, 2020).
2. **Lack of Data Analysis Skills:** Many library workers lack training in using programs like Power BI and Tableau. Analysis is meaningless without analysis, and many librarians today lack the analytical expertise required to function effectively in a world of dynamic content curation. While library professionals bring valuable talents to data management, they frequently need to improve their data storytelling skills and use visualisations to effectively explain data discoveries (Kirkwood 2016).
3. **Budgetary Constraints:** Managing budget constraints is a significant barrier to library collection growth. Libraries must use available finances to purchase resources that fulfil the requirements of their patrons. The high cost of digital subscriptions and licenses for e-books and online databases can quickly deplete a library's funds. Insufficient finances and staffing are major issues in research data collection management.
4. **Technological Infrastructure:** Libraries need enough technological infrastructure to facilitate access and use of digital resources. Limited resources, training opportunities, and collaboration platforms may prevent successful data stewardship (Wang, 2024).
5. **Collection Quality and Diversity:** Collection quality is a key concern for demand-driven acquisition (DDA) methods. Relying on a DDA strategy may worsen the difficulties of diversity and inclusion. Academic libraries have a distinct focus that necessitates consideration of the collection's long-term research usefulness, which may be unclear to current users or librarians (Ramsey, 2024).

Methodology

The design and procedure used for the study are discussed in the following headings:

This study is a descriptive survey of Data-driven collection development in Libraries: A Case study of Federal College of Education, Yola, and College of Education, Hong Libraries. Adamawa State is using a questionnaire. It is a descriptive survey research because it is based principally on the views of the respondents in the population of the study. Descriptive survey research is a quantitative research design that seeks to collect, analyze, and interpret data from a sample to describe the characteristics, opinions, attitudes, or behaviors of a population. It does not manipulate variables but rather observes and records existing conditions, providing a snapshot of a phenomenon at a particular time (Creswell & Creswell, 2018).

The purpose of descriptive survey research is to answer questions such as "what is," "what exists," or "what are the perceptions," rather than to establish causal relationships. This design often relies on structured questionnaires, interviews, or checklists to gather data systematically, making it particularly useful in the social sciences, education, and library and information science. By focusing on describing trends and patterns, descriptive surveys enable researchers to generalize findings from a sample to a larger population with a reasonable degree of confidence (McCombes, 2023).

The research is limited to the academic libraries in Federal College of Education, Yola, and College of Education, Hong. The population of the study includes 66 staff members of both Colleges of Education Libraries. The sample was categorized into two strata: 39 males and 27 females. The researcher adopted a purposive sampling technique, which is under the non-probability sampling technique, where you choose to examine the entire population (i.e, the total population) that has a particular set of characteristics. This section presents the findings from the study, analyzed using descriptive statistics in the form of frequencies and percentages. The results are structured according to the research questions and are discussed in relation to the study's objectives. These include the calculations of percentages and tables that were necessary. A percentage of 99.9% - 50% was considered as accepted by the respondents, while 49.9% - 0.00% were considered rejected by the respondents.

The instrument used for data collection was primarily a questionnaire developed by the researcher. The data that was collected and analyzed by the use of Statistical Percentage for Social Software 20.0 (SPSS). Data collected was analysed using Statistical Package for Social Sciences (SPSS); therefore, descriptive statistical instruments such as percentages and tables were used to present the results. Tables were used to present the data collected from both the Colleges of Education library staff, and were administered through questionnaires. The values were used for frequency and percentage: $\frac{45 \times 100}{66} \approx 68.18$

The presentation, analysis, and interpretation of data are presented in the tables

Research Question 1: To what extent are data-driven collection development practices applied in the libraries?

Table 1: Percentage response of data-driven collection development practices applied in the libraries.

S/N	Questions	Not at All	Rarely	Often	Very Often	Total
1.	To what extent do you use data analytics tools?	3 4.54	12 18.18	47 71.21	4 71.21	66 F 100%
2.	How frequently do you analyze user feedback (e.g., surveys, focus groups) to inform collection decisions?	2 3.03	4 6.06	10 15.15	50 75.75	66 F 100%
3.	How often do you incorporate borrowing statistics in your collection assessment?	16 24.24	16 24.24	17 25.75	17 25.75	66 F 100%
4.	To what extent do you collaborate with schools to align collection development with curriculum needs based on data?	0 0.00	5 7.57	6 9.09	55 83.33	66 F 100%
5.	How regularly do you use predictive analytics to anticipate future collection needs?	2 3.03	34 51.51	20 30.30	10 15.15	66 F 100%

Key: Not at All, Rarely, Sometimes, Often, Very Often

The research question examines the extent of data-driven collection development practices in libraries. Findings indicate a strong use of data analytics tools, with 71.21% of respondents employing them "Very Often," reflecting a significant reliance on data for collection strategies. Additionally75.75% frequently analyze user feedback, showcasing a commitment to integrating patron insights.

However, 24.24% of participants do not utilize borrowing statistics, highlighting a gap for improvement. Collaboration with schools is strong, as 83.33% engage "Very Often" in aligning collections with educational needs. While 51.51% use predictive analytics "Often," there is room for further integration. Overall, libraries are effectively adopting data-driven methods, but can enhance practices, particularly in borrowing statistics and predictive analytics, to strengthen collection development.

Research Question 2: What are the challenges affecting the implementation of data-driven collection development in the selected libraries?

Table 2: Percentage response of challenges affecting the implementation of data-driven collection development.

S/N	Questions	Not at All	Rarely	Often	Very Often	Total
1.	How would you rate the accuracy and reliability of the data you use?	1 1.51	10 15.15	55 83.33	0 0.00	66 F 100%
2.	How confident do you feel in your data analysis skills?	15 22.72	33 50.00	7 10.60	11 16.66	66 F 100%
3.	How adequate is your library's budget for acquiring data-driven tools?	8 12.12	50 75.75	5 7.57	3 4.54	66 F 100%
4.	How would you describe the technological infrastructure available in your library for data management?	33 50.00	20 30.30	7 10.60	6 9.09	66 F 100%
5.	How satisfied are you with the diversity and quality of your library's collection?	26 39.39	35 53.03	3 4.54	2 3.03	66 F 100%

Key: Not at All, Rarely, Sometimes, Often, Very Often

The research question investigates perceptions of data accuracy, confidence in data analysis skills, budget adequacy for data-driven tools, technological infrastructure, and satisfaction with collection diversity and quality in libraries. The results reveal that 83.33% of respondents trust the accuracy and reliability of their data, indicating strong confidence in decision-making.

However, confidence in data analysis skills is mixed, with 50% neutral and only 10.60% feeling "Very Confident," suggesting a need for skill development. While 75.75% find their budget adequate for data-driven tools, 12.12% feel it is insufficient, indicating room for improvement. Half of the respondents rate technological infrastructure as "Adequate," but concerns remain about its effectiveness. Additionally, 39.39% express dissatisfaction with the diversity and quality of collections, highlighting an area for growth. Overall, while libraries have a solid foundation in data practices, there is potential for enhanced training, better technological resources, and improved collection diversity to meet user needs more effectively.

Discussion of findings

The findings indicate a strong commitment to data-driven collection practices among the libraries studied, with 71.21% of respondents utilizing data analytics tools and 75.75% actively analyzing user feedback. However, the fact that 24.24% do not utilize borrowing statistics reveals a significant gap in their data-driven approach. This underutilization suggests a missed opportunity to leverage borrowing metrics for informed decision-making. Additionally, collaboration with educational institutions is evident, as 83.33% of library staff align collections with curriculum needs. This aligns well with the recommendation to enhance training programs, as improving staff confidence in data analysis could further increase the effective use of borrowing statistics, thereby addressing the identified gap.

The research highlights several challenges in the implementation of data-driven collection development, with only 51.51% of respondents currently using predictive analytics, indicating a need for further integration of these tools. Despite a general trust in data accuracy, only 10.60% of respondents feel "Very Confident" in their data analysis skills, suggesting that training programs are crucial for boosting staff capabilities. Additionally, while budget adequacy is viewed positively, 12.12% of respondents report insufficient funding, which could hinder the necessary upgrades to technological infrastructure. Addressing these challenges through enhanced predictive analytics integration and improved technological support will be essential for libraries to optimize their collection strategies effectively.

Conclusion

In conclusion, the shift towards data-driven collection development (DDCD) represents a significant evolution in library practices, particularly in addressing the unique challenges faced by academic libraries in Nigeria. While DDCD offers a structured approach to resource selection and management, it also highlights the necessity for libraries to adapt to the digital age through the effective use of data analytics. Despite the potential benefits, such as improved alignment with user needs and enhanced resource allocation, various obstacles—such as data integrity issues, budget constraints, and a lack of data analysis skills—hinder successful implementation. For libraries in Nigeria to fully leverage DDCD, investment in technology and training, as well as strategies to ensure data reliability, are essential. Embracing these changes will not only strengthen library collections but also ensure they remain relevant and responsive to the evolving demands of their communities.

Recommendations

Libraries must carefully handle the many issues that impede the adoption of data-driven collection creation if they hope to reap its full benefits. Libraries may create strong, adaptable collections that efficiently and fairly serve their communities by bolstering infrastructure, encouraging moral behaviour, broadening the range of evaluation techniques, and arguing for funding and technical assistance (Arup, 2025).

i. **Enhance Training Programs and Improve Borrowing Statistics Utilization**
To address the extent of data-driven collection development practices applied in the libraries, it is essential to implement targeted training sessions for library staff. These workshops should focus on building confidence in data analysis skills, particularly in using data analytics tools and effectively interpreting borrowing statistics. Furthermore, developing standardized protocols for collecting and analyzing borrowing statistics will empower libraries to integrate these metrics into their collection development strategies, enabling them to identify trends and better meet user needs.

ii. **Strengthen Predictive Analytics Integration and Upgrade Technological Infrastructure**
In response to the challenges affecting the implementation of data-driven collection development, libraries should prioritize the adoption and integration of predictive analytics. This involves investing in user-friendly software and providing training on its application for forecasting collection trends. Additionally, assessing and upgrading the technological infrastructure is crucial to ensure libraries have the necessary systems in place to enhance data collection, analysis, and accessibility. This dual approach will facilitate more effective and informed decision-making in collection management.

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