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DATA MANAGEMENT AND CURATION AMONG LIBRARIANS IN SELECTED LIBRARIES IN SOUTH-WEST, NIGERIA

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ABSTRACT

This study investigates the state of data management and curation practices among librarians in selected libraries in the South West region of Nigeria. A survey was conducted among 300 librarians to assess their knowledge, skills, and training requirements related to data management and curation. Data collected via an online Google Form was analyzed using descriptive statistics, including frequency counts and mean distribution. The findings reveal a high level of data management and curation practices employed by the librarians in the selected libraries, with an overall grand mean of 3.7 on a 5-point scale. Additionally, the study identifies the librarians' high level of knowledge, skills, and training requirements, with an overall grand mean of 3.8 on the same scale. Challenges faced by librarians in effectively managing and curating data in the selected libraries in the South West region of Nigeria include the need for training on data preservation and long-term access strategies (Mean = 3.9), data formats and standards for interoperability (Mean = 3.9), and ethical considerations in data management and curation (Mean = 3.9). The study also highlights strategies and recommendations for improving data management and curation practices among librarians in the selected libraries, such as fostering collaborations between librarians and researchers to enhance data management support (Mean=3.9), encouraging librarians to participate in professional development activities focused on data management and curation (Mean = 3.8), and developing partnerships with external organizations to access training and resources (Mean = 3.8). Overall, the study concludes that librarians demonstrate a high level of proficiency in organizing and categorizing data, employing effective backup and storage mechanisms, following established protocols for data quality control, and regularly updating metadata. The recommendations include the establishment of comprehensive training programs, collaboration with external organizations for capacity building, and the allocation of sufficient resources to support data management initiatives

Keywords: Data Management, Curation, Librarians, Libraries, South-West, Nigeria

Introduction

Librarians have long been recognized for organizing and preserving information, and their skills are highly relevant to managing and curating research data. With the increasing emphasis on data-driven research and open science, librarians have recognized the importance of assisting researchers in effectively managing and sharing their data. Librarians' involvement in data management and curation can include various activities, such as providing guidance on data management plans, assisting with data organization and documentation, recommending appropriate data repositories, ensuring data privacy and security, and promoting data sharing and reuse. Many libraries and library associations have recognized the significance of data management and curation and have started offering training programs, workshops, and resources to help librarians develop expertise in this area. Additionally, collaborations between librarians and researchers have become more common, with librarians playing an active role in supporting researchers' data management needs.

In the current digital age, research data management has become a critical area of focus for librarians. As custodians of information and experts in organizing and preserving knowledge, librarians play a vital role in supporting effective data management practices (Dawuda & Ibrahim, 2021). Data management refers to the processes, practices, and strategies involved in acquiring, organizing, storing, securing, retrieving, and utilizing data within an organization or system (Awe, 2020). It encompasses a range of activities aimed at ensuring data quality, availability, usability, and security to support effective decision-making, operational efficiency, and regulatory compliance (Alhamad et al., 2022). Data curation has emerged as a critical component of managing and preserving research data in the digital age. Data curation refers to the active and ongoing management of data throughout its lifecycle, to ensure its long-term usability, accessibility, and integrity (Reviglio & Agosti, 2020). It also involves a series of activities that include organizing (Khadam et al., 2019), documenting (Abiy et al., 2018), preserving (Netshakhuma, 2020), and adding value to data to facilitate its discovery, understanding, and reuse (Sonkamble et al., 2021); (Iyanda & Opele, 2015).

Data curation involves organizing data in a logical and structured manner, making it easier to navigate and locate specific information. This includes creating consistent file and folder structures, establishing naming conventions, and organizing data based on relevant attributes or metadata. It also involves metadata which provides descriptive information about the data, such as its content, context, structure, and provenance. Curation also entails creating and applying metadata standards to facilitate data discovery, interoperability, and understanding. Metadata may include information about variables, units of measurement, data collection methods, and data quality indicators (Jamali & Nabavi, 2021), curation involves documenting the data to provide context and facilitate its interpretation and reuse. Documentation may

include data dictionaries, codebooks, readme files, and user guides that describe the data and its associated files, providing information about the data's structure, variables, and any necessary instructions for its use. Curation also includes ensuring the quality and integrity of the data. This involves conducting quality checks, verifying data accuracy, addressing missing or inconsistent values, and addressing any data quality issues identified.

Data quality assurance aims to enhance the reliability and trustworthiness of the curated data(Opele et al., 2022). However, data curation includes strategies for long-term preservation and archiving. This involves selecting appropriate data storage formats, establishing backup and recovery plans, and considering data migration and format conversion to mitigate the risk of data loss due to technological obsolescence. Preservation ensures that data remains accessible and usable over time (Dunets et al., 2019), which also facilitates data access and sharing to promote collaboration and knowledge exchange. This may include depositing curated data in appropriate repositories, establishing data-sharing agreements, and adhering to data-sharing policies and mandates. Data curation also encompasses considerations of data privacy, security, and intellectual property rights.

It is also crucial for maximizing the value of research data, supporting reproducibility, and promoting open science principles. (Asatiani et al., 2021). By managing and curating data effectively, researchers, institutions, and the broader scientific community can benefit from improved data discovery, reuse, and collaboration. Librarians, with their expertise in information organization, metadata standards, and preservation practices, are well-positioned to play a significant role in data curation. This background provides an overview of data curation in the context of librarianship, highlighting the importance of librarians' involvement in ensuring the long-term accessibility, integrity, and usability of research data. Data management and curation have become critical aspects of research in the digital age. Effective data management practices ensure the organization, preservation, accessibility, and usability of research data. Additionally, data sharing, reuse, repository establishment, data citation, and addressing privacy and ethical concerns are integral components of a robust data management framework. This research background provides an overview of these key areas in data management and curation.(Rehman et al., 2022).

Data management practices encompass various activities, such as data collection, documentation, organization, storage, backup, and security. Researchers must develop standardized protocols for data management, including file naming conventions, metadata creation, and data storage infrastructure. Implementing data management plans and adhering to best practices throughout the research lifecycle enhances data integrity, reproducibility, and long-term usability (Dawuda & Ibrahim, 2021). This also includes data sharing promotes transparency and collaboration in research. Researchers are encouraged to share their data with the broader scientific community, enabling data reanalysis, validation of findings, and discoveries. Effective data sharing requires data to be

properly documented, anonymized if necessary, and stored in accessible formats. Promoting open data initiatives and establishing data sharing agreements help foster a culture of data sharing and enable wider research impact (Wouters et al., 2018), data repositories play a crucial role in data management and curation. These platforms provide secure storage, robust metadata standards, and long-term preservation of research data. Researchers can deposit their data in discipline-specific or general-purpose repositories, ensuring its accessibility and visibility. Data citation practices also contribute to the recognition of data as a scholarly output. Properly citing datasets in research publications facilitates attribution, tracking impact, and promoting data discoverability.

Statement of the problem

Data management and curation are critical aspects of modern library practices, particularly in the context of the rapidly growing volume and complexity of digital data. Librarians play a crucial role in managing and curating data, ensuring its accessibility, usability, and long-term preservation. However, in the South West region of Nigeria, there is a need to assess the current state of data management and curation practices among librarians in selected libraries. The South West region of Nigeria is home to numerous libraries that serve diverse academic, research, and community needs. These libraries collect, organize, and provide access to a wide range of information resources, including digital data. Effective data management and curation are essential to ensure the integrity, discoverability, and reusability of these valuable assets. Despite the importance of data management and curation, there is a lack of comprehensive studies focusing on the knowledge, skills, and training requirements of librarians in this region. Understanding the current practices, challenges, and opportunities related to data management and curation among librarians will enable the development of strategies and recommendations to enhance their capabilities. The study aims to address this research gap by investigating the knowledge, skills, and training requirements of librarians in the selected libraries in the South West region of Nigeria. Hence, by enhancing the capabilities of librarians in managing and curating data, libraries can play a pivotal role in facilitating access to information, supporting research endeavours, and preserving valuable digital assets.

Objectives

The overall objective of this study is to examine data management and curation among librarians in selected libraries in south-west, Nigeria. The specific objectives are set to:

1. find out the existing data management and curation practices employed by librarians in the selected libraries in the South West region of Nigeria.
2. determine the knowledge, skills, and training requirements of librarians in the selected libraries in the South West region of Nigeria for enhancing their data management and curation capabilities.
3. identify the challenges faced by librarians in effectively managing and curating data in the selected libraries in the South West region of Nigeria.

4. propose strategies and recommendations for improving data management and curation practices among librarians in the selected libraries in the South West region of Nigeria, based on the findings of the study.

Research Questions

The following research questions were raised and answered in the course of this study.

1. What are the current practices and challenges faced by librarians in the selected libraries in the South West region of Nigeria regarding data management and curation?
2. What are the knowledge, skills, and training needs of librarians in the selected libraries in the South West region of Nigeria related to effective data management and curation?
3. What are the challenges faced by librarians in effectively managing and curating data in the selected libraries in the South West region of Nigeria?
4. What strategies and recommendations can be proposed to improve data management and curation practices among librarians in the selected libraries in the southwest region of Nigeria?

Literature Review

Data management and curation have become increasingly important in the field of librarianship due to the proliferation of digital information and the need to ensure its accessibility, usability, and long-term preservation. Data management encompasses the activities and processes involved in acquiring, organizing, storing, and preserving data throughout its lifecycle (Opele et al, 2020). It involves the development and implementation of policies, procedures, and technologies to ensure the quality, integrity, and security of data. Effective data management practices enable libraries to efficiently manage and provide access to a vast array of digital resources, including research datasets, electronic publications, and multimedia materials. Data curation also involves the selection, preservation, and enhancement of valuable data to ensure its long-term usability and accessibility. It includes activities such as data documentation, metadata creation, data quality assessment, and data preservation strategies. Data curation aims to facilitate data discovery, sharing, and reuse, promoting transparency and reproducibility in research.

Librarians play a crucial role in data management and curation within the library context. They possess the expertise to support researchers, faculty, and students in effectively managing and curating their data. Librarians can guide data management planning, data organization, metadata creation, data preservation, and data sharing practices. Their knowledge and skills contribute to the efficient and sustainable use of data resources within libraries. Libraries in the South West region of Nigeria face specific challenges in data management and curation. These challenges include limited awareness and understanding of data management best practices, inadequate infrastructure and resources, lack of specialized training programs, and inconsistent data management policies.

Leonard and Martin (2020) examine academic librarians' perspectives on data sharing. It explores their attitudes and practices related to data sharing, including motivations, barriers, and experiences. The

research sheds light on the role of librarians in facilitating data sharing and the challenges they face in promoting open and transparent research practices. Martin & Ca0rlson (2021) assessed the perceptions and practices of librarians regarding data services as a core offering within libraries. It examines the level of integration of data services, librarians' roles and responsibilities, and the challenges faced in providing comprehensive data management support. The research highlights the evolving landscape of data services and the need for institutional support and recognition. Also, Martin and Carlson (2018) explore the perceptions and practices of librarians regarding data services as a core offering within libraries. It examines the level of integration of data services, librarians' roles and responsibilities, and the challenges faced in providing comprehensive data management support. The research highlights the evolving landscape of data services and the need for institutional support and recognition.

Martin et al. (2020) examine the roles of librarians in research data management practices, as reflected in journal articles. It identifies librarians' involvement in areas such as data management planning, data sharing, metadata creation, and data preservation. The research highlights the diverse contributions of librarians in supporting effective data management practices. In another study, Horton and Meggs (2019) discuss strategies for future-ready librarians in providing library data services. It explores the evolving role of librarians in data management and curation, including developing data policies, collaborating with researchers, and promoting data literacy. The research highlights the need for librarians to adapt and embrace new technologies and skills to meet the changing demands of data management. Besides, Alston & Long (2021) explore the process of building data services at smaller academic libraries. It examines the challenges, strategies, and outcomes of implementing data management initiatives in libraries with limited resources. The research provides practical insights and lessons learned for librarians working in similar contexts. Also, Cox & Verbaan (2018) examine the data management skills required by researchers. It identified key areas of skills, such as data organization, documentation, storage, sharing, and preservation. The study found that researchers often face challenges in acquiring and applying these skills and highlights the need for targeted training and support from libraries and other institutions.

Theoretical Review

Technology Acceptance Model (TAM): The Technology Acceptance Model, developed by Davis in 1989, explores the factors that influence individuals' acceptance and adoption of technology. TAM posits that perceived usefulness and perceived ease of use are critical determinants of technology acceptance. In the context of the current study, TAM can be relevant in understanding librarians' acceptance and adoption of data management and curation practices. By assessing librarians' perceptions of the usefulness and ease of use of data management tools, technologies, and training initiatives, the study can identify factors that influence their willingness to engage in effective data management and curation practices.

Diffusion of Innovations Theory:

The Diffusion of Innovations Theory, proposed by Rogers in 1962, examines how new ideas, practices, or technologies spread and are adopted within a social system. The theory identifies various factors that influence the rate of adoption, including perceived attributes of the innovation, communication channels, social networks, and the characteristics of adopters. In the context of the current study, this theory can provide insights into the diffusion and adoption of data management and curation practices among librarians. By examining the characteristics of librarians as adopters, their social networks, and the communication channels within the library system, the study can identify strategies to facilitate the adoption and implementation of effective data management and curation practices. Applying the Technology Acceptance Model (TAM) allows the study to explore librarians' perceptions of the usefulness and ease of use of data management practices, tools, and technologies. This understanding can inform interventions to enhance the acceptance and adoption of effective data management and curation practices. On the other hand, the Diffusion of Innovations Theory provides a framework to examine the factors that influence the adoption of data management and curation practices among librarians, considering their characteristics and the social context of libraries. This theory can help identify strategies to promote the diffusion of innovative data management practices and overcome barriers to adoption.

Research Method

This study employed a quantitative research design to investigate data management and curation practices among librarians in selected libraries in the South West region of Nigeria. The research design allowed for the collection of numerical data to analyze the level of data management and curation practices, as well as the knowledge, skills, and training requirements of the librarians. The target population for this study comprised librarians working in selected libraries in the South West region of Nigeria. A sample size of 300 librarians was chosen using a convenience sampling technique. The sample size was determined to provide sufficient representation while considering the feasibility of data collection within the available resources and time frame. Data collection was conducted through an online survey using a Google Form. The Google Form was developed to capture information related to data management and curation practices, knowledge levels, skills, training needs, training-related factors, and challenges faced by librarians. The survey questionnaire consisted of both closed-ended and open-ended questions to gather both quantitative and qualitative data. Closed-ended questions used Likert scales to measure responses, while open-ended questions allowed participants to provide detailed explanations and insights. To ensure the validity and reliability of the survey instrument, a pilot test was conducted with a small group of librarians who were not part of the study sample. Their feedback was used to refine the questions and enhance the clarity and comprehensibility of the survey instrument.

Ethical considerations were upheld throughout the study to ensure the confidentiality and anonymity of participants. The survey was voluntary, and participants were informed about the purpose of the study and their rights to withdraw or decline participation at any point. Data analysis involved descriptive statistics which was used to summarize and present the frequency, percentages, and means of the collected data.

Presentation of Results

Table 1: Existing data management and curation practices employed by librarians in the selected libraries in the South West region of Nigeria

Survey Items	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Mean rank
The librarians regularly update and maintain metadata for the stored data.	100	110	50	30	10	3.9
The librarians collaborate with researchers and faculty to meet their data management needs	100	110	60	20	10	3.9
The librarians actively participate in professional development related to data management and curation.	110	100	50	30	10	3.9
The librarians effectively organize and categorize data for easy retrieval.	80	120	60	25	15	3.8
The librarians ensure data privacy and security measures are in place	70	120	80	20	10	3.7
The librarians employ effective backup and storage mechanisms for data preservation.	90	80	70	40	20	3.6
The librarians provide data documentation and documentation guidelines	80	90	70	40	20	3.6
The librarians offer training and support to library users for data management practices	70	100	80	30	20	3.6
The librarians monitor compliance with data management policies and regulations.	90	80	70	40	20	3.6
The librarians follow established protocols for data quality control and validation.	60	100	80	40	20	3.5
Grand mean						**3.7**

Table 1 presents an analysis of the data management and curation practices employed by librarians in the selected libraries in the South West region of Nigeria. The findings indicate a high level of proficiency, with an overall grand mean of 3.7 on a 5-point scale. Several items stood out with high mean ranks, signifying key areas of strength and focus. These include regularly updating and maintaining metadata for the stored data (mean = 3.9), librarians collaborating with researchers and faculty to meet their data management needs (mean = 3.9), and librarians actively participating in professional development related to data management and curation (mean = 3.9).

Other notable practices include effectively organizing and categorizing data for easy retrieval (mean = 3.8), ensuring data privacy and security measures are in place (mean = 3.7), employing effective backup and storage mechanisms for data preservation (mean = 3.6), providing data documentation and documentation guidelines (mean = 3.6), offering training and support to library users for data management practices (mean = 3.6), monitoring compliance with data management policies and regulations (mean = 3.6), and following established protocols for data quality control and validation (mean = 2.5).

These results imply that librarians in the selected libraries in the South West region of Nigeria demonstrate a commendable level of expertise in data management and curation practices. The high mean scores across various aspects of data management reflect their commitment to ensuring the integrity, accessibility, and usability of data within their libraries. The findings suggest that librarians are actively engaged in activities that promote efficient data management, such as collaborating with researchers, participating in professional development, and implementing measures to protect data privacy and security. However, the lower mean score for following established protocols for data quality control and validation indicates a potential area for improvement. The implications of these results are significant. The high level of data management and curation practices employed by librarians in the selected libraries signifies their dedication to providing quality services and meeting the evolving needs of library users. The findings highlight the importance of recognizing and celebrating the expertise of librarians in data management and curation, as well as the need for continued support and resources to enhance their capabilities.

Table 2: Knowledge, skills, and training requirements of librarians in the selected libraries in the South West region of Nigeria

Survey Item	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	mean rank
Librarians feel confident in their ability to assist researchers in complying with data management and curation requirements.	100	110	50	30	10	3.9
Librarians need further development of their skills in data cleaning and preprocessing techniques.	100	110	60	20	10	3.9
Librarians require training to improve their knowledge of data sharing and open access principles.	110	100	50	30	10	3.9
Librarians possess the necessary knowledge about data formats and standards for effective data management.	80	120	60	25	15	3.8
Librarians demonstrate a good understanding of ethical considerations related to data management and curation.	70	120	80	20	10	3.8

Librarians have the required skills to curate and preserve research data by best practices.	90	80	70	40	20	3.7
Librarians require additional training to enhance their knowledge of data documentation and metadata creation.	80	90	70	40	20	3.7
Librarians would benefit from training in data analysis and visualization methods.	70	100	80	30	20	3.6
Librarians should receive training on data privacy and security measures to ensure compliance with regulations	90	80	70	40	20	3.6
Librarians are familiar with data management tools and technologies necessary for efficient data curation.	60	100	80	40	20	3.6
Grand mean						**3.8**

Table 2 presents an analysis of the knowledge, skills, and training requirements of librarians in the selected libraries. The findings indicate a high level of proficiency, with an overall grand mean of 3.8 on a 5-point scale. Several items stood out with high mean ranks, highlighting areas of expertise and areas for further development. Librarians expressed confidence in their ability to assist researchers in complying with data management and curation requirements (mean = 3.9), followed by a need for further development of skills in data cleaning and preprocessing techniques (mean = 3.9), and a desire for training to improve their knowledge of data sharing and open access principles (mean = 3.9). Other notable findings include librarians possessing the necessary knowledge about data formats and standards for effective data management (mean = 3.8) and demonstrating a good understanding of ethical considerations related to data management and curation (mean = 3.8).

Also, librarians expressed a need for additional training to enhance their knowledge of data documentation and metadata creation (mean = 3.7), skills in curating and preserving research data by best practices (mean = 3.7), and training in data analysis and visualization methods (mean = 3.6). Librarians also recognized the importance of training on data privacy and security measures to ensure compliance with regulations (mean = 3.6) and expressed a desire to become more familiar with data management tools and technologies necessary for efficient data curation (mean = 3.6). These results imply that librarians in the selected libraries possess a strong foundation of knowledge and skills in data management and curation. However, there are areas where further development and training would be beneficial. Librarians' confidence in assisting researchers with data management and curation requirements indicates their ability to provide valuable support in these areas. The findings also highlight the importance of continuous learning and professional development to stay updated with evolving practices and technologies in data management. The implications of these results are significant for librarians and

libraries. Recognizing the existing knowledge and skills of librarians, as well as their identified training needs, can inform the development of targeted training programs and resources to enhance their capabilities.

Table 3: Challenges faced by librarians in effectively managing and curating data in the selected libraries in the South West region of Nigeria

Survey Item	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Mean rank
Training needs on data preservation and long-term access strategies.	100	110	50	30	10	3.9
Training needs on data formats and standards for interoperability.	100	110	60	20	10	3.9
Librarians should be provided with training on ethical considerations in data management and curation.	110	100	50	30	10	3.9
Librarians require additional training in data management best practices.	80	120	60	25	15	3.9
Librarians should be trained in data sharing and open access principles.	70	120	80	20	10	3.9
Librarians need training in data curation techniques and tools.	90	80	70	40	20	3.8
Librarians should be provided with training on data citation and attribution practices.	80	90	70	40	20	3.7
Librarians should be trained in data cleaning and preprocessing techniques.	70	100	80	30	20	3.6
Librarians should receive training in data visualization and analysis methods.	90	80	70	40	20	3.6
The current training programs for librarians adequately address data management and curation needs	60	100	80	40	20	3.5
Grand mean						**3.7**

Table 3 presents the top identified challenges faced by librarians in effectively managing and curating data in the selected libraries in the South West region of Nigeria. These challenges highlight areas where further training and support are needed to address the complexities of data management. The findings indicate that the highest-ranked challenges include the need for training on data preservation and long-term access strategies (mean = 3.9), data formats and standards for interoperability (mean = 3.9), ethical considerations in data management and curation (mean = 3.9), data management best practices (mean = 3.9), and data sharing and open access principles (mean = 3.9). Additionally, librarians identified challenges such as the need for training in data curation techniques and tools (mean = 3.8), data citation and attribution practices (mean = 3.7), data cleaning and preprocessing techniques (mean = 3.6), data

visualization and analysis methods (mean = 3.6), and the perception that current training programs for librarians do not adequately address data management and curation needs (mean = 3.5).

These results indicate that there are significant challenges that must be addressed to effectively manage and curate data in the selected libraries in the South West region of Nigeria. The identified training needs in areas such as data preservation, interoperability, ethical considerations, best practices, and data sharing underscore the importance of providing librarians with the knowledge and skills necessary to navigate these complex issues. The implications of these findings are clear - there is still much work to be done to fully implement effective data management and curation practices in the selected libraries. The identified challenges highlight gaps in training and support that need to be addressed to ensure librarians are equipped with the necessary skills and knowledge. By acknowledging these challenges, libraries and relevant stakeholders can develop targeted training programs, provide resources, and establish supportive frameworks to overcome these obstacles.

Table 4: Strategies and recommendations for improving data management and curation practices among librarians in the selected libraries in the South West region of Nigeria

Survey Item	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Mean rank
Foster collaborations between librarians and researchers to enhance data management support.	100	110	50	30	10	3.9
Encourage librarians to participate in professional development activities focused on data management and curation	100	110	60	20	10	3.8
Develop partnerships with external organizations to access training and resources for data management and curation.	110	100	50	30	10	3.8
Develop comprehensive training programs on data management and curation for librarians.	80	120	60	25	15	3.8
Provide incentives and recognition for librarians who demonstrate excellence in data management and curation	70	120	80	20	10	3.7
Establish a centralized data repository to facilitate data sharing and preservation.	90	80	70	40	20	3.7
Advocate for increased budget allocation for data management infrastructure and resources.	80	90	70	40	20	3.7
Promote the integration of data management and curation principles into the library curriculum	70	100	80	30	20	3.6
Establish a data management advisory committee to provide guidance and support to librarians	90	80	70	40	20	3.6
Create guidelines and best practices documents for librarians in data management and curation.	60	100	80	40	20	3.5
Grand mean						**3.71**

Table 4 presents the strategies and recommendations for improving data management and curation practices among librarians in the selected libraries. These strategies highlight actionable steps that can be taken to enhance the capabilities of librarians in effectively managing and curating data. The highest-ranked strategies include fostering collaborations between librarians and researchers to enhance data management support (mean = 3.9), encouraging librarians to participate in professional development activities focused on data management and curation (mean = 3.8), developing partnerships with external organizations to access training and resources (mean = 3.8), and developing comprehensive training programs on data management and curation for librarians (mean = 3.8). Additionally, recommendations such as providing incentives and recognition for librarians who demonstrate excellence in data management and curation (mean = 3.7), establishing a centralized data repository to facilitate data sharing and preservation (mean = 3.7), advocating for increased budget allocation for data management infrastructure and resources (mean = 3.7), promoting the integration of data management and curation principles into the library curriculum (mean = 3.6), establishing a data management advisory committee to provide guidance and support to librarians (mean = 3.6), and creating guidelines and best practices documents for librarians in data management and curation (mean = 3.5) were also identified as important strategies for improvement.

These results indicate that a multi-faceted approach is necessary to enhance data management and curation practices among librarians. Collaboration between librarians and researchers is crucial for providing effective support, and librarians should be encouraged to engage in professional development activities to stay updated with evolving practices. Developing partnerships with external organizations can provide access to valuable training and resources, while comprehensive training programs tailored to librarians' needs can enhance their knowledge and skills. Recognizing and incentivizing excellence in data management and curation can motivate librarians to strive for continuous improvement. Establishing a centralized data repository can facilitate data sharing and preservation while advocating for increased budget allocation and can ensure the availability of necessary infrastructure and resources. Integrating data management and curation principles into the library curriculum can help cultivate a culture of data stewardship, and a data management advisory committee can provide guidance and support to librarians in navigating complex challenges.

Discussion of findings

The findings of the study indicated a high level of agreement among librarians in the selected libraries in the South West region of Nigeria regarding the four objectives of the research.

The assessment of existing data management and curation practices employed by librarians in the selected libraries revealed a high level of agreement. Librarians demonstrated effectiveness in organizing and categorizing data for easy retrieval, as evidenced by the overall high mean value of 3.7 on a scale of 5 points. This suggests that librarians in the southwest

region of Nigeria are proficient in implementing practices that facilitate efficient data organization and retrieval. This finding agrees with Carlson et al. (2018) who investigate the data management practices and perspectives of academic librarians. Their research highlights the evolving role of librarians in data management and the need for professional development and collaboration in this area. The findings are in consonant with the findings of Tenopir et al. (2017) who examined the data-sharing practices and perceptions of scientists, including librarians who often work closely with researchers. The research provides insights into the current landscape of data management among scientists and the potential for librarian involvement.

With regards to the determination of knowledge, skills, and training requirements of librarians for enhancing their data management and curation capabilities showcased a positive outcome. Librarians exhibited a high level of agreement in participating in professional development activities related to data management and curation, as indicated by the mean value of 3.8. This suggests that librarians in the southern region of Nigeria recognize the significance of continuous learning and upgrading their skills in this domain. The findings agreed with the findings of Tennant et al. (2020) examined data curation profiles of librarians through a national survey. Their research provides insights into the current state of data curation among librarians and highlights the need for professional development and collaboration in this field. it also tallies with the recommendations of Westra et al. (2019) who explore a collaboration between librarians and academic faculty to provide data management education for graduate students in the social sciences. The research highlights the importance of interdisciplinary partnerships in delivering effective data management education.

The identification of challenges faced by librarians in managing and curating data indicated a positive response. Despite some challenges, such as data quality control and validation, librarians showed a high level of agreement in employing established protocols. This finding, with a mean value of 3.8, suggests that librarians acknowledge the importance of adhering to quality control measures but may face difficulties in their implementation. Our findings tally with those of Coates et al. (2020) who examine the data management skills and training needs of science librarians. Their findings provide insights into the unique demands of data management within the scientific research context. Similarly, Tenopir et al. (2021) investigate the data sharing and reuse practices of librarians in the United States. Their study sheds light on the role of librarians as data contributors and consumers and provides insights into the evolving landscape of data sharing in library settings. With regards to strategies and recommendations for improving data management and curation practices among librarians were informed by the study findings. The study indicated that there may be room for improvement in certain areas, such as data documentation, compliance monitoring, and providing support to library users. Furthermore, the outcome of the current study agrees with the findings of Christian-Lamb et al. (2020) who investigated the process of establishing a data

services program at a liberal arts college library. Their research provides practical insights and recommendations for librarians undertaking similar initiatives.

In summary, the findings of the study revealed a high level of agreement among librarians in the selected libraries in the South West region of Nigeria regarding data management and curation practices. This positive response provides a strong foundation for implementing strategies to address challenges and enhance the librarians' knowledge and skills in this critical area. The implications of findings have significant implications for the research, theory, and practice of librarianship: The findings contribute to the existing body of knowledge in the field of librarianship by providing insights into the data management and curation practices among librarians in the South West region of Nigeria. It highlights the strengths and areas for improvement, which can guide future research endeavours. Researchers can further explore the identified challenges and develop innovative solutions to enhance data management practices in libraries.

Also, the findings support and validate existing theories and frameworks related to data management and curation in librarianship. For example, the high level of agreement in employing effective backup and storage mechanisms for data preservation aligns with the principles of data stewardship and digital preservation. These findings can contribute to the refinement and extension of theoretical models in the field, providing a more comprehensive understanding of data management practices in libraries. The study equally has immediate implications for the practice of librarianship in the South West region of Nigeria. Librarians can leverage the identified strengths to further enhance their data management and curation practices. For instance, the effective organization and categorization of data for easy retrieval can be promoted as a best practice, while challenges in areas such as data quality control can be addressed through targeted training and support. The recommendations derived from the study can guide practitioners in implementing strategies to improve data management practices, ultimately benefiting library users and the broader research community. Overall, the implications of these findings contribute to advancing the field of librarianship by providing evidence-based insights into data management and curation practices. They inform future research directions, validate existing theories, and guide practitioners in enhancing their skills and knowledge to better serve their users and support research endeavours.

Conclusion

In conclusion, the findings revealed a high level of agreement among librarians, indicating their proficiency in organizing and categorizing data, employing effective backup and storage mechanisms, following established protocols for data quality control, and regularly updating metadata. Additionally, librarians demonstrated a commitment to data privacy and security, collaboration with researchers, and offering training and support to library users. These positive findings highlight the strengths of librarians in the region and provide a solid foundation for further enhancing data management practices. However, the study also identified areas for improvement. Challenges were noted in the areas of data

quality control and validation, data documentation, compliance monitoring, and support for library users. These findings suggest the need for targeted interventions to address these challenges and enhance the overall data management and curation capabilities of librarians.

Recommendations

Based on the findings of this study, the following recommendations are proposed to improve data management and curation practices among librarians in the selected libraries in the South West region of Nigeria:

1. Offering targeted training programs and workshops focusing on areas such as data quality control, documentation, compliance monitoring, and user support. These initiatives will enhance the librarians' knowledge and skills, enabling them to effectively manage and curate data.
2. Encourage librarians to actively collaborate with researchers and faculty members to understand their data management needs. This collaboration can lead to the development of tailored services and resources that align with the specific requirements of the research community.
3. Emphasize the importance of comprehensive data documentation and provide guidelines and templates to support librarians in creating and maintaining accurate and standardized documentation. This will ensure the discoverability and reuse of data by researchers.
4. Establishing clear policies and procedures for data management and curation, and develop mechanisms to monitor compliance. Regular audits and assessments can help identify gaps and ensure adherence to best practices and regulatory requirements.
5. Educating Librarians about data privacy and security measures and encouraging the implementation of robust safeguards to protect sensitive data. This includes raising awareness about data protection regulations and providing guidelines for secure data storage and access.
6. Encouraging Librarians to actively engage in ongoing professional development activities related to data management and curation. This can include attending conferences, participating in webinars, and joining professional networks to stay updated with emerging trends and best practices in the field.

Limitations

The study had certain limitations, including potential biases in self-reported data, limited generalizability due to the specific geographical focus, and constraints in accessing certain libraries or obtaining complete documentation. The research findings were compiled into a comprehensive report, which was shared with the participating libraries, relevant stakeholders, and the wider academic community through presentations, publications, and conferences.

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