

UTILIZATION OF ROBOTICS IN ENHANCING SERVICE DELIVERY TO USERS IN ACADEMIC LIBRARIES IN NIGERIA

By

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Abstract

This study investigated the utilization of robotics in enhancing service delivery to users in academic libraries in Nigeria. Employing a survey research design, the study aimed to (1) assess the robotic technologies available for service delivery; (2) identify potential areas for effective utilization; (3) evaluate the perceived impact on user satisfaction; and (4) examine challenges in their utilization. The sample comprised 50 librarians purposively selected from two universities and two polytechnics across Rivers and Anambra States. Data were collected using an observation checklist and a questionnaire, validated by three experts, and yielding a Cronbach's Alpha reliability coefficient of 0.79. Descriptive statistics, including mean scores and standard deviation, were used for data analysis. The findings revealed a complete absence of robotic technologies in the surveyed libraries, indicating a significant lag in automation. However, librarians expressed strong consensus on the potential of robotics to enhance operational efficiency, including increased convenience, personalized assistance, and a modern library image. Despite this optimism, librarians strongly perceived several challenges, notably high initial costs, lack of technical expertise, potential user resistance, technical malfunctions, data privacy concerns, and customization difficulties. The study concludes that while the potential of robotics is recognized, significant infrastructural and capacity gaps hinder its adoption. It recommends the initiation of pilot programs with low-cost technologies, fostering partnerships with technology institutions, developing best practice guidelines, providing targeted staff training, and establishing robust data privacy protocols to facilitate the integration of robotics in Nigerian academic libraries.

Keywords: Robotics, Service Delivery, Academic Libraries, User Satisfaction, Nigeria, Automation, Challenges.

Introduction

The landscape of academic libraries is undergoing a significant transformation, driven by rapid advancements in technology and evolving user expectations. Traditionally, libraries have served as repositories of knowledge, providing access to physical resources and offering assistance with information retrieval. However, the digital age has necessitated a shift

towards more dynamic and user-centric services. In Nigeria, academic libraries face unique challenges, including limited resources, infrastructure constraints, and a growing demand for digital literacy and access. In this context, the potential of robotics to enhance service delivery is gaining increasing attention. Robotics, with its ability to automate repetitive tasks, improve efficiency, and provide personalized assistance, offers a promising avenue for addressing these challenges. The integration of robotic technologies in academic libraries is not merely a technological upgrade but a strategic move towards creating more responsive and accessible learning environments. The application of robotics could range from information retrieval and book handling to providing personalized user assistance and enhancing accessibility for users with disabilities (Murphy & Tadokoro, 2020).

The concept of utilizing robotics in service delivery is not entirely novel, but its application within the specific context of Nigerian academic libraries presents a unique area of exploration. Globally, libraries are experimenting with robotic systems to streamline operations and improve user experiences. For instance, automated storage and retrieval systems (ASRS) have been implemented in some libraries to optimize space utilization and enhance retrieval efficiency (Botta et al., 2016). Furthermore, the development of service robots capable of providing wayfinding assistance, answering frequently asked questions, and delivering materials is also being explored (El Zaatari et al., 2019). However, the adaptation of these technologies to the specific needs and challenges of Nigerian academic libraries requires careful consideration of local contexts, including infrastructure limitations, cultural factors, and resource constraints. The potential benefits of robotics in addressing these challenges include improved efficiency in resource management, enhanced accessibility for users with disabilities, and the ability to provide personalized assistance to a diverse user population.

The integration of robotics in academic libraries aligns with the broader trend of digital transformation in higher education. Nigerian academic libraries, like their counterparts globally, are increasingly adopting digital technologies to enhance teaching, learning, and research (Ezejiofor, Agim & Ndanwu, 2022). This includes the implementation of library management systems, digital repositories, and online learning platforms. However, the

effective utilization of these technologies requires a robust infrastructure and a skilled workforce capable of managing and maintaining them. The introduction of robotics can further enhance the efficiency and effectiveness of digital services by automating routine tasks and providing personalized assistance to users. For example, robotic systems can be used to manage digital collections, assist with online information retrieval, and provide virtual reference services (Levine et al., 2018). Moreover, the use of robots can also help bridge the digital divide by providing access to information and resources in remote or underserved areas.

The study of robotics in Nigerian academic libraries is particularly timely, given the increasing emphasis on innovation and technology-driven development in the country. The Nigerian government has recognized the importance of technology in driving economic growth and social development, and has launched several initiatives to promote digital literacy and access. Academic libraries, as key institutions of knowledge dissemination, have a crucial role to play in supporting these initiatives. With the need to explore the potential of robotics to enhance service delivery, this study aims to contribute to the development of more efficient, accessible, and user-centric academic libraries in Nigeria. As academic libraries aim to redefine their relevance in the digital age, there is a pressing need to explore how robotics can enhance service delivery among library users in Nigeria. This study, therefore, seeks to examine the utilization of robotics in enhancing service delivery to users in academic libraries in Nigeria.

Statement of the Problem

The ideal situation for academic libraries in Nigeria would involve seamless, efficient, and personalized service delivery to all users, facilitated by cutting-edge technologies that enhance accessibility and resource utilization. This would include rapid and accurate information retrieval, 24/7 availability of resources, and tailored assistance for diverse user needs, ensuring that libraries remain central hubs for learning and research. However, the current situation in Nigerian academic libraries often falls short of this ideal. Nigerian academic libraries, while crucial for supporting education and research, face persistent challenges in delivering efficient and timely services, including difficulties with resource

management, long wait times, and evolving user expectations in a digital age; the slow adoption of emerging technologies, such as robotics, exacerbates these issues, limiting the libraries' ability to automate routine tasks, enhance information access, and optimize service delivery. This underutilization of robotics not only hampers operational efficiency but also prevents these libraries from fully meeting the dynamic needs of their users, potentially hindering academic productivity and the development of essential information literacy skills among students and researchers. Consequently, there is a growing need to explore and implement robotic solutions to transform library operations, improve service quality, and ensure that Nigerian academic libraries remain relevant and effective in the 21st century.

Previous studies on the integration of technology in Nigerian academic libraries have largely focused on the adoption of digital resources and library management systems. While these studies have provided valuable insights into the challenges and opportunities associated with digital transformation, they have often overlooked the potential of robotics to enhance service delivery. A significant gap exists in understanding how robotic technologies are effectively implemented to address specific challenges faced by Nigerian academic libraries, as well the impact of robotics on user satisfaction and library efficiency in this context. This study therefore seeks to fill the gap by providing empirical evidence on the subject matter.

Research Questions

1. What are the robotic technologies available for service delivery within Nigerian academic libraries?
2. What are the potential areas where robotic technologies can be effectively utilized to enhance service delivery?
3. What are the perceived impacts of robotic technologies on user experience and satisfaction in academic libraries?
4. What are the challenges in the utilization of robotics in enhancing service delivery to users in academic libraries?

Review of Related Literature

Service Delivery in Academic Libraries

Service delivery in academic libraries has evolved significantly, shifting from a focus on physical resource provision to a multifaceted approach encompassing information access, instruction, and user support. Contemporary academic libraries strive to provide seamless and personalized services that cater to the diverse needs of their user populations, including students, faculty, and researchers. The emphasis is on facilitating information literacy, supporting research endeavors, and fostering a conducive learning environment. Recent studies highlight the importance of integrating digital technologies to enhance service delivery, such as online databases, virtual reference services, and digital repositories (Nicholas et al., 2017). Moreover, the concept of service delivery extends beyond resource provision to include the creation of collaborative learning spaces and the provision of expert assistance in information retrieval and evaluation (Julien et al., 2018). Effective service delivery in academic libraries requires a deep understanding of user needs, a commitment to continuous improvement, and a willingness to adapt to the rapidly changing information landscape.

The integration of technology has transformed how academic libraries deliver services, enabling them to reach a wider audience and provide more efficient and accessible resources. The rise of digital resources and online learning platforms has necessitated a shift towards blended service models, combining traditional library services with digital tools and platforms (Cox et al., 2019). Academic librarians are increasingly involved in providing digital literacy instruction, assisting users with online research, and managing digital collections. Furthermore, service delivery in academic libraries also encompasses the creation of inclusive and accessible environments that cater to the needs of users with disabilities. The concept of user experience (UX) has become increasingly relevant, with libraries focusing on designing services and spaces that are user-friendly and intuitive. As noted by Agim, Abah, and Ezejiofor (2025), they attested that there is a clear need for continuous training and adaptation of library staff to be able to effectively deliver service in the digital era. Agim, et al (2025) also highlighted the importance of user feedback and the need to design services that are tailored to the specific needs of the academic community.

In addition to technological integration, service delivery in academic libraries involves building strong relationships with users and fostering a sense of community. This includes providing personalized assistance, offering tailored research support, and creating opportunities for collaboration and knowledge sharing. Academic libraries play a vital role in supporting the academic mission of their institutions, contributing to student success and research productivity. The concept of library as place remains relevant, with libraries providing physical spaces that facilitate learning, collaboration, and social interaction. Moreover, academic libraries are increasingly involved in promoting open access initiatives and supporting the dissemination of scholarly research. Effective service delivery in academic libraries requires a commitment to continuous improvement, a focus on user needs, and a willingness to adapt to the evolving information landscape.

Robotics in Library Applications

The application of robotics in library settings is an emerging field that holds significant potential for enhancing service delivery and optimizing operational efficiency. Robotics technologies are being explored and implemented to automate routine tasks, improve resource management, and provide innovative user experiences. Automated Storage and Retrieval Systems (ASRS), for instance, are being utilized to streamline the storage and retrieval of library materials, maximizing space utilization and minimizing retrieval time (Botta et al., 2016). Furthermore, robots are being developed to perform tasks such as shelf-reading, inventory management, and material transportation, freeing up library staff to focus on more complex and user-centric activities. The integration of robotic technologies also extends to the provision of user assistance, with robots being deployed as information kiosks, wayfinding guides, and virtual reference assistants. These applications aim to improve accessibility, enhance user engagement, and create more interactive and dynamic library environments.

Beyond logistical and operational applications, robotics is also being explored for its potential to enhance user interaction and information access. Humanoid robots and telepresence robots are being developed to provide personalized assistance, conduct library tours, and facilitate remote access to library resources. These technologies can cater to the

diverse needs of library users, including those with disabilities or limited mobility, by providing accessible and inclusive services. Moreover, the integration of artificial intelligence (AI) and chatbots is enabling libraries to provide automated online assistance, answer frequently asked questions, and guide users to relevant resources (Levine et al., 2018). These AI-powered systems can enhance the efficiency of reference services and provide 24/7 support to users, regardless of their location or time zone. The development of robotic inventory systems also helps libraries maintain accurate and up to date records of their collection.

The implementation of robotics in library applications requires careful consideration of factors such as cost, feasibility, and user acceptance. While the potential benefits are significant, libraries must address challenges related to infrastructure, staff training, and ethical considerations. The successful integration of robotic technologies requires a strategic approach that aligns with the library's mission and goals, and a commitment to continuous evaluation and improvement. Future research should focus on exploring the long-term impact of robotics on library services, user experiences, and operational efficiency. Furthermore, it is important to study the best practices for the deployment of such technologies, as well as developing frameworks that can guide library professionals in the effective utilization of robotic systems.

Methodology

This study adopts the survey research design. The sample population of the study comprised of the Librarians from tertiary institutions in Rivers and Anambra state. The study sample was librarians in polytechnics and universities in Rivers and Anambra state. For Rivers state, Federal Polytechnic of Oil and Gas Bonny and Rivers State University were selected. For Anambra state, the Federal Polytechnic Oko and University on the Niger Umunya were used. The sample selected were 50 librarians through the purposive sampling technique. The reason for the adoption of the purposive sampling method was to select participants who are familiar with library ICT and AI tools. The observation checklist and questionnaire were the research instruments used for data collection. The instrument was validated by 3 experts. The Crombach Alpha a reliability method was used to test the internal

consistency of the instrument. A reliability coefficient of 0.79 was gotten. Data collected was analyzed using descriptive statistics of mean scores and standard deviation

Results

Research Question 1: What are the robotic technologies available for service delivery within Nigerian academic libraries?

Table 1: Observation Checklist on Robotic Technologies Available for Service Delivery in academic libraries

(N=50 Librarians)			
S/N	Items	Available	Not Available
1	Automated Storage and Retrieval Systems (ASRS)		x
2	Shelf-Reading Robots		x
3	Robotic Delivery Systems		x
4	Information Kiosk Robots		x
5	Humanoid Robots for User Assistance		x
6	Telepresence Robots		x
7	Chatbots		x
8	Robotic Inventory Systems		x
9	Robots for Book Handling and Sorting		x
10	Robots for Library Security		x

The data presented in Table 1, based on the observation checklist of robotic technologies available for service delivery within polytechnic and university libraries in Rivers and Anambra States, indicates that none of the listed robotic technologies are currently available. For all ten items, including Automated Storage and Retrieval Systems (ASRS), Shelf-Reading Robots, Robotic Delivery Systems, Information Kiosk Robots, Humanoid Robots for User Assistance, Telepresence Robots, Chatbots, Robotic Inventory Systems, Robots for Book Handling and Sorting, and Robots for Library Security, the responses showed that these technologies are "Not Available." This observation suggests a significant gap in the adoption and implementation of robotic technologies within the surveyed academic libraries.

The findings from the observation checklist reveal a complete absence of robotic technologies in the sampled polytechnic and university libraries within Rivers and Anambra

States. The results highlight a significant lag in technological advancement in comparison to global trends in library automation. This result is in line with previous studies such as the study conducted by Ivwurie and Ogbomo (2020) who found that many academic libraries in Nigeria struggle with the adoption of advanced technologies due to infrastructural limitations and funding constraints. The study highlighted that the limited availability of resources and the lack of technical expertise hinder the implementation of robotic systems, supporting the observation that advanced robotic technologies are not yet prevalent in Nigerian academic libraries. Also, research by Adetayo and Popoola (2018) revealed that while there is an awareness of emerging technologies, actual implementation remains low. The authors identified a significant gap between the perceived benefits of technologies like robotics and their practical application, largely due to financial and technical challenges. Similarly, a study by Eze and Igwe (2019) found that many libraries lack the necessary infrastructure to support advanced technologies, including robotics. This lack of infrastructure, coupled with inadequate funding, contributes to the non-adoption of robotic systems, reinforcing the findings of this observation checklist.

Research question 2: What are the potential areas where robotic technologies can be effectively utilized to enhance service delivery?

Table 2: Mean Responses on Potential Areas for Robotic Technologies to Enhance Service Delivery (N=50 Librarians)

S/N	Items	Mean	SD	Remarks
1	Robotic systems could significantly improve the efficiency of book retrieval and return processes within the library.	2.80	0.70	Agree
2	Robots would be valuable in providing wayfinding and directional assistance to users within the library space.	2.65	0.65	Agree
3	Robotic information kiosks could offer personalized assistance and answer frequently asked questions from library users.	3.20	0.75	Strongly Agree
4	Robotic delivery systems could enhance the delivery of interlibrary loan materials to users' designated locations.	2.90	0.72	Agree
5	Robots equipped with AI could provide 24/7 virtual reference assistance to users, improving access to information outside of traditional library hours.	2.75	0.68	Agree
6	Robotic systems could be effectively employed for inventory	3.30	0.78	Strongly

	management and shelf-reading tasks, ensuring accurate and up-to-date collection information.			Agree
7	Robots could be designed to assist users with disabilities, providing accessible information and physical assistance within the library.	3.10	0.80	Strongly Agree
	Grand Mean	2.96		Agree

The data in Table 2 reveals the perceived potential areas where robotic technologies can be effectively utilized to enhance service delivery, as rated by librarians in polytechnics and universities in Rivers and Anambra States. The items that were rated "Agree" included: "Robotic systems could significantly improve the efficiency of book retrieval and return processes within the library" (Mean=2.80), "Robots would be valuable in providing wayfinding and directional assistance to users within the library space" (Mean=2.65), "Robotic delivery systems could enhance the delivery of interlibrary loan materials to users' designated locations" (Mean=2.90), and "Robots equipped with AI could provide 24/7 virtual reference assistance to users, improving access to information outside of traditional library hours" (Mean=2.75). The items that were rated "Strongly Agree" were: "Robotic information kiosks could offer personalized assistance and answer frequently asked questions from library users" (Mean=3.20), "Robotic systems could be effectively employed for inventory management and shelf-reading tasks, ensuring accurate and up-to-date collection information" (Mean=3.30), and "Robots could be designed to assist users with disabilities, providing accessible information and physical assistance within the library" (Mean=3.10). The grand mean of 2.96 indicates an overall agreement among the respondents regarding the potential utilization of robotic technologies to enhance service delivery.

The findings indicate a strong consensus among librarians regarding the potential of robotic technologies to enhance service delivery within academic libraries. The respondents generally agreed or strongly agreed that robotic systems could significantly improve operational efficiency, enhance user assistance, and provide accessible services. This suggests a positive perception of the potential benefits of integrating robotic technologies into library operations. This result tallies with that of Ivwurie and Ogbomo (2020) who highlighted the potential of technology to enhance library services, particularly in areas like

inventory management and user assistance. The authors found that librarians recognize the value of automated systems in improving efficiency and accessibility, which supports the positive mean scores in this table. Another study by Agim, Mohammed and Obande (2024) found that librarians were receptive to the idea of incorporating emerging technologies to improve service delivery. The study reported that librarians believed that technologies like robotic information kiosks and automated retrieval systems could significantly enhance user experience. The authors also found that there is a strong desire for improvement in library service delivery with the use of technology, particularly in areas that improves access, and user assistance. This study reinforces the results, that librarians recognize the potential of robotics to improve library services.

Research Question 3: What are the perceived impacts of robotic technologies on user experience and satisfaction in academic libraries?

Table 3: Mean Responses on Perceived Impacts of Robotic Technologies on User Experience and Satisfaction
(N=50 Librarians)

S/N	Items	Mean	SD	Remarks
1	I believe that the use of robots in the library would make accessing information more convenient.	2.85	0.60	Agree
2	I would feel comfortable interacting with a robot for assistance in the library.	2.95	0.65	Agree
3	I think that robots in the library would improve the speed and efficiency of service delivery.	2.70	0.70	Agree
4	I believe that robots in the library would enhance the overall user experience.	3.20	0.55	Strongly Agree
5	I would find it helpful if robots could provide personalized assistance based on my specific needs.	3.30	0.58	Strongly Agree
6	I believe that the use of robots would make the library feel more modern and innovative.	3.15	0.62	Strongly Agree
7	I think that robots in the library would increase my satisfaction with the library's services.	3.40	0.50	Strongly Agree
Grand Mean		3.08		Strongly Agree

The data in Table 3 presents the perceived impacts of robotic technologies on user experience and satisfaction in academic libraries, as reported by librarians from polytechnics and universities in Rivers and Anambra States. The items that were rated "Agree" included:

"I believe that the use of robots in the library would make accessing information more convenient" (Mean = 2.85), "I would feel comfortable interacting with a robot for assistance in the library" (Mean = 2.95), and "I think that robots in the library would improve the speed and efficiency of service delivery" (Mean = 2.70). The items that were rated "Strongly Agree" were: "I believe that robots in the library would enhance the overall user experience" (Mean = 3.20), "I would find it helpful if robots could provide personalized assistance based on my specific needs" (Mean = 3.30), "I believe that the use of robots would make the library feel more modern and innovative" (Mean = 3.15), and "I think that robots in the library would increase my satisfaction with the library's services" (Mean = 3.40). The grand mean of 3.08 indicates a general "Strongly Agree" response, suggesting a positive perception of the impacts of robotic technologies on user experience and satisfaction.

The findings indicate a strong positive perception among librarians in Rivers and Anambra States regarding the potential impacts of robotic technologies on user experience and satisfaction in academic libraries. The respondents generally strongly agree that robotic technologies would enhance user experience, provide personalized assistance, modernize the library, and increase user satisfaction. This finding is in agreement with the study of Adetayo and Popoola (2018) in their research that reported that librarians were optimistic about the impacts of emerging technologies on user engagement and satisfaction. The authors found that librarians perceived that technologies like robotics can improve the modernity and user-friendliness of library services. Also, Eze and Igwe (2019) in their study found that librarians anticipate that improved technological infrastructure and service delivery, including the use of modern tools like robotics, would lead to higher user satisfaction. This finding reinforces the positive perceptions shown in this table, particularly regarding the increase in user satisfaction. Also, Uzoagba, Agim and Ezejiofor (2024) found that librarians have a positive outlook on the potential of technology to improve user experience, with a focus on convenience and efficiency. The study highlighted that librarians believe that innovative technologies can significantly enhance user satisfaction.

Research Question 4: What are the challenges in the utilization of robotics in enhancing service delivery to users in academic libraries?

**Table 4: Mean Responses on Challenges in the Utilization of Robotics in Enhancing Service Delivery
(N=50 Librarians)**

S/N	Items	Mean	SD	Remarks
1	I believe that the high initial cost of implementing robotic technologies would be a significant barrier.	2.80	0.75	Agree
2	I am concerned about the potential lack of technical expertise among library staff.	3.20	0.70	Strongly Agree
3	I think that the existing infrastructure may not be adequate to support robotic technologies.	2.90	0.80	Agree
4	I anticipate potential user resistance to interacting with robots in the library.	3.10	0.78	Strongly Agree
5	I am worried about potential technical malfunctions or system failures with robotic technologies.	3.30	0.65	Strongly Agree
6	I believe ensuring data privacy and security in robotic systems would be a significant challenge.	3.05	0.82	Strongly Agree
7	I think customization of robotic systems to meet specific user needs would be difficult.	3.40	0.72	Strongly Agree
Grand Mean		3.11		Strongly Agree

The data presented in Table 4 reflects the perceived challenges in utilizing robotic technologies for enhancing service delivery in academic libraries, as reported by librarians in polytechnics and universities in Rivers and Anambra States. The items that were rated "Agree" included: "I believe that the high initial cost of implementing robotic technologies would be a significant barrier" (Mean = 2.80) and "I think that the existing infrastructure may not be adequate to support robotic technologies" (Mean = 2.90). The items that were rated "Strongly Agree" were: "I am concerned about the potential lack of technical expertise among library staff" (Mean = 3.20), "I anticipate potential user resistance to interacting with robots" (Mean = 3.10), "I am worried about potential technical malfunctions or system failures" (Mean = 3.30), "I believe ensuring data privacy and security would be a significant challenge" (Mean = 3.05), and "I think customization of robotic systems to meet specific user needs would be difficult" (Mean = 3.40). The grand mean of 3.11 indicates a general "Strongly Agree" response, suggesting that librarians perceive significant challenges in the utilization of robotics.

The findings reveal that librarians strongly perceive several challenges in the utilization of robotic technologies within academic libraries. The significant concerns include lack of technical expertise, potential user resistance, technical malfunctions, data privacy, and customization difficulties. While the high initial cost and infrastructure limitations are also noted, the overall sentiment indicates a strong recognition of multiple barriers to successful implementation. This is in alignment with previous study by Agim, Adegbite and Edeh (2025) in their study found that infrastructural limitations and the lack of technical expertise are major hindrances to the adoption of advanced technologies in Nigerian academic libraries. The study highlighted that the fear of technical malfunctions and the need for specialized skills are significant concerns. Also, Adetayo and Popoola (2018) in their research reported that the high initial cost and the perceived complexity of implementing emerging technologies are significant barriers. The authors also found that librarians were concerned about user acceptance and the need for adequate training. Ezejiofor, Agim and Ndanwu (2022) in their study found that inadequate infrastructure and the lack of skilled personnel are major challenges in the utilization of technology in academic libraries. The study also noted the concerns about data privacy and system reliability, which reinforces the findings of this table.

Conclusion

In conclusion, this study on the "Utilization of Robotics in Enhancing Service Delivery to Users in Academic Libraries in Nigeria" reveals a stark contrast between the perceived potential and the current reality. While librarians in Rivers and Anambra States demonstrate a strong consensus on the benefits of robotic technologies, recognizing their capacity to significantly improve operational efficiency, user experience, and overall satisfaction, the observation checklist indicates a complete absence of these technologies in their institutions. This highlights a substantial technological lag compared to global trends in library automation. The librarians strongly agree that robotic systems can enhance user assistance, provide accessible services, and modernize library operations, yet they also acknowledge significant challenges hindering implementation, including a lack of technical expertise, potential user resistance, concerns over technical malfunctions and data privacy, and difficulties with customization. Therefore, while the potential for robotics to

revolutionize service delivery is clearly recognized, the actual adoption is impeded by infrastructural and human capacity limitations. The study underscores the urgent need for strategic interventions, including investments in infrastructure, training programs for library staff, and user sensitization campaigns, to bridge this gap and facilitate the integration of robotic technologies in Nigerian academic libraries.

Recommendations

Based on the findings of the study on the Utilization of robotics in enhancing service delivery to users in academic libraries in Nigeria, several recommendations were made to address the identified problems:

1. Initiate pilot programs in select polytechnic and university libraries within Rivers and Anambra States, focusing on the implementation of low-cost robotic technologies such as automated book drops or basic information kiosk robots.
2. Tertiary institutions should provide practical learning and demonstration to robotic systems to enhance their utilization
3. Institutions should make significant financial investment in procuring deployable robotic technologies to enable their utilization in service delivery.
4. Organize workshops and seminars for librarians and library administrators in Rivers and Anambra States to raise awareness about the specific applications of different robotic technologies relevant to their context.
5. Conduct user awareness campaigns within the academic communities (students, faculty) to educate them about the potential benefits of robotics in the library, such as improved convenience, personalized assistance, and modern facilities.
6. Develop targeted training programs for library staff focusing on the operation, basic maintenance, and troubleshooting of the specific robotic technologies being considered for implementation.

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