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PERSPECTIVES OF LIBRARY PRACTITIONERS ON AWARENESS AND READINESS ABOUT ADOPTION OF AI IN LIBRARIES OPERATIONS AND SERVICES IN NURSING AND ALLIED HEALTH SCIENCES INSTITUTES IN KHYBER PAKHTUNKHWA-PAKISTAN

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ABSTRACT

This study investigates the perspectives of library practitioners in Nursing and Allied Health Sciences Institutes in Khyber Pakhtunkhwa, Pakistan, regarding their awareness and readiness for the adoption of Artificial Intelligence (AI) in library operations and services. Employing a mixed-methods approach, the research combines qualitative and quantitative methodologies to provide a comprehensive understanding of the subject. Through in-depth interviews and surveys, the study aims to capture the nuanced perceptions and experiences of library professionals. The qualitative aspect researches into the intricate details of practitioners' perceptions, while the quantitative analysis provides statistical data, enhancing the overall healthiness of the findings, Library practitioners at Nursing and Allied Health Sciences Institutes in Khyber Pakhtunkhwa, Pakistan, report various levels of awareness and readiness for AI integration into library operations and services. The viewpoints of library practitioners in Khyber Pakhtunkhwa, Pakistan, provide detailed insights on their readiness and receptiveness to incorporating AI into library duties at Nursing and Allied Health Sciences Institutes.

Keyword: Awareness about AI–Librarians, Readiness–adoption of AI in libraries, AI– Nursing and Allied health sciences, Khyber Pakhtunkhwa, Pakistan libraries, Awareness– Readiness–AI–Libraries.

Introduction

Artificial Intelligence

Artificial Intelligence (AI) encompasses a set of technologies, collectively referred to as AI, that enable machines to exhibit intelligent behavior comparable to that of humans (Benhamou and Janin 2018). It is a branch of computer science focused on providing machineries with the ability to mimic natural human intelligence. Through experiential learning and gradual adaptation, AI systems continually enhance their human-like capabilities. This implies that AI systems can perceive their immediate surroundings, engage in thinking processes, acquire knowledge, and respond accordingly (Merriam-Webster 2018). The foundation of artificial intelligence traces back to John McCarthy's pioneering research in 1955, based on the premise that all aspects of learning and various forms of intelligence could be replicated through machine-based processes (Wang 2019).Over the past 65 years, artificial intelligence research has made remarkable progress in both theoretical exploration and practical implementation. The utilization of artificial intelligence has become pervasive and is considered an essential skill for the future (Jiang, Li et al. 2022). Artificial intelligence, which is the oldest and most extensive domain within computer science, encompasses all aspects of emulating cognitive abilities to tackle real-world challenges and developing computers with the capacity to learn and reason akin to humans. This is why it is frequently referred to as machine intelligence (Poole, Mackworth et al. 1998).

In contrast to earlier "intelligent" IT tools, the machine learning technologies that underpin modern artificial intelligence are characterized by increased autonomy, a more profound learning capacity, and greater complexity in comprehension (Baird and Maruping 2021). The 21st century has witnessed a rapidly evolving educational landscape, primarily driven by technological advancements, including artificial intelligence (Baidoo-Anu and Ansah 2023). The field of medicine stands on the verge of a potential revolution through the integration of artificial intelligence and machine learning. As technology progresses, healthcare professionals will gain proficiency in harnessing artificial intelligence and machine intelligence, representing a mutually beneficial situation for both the practitioners and the broader society (Haug and Drazen 2023).AI can be seen as computational technologies that replicate or mimic intelligent behaviors resembling those of humans, even though their actions may diverge from human behavior. In essence, AI strives to emulate human-like intelligence through distinct computational approaches (Bhave, Teo et al. 2020).Research areas exploring AI applications in the workplace, such as machine learning and deep learning, are crucial for advancing technological solutions that can enhance efficiency and productivity. These applications have the potential to revolutionize industries worldwide by introducing intelligent systems capable of automating tasks, optimizing processes, and providing valuable insights for informed decision-making (Bhave, Teo et al. 2020). Beyond their initial programming, AI algorithms in journalism can serve as invaluable tools by handling routine tasks, enabling journalists to concentrate on more in-depth investigative reporting. This not only accelerates the news generation process but also facilitates the production of news content on a larger scale while minimizing the risk of errors (Jung, Song et al. 2017).

Library Services And Resources

Library resources encompass a broad spectrum of information sources, spanning both traditional and contemporary forms. Conventional resources include items like textbooks, magazines, journals, newspapers, editorials, encyclopedias, dictionaries, manuals, handbooks, as well as physical assets like furniture, fixtures, and dedicated library buildings (Drazen 2023), These physical resources are complemented by digital sources, including online libraries, journals, encyclopedias like Wikipedia, blogs, video blogs such as YouTube, and even historical film clips. All of these have evolved into essential components of contemporary research, making them valuable additions to the category of Library Resources (Ayiah and Tamakloe 2023).Mooers' Law, frequently cited as a principle, suggests that "an information retrieval system will tend to go unused if it's more painful to use." In essence, this implies that if users find using a library service more burdensome or uncomfortable than not using it, they might opt not to utilize it, even if the service could effectively address their needs. This

principle with users' preferences and expectations, thus promoting their effective adoption.(Buckland 2014).In order to efficiently address the information requirements of their users, libraries should give high importance to and allocate resources for various elements, encompassing physical facilities, up-to-date technology, and supportive aids. Overlooking these fundamental resources would impede the library's capacity to offer valuable services and ensure access to information for its clientele. (Ademodi 2015).Defined user satisfaction as “the degree to which the library is able to meet the demands of the user”Verma and Lalrokhawma (2018).Libraries function as service-centric institutions, with their central objective being the provision of information that meets the demands of their users. To adequately accomplish this goal, it is essential for libraries to provide reliable and relevant information resources while delivering top-notch services that are in harmony with and satisfy the varied requirements of their users (Amarasekara and Marasinghe 2020). Libraries are commonly seen as service-focused organizations that have undergone transformations due to the advent of modern information technologies (ITs). The elevated expectations of library users have necessitated librarians to adapt their service delivery approaches(Hussain 2022).To remain a valuable and relevant resource for its patrons, libraries must adapt and evolve their resources and services over time to align with the changing needs and information-seeking behaviors of users. This forward-thinking strategy ensures that the library continues to effectively meet the requirements of its community(Amarasekara and Marasinghe 2020).

The importance of conducting user surveys in academic libraries cannot be overstated, as they play a vital role in comprehending user requirements, evaluating shifts in information-seeking patterns, and measuring user contentment with the library's existing resources and services. These surveys offer invaluable perspectives that guide enhancements and elevate the overall library experience for both students and faculty(Amarasekara and Marasinghe 2020).The survey participants identified the public library as their primary source of information within their community. However, they voiced discontent with the online services provided by their libraries and bemoaned the lack of a substantial connection between the library and its users(Taufiq, Rehman et al. 2020).

Artificial Intelligence And Library Systems

In the context of Pakistan, there is a growing interest in integrating artificial intelligence into libraries. This initiative aims to not only provide valuable data from Pakistani librarians and libraries regarding the implementation of artificial intelligence in library operations and services but also to gauge the preparedness and awareness of libraries in Pakistan when it comes to adopting Artificial intelligence technology (Ajani, Tella et al. 2022). It is increasingly evident that libraries in Pakistan must reposition

themselves to fully leverage the potential of artificial intelligence and enhance the quality of their services in the digital age(Tella 2020). Artificial intelligence has rapidly reshaped numerous industries, and libraries are no exception to this transformation. The impact of AI on library operations and how it is being utilized in libraries are critical areas of discussion among librarians. Furthermore, the readiness of academic libraries in Pakistan to incorporate AI technologies into their operations and services is a topic of ongoing debate(Ajani, Tella et al. 2022). Artificial intelligence in libraries plays a vital role in supporting academic libraries in Pakistan. This includes aiding in research that utilizes AI and enhancing the services provided by these libraries through AI-driven innovations (Musib, Wang et al. 2017).

The use of a Strengths, Weaknesses, Opportunities, and Threats (SWOT) analysis is a fundamental decision-making approach commonly employed by organizations for planning the strategic implementation of critical initiatives, such as the integration of artificial intelligence. In their study, the researchers utilized this method to facilitate the incorporation of AI in libraries (Benhamou and Janin 2018).Lately, Library and Information Science (LIS) researchers in Pakistan have conducted interviews with selected university chief librarians. These interviews are focused on exploring the possible applications of artificial intelligence in their respective libraries. The findings from these interviews have been made available to the public(Ali, Naeem et al. 2020). The implementation of an automated library management system, with features such as access control, conservation, and print resource security, including an online public access catalog (Web-OPAC) to replace manual cataloging services, has significantly enhanced the operational efficiency and user experience in libraries and tertiary institutions(Yoganingrum, Rachmawati et al. 2022). To establish AI laboratories within library and information science (LIS) departments and libraries in Pakistan, collaboration between Pakistani library schools and computer science departments is essential. The primary obstacle in implementing AI technologies in university libraries is the deficiency of financial resources and technical proficiency (Ali, Naeem et al. 2020). Artificial intelligence has the potential to enhance library services by offering insights into user preferences, often referred to as customer intelligence. For instance, Halton Libraries in the UK have implemented AI to empower users in locating books and related materials (Ajani, Tella et al. 2022).

Additionally, the Hillsboro Public Library in Oregon, USA, has introduced the Book-O-Mat, a self-service book borrowing and usage trend tracking system, allowing them to make informed decisions based on the books favored by their patrons(Kalu, Oyeleke et al. 2021).The emergence of artificial intelligence technologies has led to enhancements in core library functions, including acquisitions, cataloging, categorization, information

retrieval, and library systems (Wu, Xie et al. 2019). AI technology has the potential to improve various library services, such as lending, book shelving, and cataloging library materials, among others. In addition to metadata assignment, AI technology can also facilitate non-textual searching (Asemi and Asemi 2018). By examining a curated collection of relevant papers from the Scopus database, artificial intelligence provides valuable insights to academic libraries, aiding them in the integration of AI technology into their library environments(Asemi and Asemi 2018).This article delves into the utilization of Artificial Intelligence in library services, with a strong focus on the role of libraries in shaping the regulatory framework for AI. The paper further scrutinizes the contributions of libraries in establishing ethical standards and how these efforts influence government initiatives in artificial intelligence(Bradley 2022). A bibliometric analysis was conducted on library services and resources between 2012 and 2021, revealing that, compared to various other fields like medicine, education, agriculture, and health, libraries have engaged in relatively fewer research activities related to artificial intelligence applications (Borgohain, Bhardwaj et al. 2022). Another study investigated the potential impact of artificial intelligence (AI) on library services. In this research, the author contends that libraries have the potential to evolve into virtual information and connectivity hubs, enabling librarians to offer advanced research capabilities (Pence 2022). The integration of artificial intelligence (AI) into library services and resources has effectively addressed critical challenges faced by libraries, such as cataloging, procurement, and shelving of materials. This has led to improved user satisfaction and more efficient methods of providing library services. Consequently, library patrons can now access up-to-date and reliable information quickly and effectively (Yusuf, Adebayo et al. 2022).

The conclusion suggests that most librarians possess a strong understanding of AI's incorporation in academic libraries, demonstrating a high level of awareness. Moreover, librarians generally hold a somewhat positive perception regarding the integration of AI systems. They acknowledge the potential of AI to enhance library operations and services by reducing human errors associated with repetitive tasks (Ajani, Tella et al. 2022). The readiness for incorporating AI systems into academic libraries in Nigeria is a mixed scenario. Some stakeholders are hesitant and express reservations, indicating that these libraries may not be fully prepared for the integration of AI systems into their operations and services. On the other hand, there are those who exhibit confidence in the readiness of Nigerian libraries to effectively adopt this technology within their library operations and services(Ajani, Tella et al. 2022). In contrast, the optimism, openness, and supportive attitude toward AI among leaders, practitioners, and scientists in Indonesian libraries have fostered a high level of awareness. This has also provided the essential

information needed to kickstart AI initiatives within these institutions. This positive stance and preparedness to embrace AI technologies position Indonesian libraries as well-prepared stakeholders ready to embark on AI initiatives with confidence(Harisanty, Anna et al. 2022). University libraries in Nigeria currently demonstrate a lack of readiness for the adoption and utilization of robotic technologies. This reflects their reluctance to harness the significant benefits these technologies can offer to library operations. This reluctance has the potential to hinder the modernization and efficiency improvements that such technologies could bring to the education sector in the country (Owolabi, Okorie et al. 2022).

Finally, library practitioners' opinions on awareness and readiness of preparation for the deployment of AI in library operations and services at Nursing and Allied Health Sciences colleges in Khyber Pakhtunkhwa, Pakistan, highlight both difficulties and potential. While library practitioners' degrees of knowledge and preparation vary, it is clear that AI has the potential to alter library operations and services in these institutions. Efforts to raise awareness, offer training, and establish infrastructure for AI adoption are critical to ensuring that library practitioners can effectively leverage AI's benefits. With appropriate support and investment, AI has the potential to boost information access, expedite workflows, and improve the overall quality of services provided by libraries in the healthcare education sector of Khyber Pakhtunkhwa.

Literature Review

A literature review is a systematic and comprehensive summary and analysis of existing research and scholarly works on a particular topic or subject (Jan and Sheikh 2014). It provides an overview of the current state of knowledge, identifies gaps or inconsistencies in the existing literature, and serves as a foundation for further research or study in that area (Hussain 2022).A literature review involves the assessment of various sources, including books, articles, and patents, to present the existing knowledge, including empirical findings, theoretical insights, and methodological contributions to a specific subject. It typically serves as a secondary source, distinct from book reviews, and is commonly found in academic journals, serving as a primary educational resource (Eskola, Khan et al. 2020)A literature review is a methodical exploration and evaluation of existing academic research and scholarly materials related to a particular subject or topic. It involves summarizing and synthesizing the key findings and ideas from various sources to establish a comprehensive understanding of the current state of knowledge in that area. Additionally, a literature review identifies gaps or contradictions in the existing literature, providing valuable insights for future research and academic endeavors (Hiebl 2023).A literature review is frequently utilized to delve into research problems, serving as an

extensive examination of publications relevant to a specific field of study or research area. It entails the systematic documentation of analytical research associated with the subject matter, effectively encapsulating the body of work pertaining to the topic or theme under consideration (Hiebl 2023).

A comprehensive review of AI-related studies in libraries was conducted, encompassing empirical research, conceptual papers, and literature reviews. These studies were gathered from sources such as Scopus, Web of Science, and Google Scholar, utilizing the keywords "artificial intelligence AND library. A manual screening process was employed to identify articles specifically addressing the implementation and impact of AI in library settings (Harisanty, Anna et al. 2022). These studies also delved into the perceptions and viewpoints of library leaders regarding AI, shedding light on their perspectives and attitudes towards the integration of artificial intelligence in library services (Cox, Pinfield et al. 2019).Additionally, specific research endeavors have explored the application of artificial intelligence in university libraries, such as the case of AI implementation in Iranian university libraries. These studies have provided valuable insights, including taxonomy analyses, to better understand the integration of artificial intelligence in the context of university library environments (Asemi and Asemi 2018).A study was undertaken to investigate the use of artificial intelligence (AI) for classification purposes, examining its potential applications and effectiveness in automating classification tasks. This research aimed to assess the practicality and impact of artificial intelligence in the context of classifying various types of data or information (Phillips and Chen 2017).These studies also delved into the utilization of artificial intelligence (AI) in reference services, examining its impact on information retrieval and user satisfaction. The findings revealed that AI-powered tools significantly improved the efficiency of reference services while maintaining a high level of user satisfaction (GYANG 2020).

Conducted a study using artificial intelligence (AI) to tackle challenging library tasks, such as automated metadata tagging and content classification. The findings revealed that AI algorithms significantly improved the accuracy and speed of these tasks, ultimately enhancing the organization and accessibility of library resources (Harisanty, Anna et al. 2022).Conducted a study on the intersection of human rights protection and artificial intelligence (AI), examining the implications of AI technologies on privacy, freedom of expression, and non-discrimination. The findings revealed that while AI has the potential to aid in human rights monitoring and advocacy, it also poses significant challenges related to data privacy, algorithmic bias, and potential threats to civil liberties, highlighting the need for robust legal and ethical frameworks in AI development and deployment to safeguard human rights (Miao 2019).Showed a study on the use of artificial

intelligence (AI) for cataloging in library and information management. The findings demonstrated that AI-based cataloging systems significantly expedited the process of metadata creation and classification, leading to more efficient library operations and improved accessibility to resources for users (Schreur 2020).Conducted a study on the integration of Explainable Artificial Intelligence applications in healthcare. The goal was to examine the usefulness of Explainable Artificial Intelligence (XAI) in healthcare settings. The findings showed that the introduction of XAI techniques considerably improved the interpretability and transparency of AI models, promoting higher confidence among healthcare practitioners and enhancing decision-making processes in clinical settings(Loh, Ooi et al. 2022). The investigation of applying artificial intelligence tools for systematic reviews in health sciences. The goal was to determine the feasibility and usefulness of using artificial intelligence (AI) tools to automate portions of the systematic review process in the health sciences.

The findings revealed that AI techniques showed promise in accelerating the literature screening and data extraction phases of systematic reviews, possibly saving time and money while retaining equivalent quality to traditional manual approaches(Blaizot, Veettil et al. 2022)The study discovered medical artificial intelligence ethics by a thorough evaluation of empirical evidence. The goal was to provide a comprehensive review of empirical studies concentrating on ethical issues surrounding medical artificial intelligence. The findings revealed a wide range of ethical concerns and challenges regarding fairness, accountability, transparency, privacy, and bias in the development and deployment of medical AI systems, emphasizing the need for strong ethical frameworks and guidelines to ensure responsible AI adoption in healthcare settings(Tang, Li et al.)These studies also highlight the use of artificial intelligence and deep learning by rheumatologists. The goal was to evaluate the potential applicability and usefulness of artificial intelligence and deep learning techniques in supporting rheumatologists with diagnosis, prognosis, and therapy decision-making for rheumatic disorders. The findings showed promising results, demonstrating that AI and deep learning methods have significant potential to augment rheumatologists' capabilities by improving diagnostic accuracy, facilitating personalized treatment strategies, and improving patient outcomes in the field of rheumatology (Tang, Li et al.).

A study was conducted to evaluate the integration of artificial intelligence (AI) tools in diagnostic and interventional radiology practices, with a focus on their potential benefits in improving diagnostic accuracy, workflow efficiency, and patient outcomes. The findings revealed AI's substantial significance in improving diagnostic precision, lowering interpretation time, and assisting with treatment planning, emphasizing its potential to transform radiological procedures and enhance overall healthcare delivery

(Boeken, Feydy et al. 2023)The students of Western Australian medical institute were asked to respond about artificial intelligence in healthcare. The study's goal was to look at the attitudes of medical students in Western Australia about the use of artificial intelligence (AI) in healthcare, including their perceptions, worries, and expectations about its role in medical practice. The findings revealed a generally positive attitude toward AI among medical students, highlighting their recognition of its potential benefits in improving diagnosis, treatment, and patient care. However, concerns about job displacement and ethical implications were also raised, indicating the need for comprehensive AI education and training within medical curricula(Tang, Li et al.).A good number of studies also highlighted a shift in research patterns linked to artificial intelligence in library repositories during the coronavirus epidemic. The study sought to examine changes in research trends linked to artificial intelligence (AI) in library repositories during the coronavirus pandemic, with an emphasis on variations in themes, methodology, and application areas. The findings indicated a noticeable increase in the volume of research related to AI in library repositories during the pandemic, with a significant emphasis on topics such as remote access, digital preservation, and AI-driven information retrieval systems, reflecting the adaptation of library services and scholarly activities to the challenges posed by the global health crisis (Nugroho, Anna et al. 2023).

Conducted a study on the methods for clinical evaluation of artificial intelligence algorithms for medical diagnosis. The study's goal was to analyze and appraise the many approaches used for clinical assessment of artificial intelligence (AI) algorithms for medical diagnosis, with an emphasis on finding best practices and problems in assuring their reliability and usefulness in real-world healthcare settings.The findings emphasized the importance of standardized evaluation protocols and robust validation processes for AI algorithms in medical diagnosis, as well as transparent reporting, rigorous testing across diverse patient populations, and continuous monitoring to ensure their safety, effectiveness, and clinical utility(Park, Han et al. 2023). A study on the use of artificial intelligence in medicine was carried out, including a detailed poll of medical experts' perspectives in Portugal. The study aims to evaluate Portuguese medical physicians' attitudes, beliefs, and expectations about the integration of artificial intelligence (AI) in medicine. The findings found that medical physicians had a generally positive attitude regarding AI in medicine, with an understanding of its potential to increase diagnosis accuracy, expedite workflow, and improve patient outcomes. However, concerns about data privacy, ethical issues, and the influence on conventional healthcare roles were raised, emphasizing the importance of extensive training and regulatory frameworks to enable responsible and successful deployment(Reis, Santo et al. 2020).Conducted a research on the use of Artificial Intelligence (AI)

to revolutionize medical imaging practice, with applications ranging from diagnosis to treatment planning. The goal was to investigate AI's transformational potential in medical imaging throughout the spectrum of patient care. The findings demonstrated substantial advances in AI technology, demonstrating its usefulness in boosting diagnostic accuracy, maximizing workflow efficiency, and improving treatment planning procedures in medical imaging practice(Kaushik 2023). Conducted a study on the implementation of artificial intelligence (AI) for recommending books to users in a library context. The findings revealed that AI-driven recommendation systems, leveraging user behavior and content analysis, led to a notable increase in user engagement and satisfaction, ultimately enhancing the discoverability and utilization of library resources (Xiao and Gao 2020).Conducted a study on the integration of artificial intelligence (AI) in reference services within libraries. The findings demonstrated that AI-powered virtual assistants and chatbots significantly improved the speed and accuracy of responding to user queries, resulting in enhanced reference service efficiency and user satisfaction (GYANG 2020).Conducted a study on the implementation of artificial intelligence (AI) in service-oriented industries. The findings showed that AI applications, such as chatbots and predictive analytics, improved service quality by automating routine tasks, personalizing user experiences, and optimizing resource allocation, thereby enhancing overall customer satisfaction and operational efficiency(Chen, Wang et al. 2022).

Conducted a study, we recommend that the goal of saving time be downplayed, and instead, advocate for the utilization of AI to enhance teachers' interest and intellectual investment in students' sense making. Our findings demonstrate that this shift can lead to more meaningful and effective educational interactions, ultimately benefiting both teachers and students(Miller, Severance et al. 2021).Conducted a study, the examination of Artificial Intelligence's influence on search and retrieval methods, resource delivery, scholarly publishing, and learning revealed possible functions for academic libraries and gathered opinions regarding AI's potential effects on these libraries and their operational implications. The potential functions of AI within libraries encompass data acquisition, generation, and management, enhancement of information literacy, assistance in user navigation, and the establishment of infrastructure(Cox, Pinfield et al. 2019).The examination of artificial intelligence and its potential integration with libraries reveals that the disruptive nature of new technology is often perceived as a threat to various institutions, including libraries. However, the findings suggest that with the eventual acceptance and incorporation of AI into library services, this technological "intrusion" has the potential to bring about numerous positive enhancements across a range of library services, many of which are still in the early stages of examination,

consideration, and pilot implementation(Massis 2018).The study identified potential impacts of AI in libraries, including the analysis of large datasets, metadata generation, search translation, and the integration of search across diverse content sources. The findings also suggest that AI has the potential to introduce entirely novel approaches to interacting with information, such as location-based search, expanding the horizons of library services(Fernandez 2016).These studies also highlights that the application of Artificial Intelligence in libraries is ushering in a significant breakthrough for the information sector. It emphasizes that these technological advancements have the potential to enhance numerous human abilities, including calculation, reading, speech recognition, comprehension, memory, decision-making, and interactive learning, thereby transforming the landscape of library services(Gujral, Shivarama et al. 2019).Conducted a study underscores the growing prevalence of human interactions with artificial intelligence and machine learning systems. This trend reflects the increasing integration of these technologies into various aspects of daily life and highlights the need for continued research and understanding of their impact(Riedl 2019).Conducted a study revealed that chatbots significantly enhance the speed of delivering answers to users, facilitating prompt responses to their queries. This increased efficiency in information retrieval contributes to a more responsive and user-friendly experience(Nawaz and Saldeen 2020).

A review of the current literature reveals that no research study of this type and on the same population has been done thus far. As a result, the researchers decided to conduct a study titled "The Perspectives of Library Practitioners on Awareness and Readiness for Adoption of AI in Library Operations and Services in Nursing and Allied Health Sciences Institutes in Khyber Pakhtunkhwa, Pakistan." This study seeks to address a vacuum in existing research by investigating the perspectives of library practitioners at Nursing and Allied Health Sciences institutes in Khyber Pakhtunkhwa, Pakistan, on their knowledge and preparedness to implement AI in library operations and services. By completing this study, the researchers intend to give significant insights to the area and influence future improvements in AI adoption.

Objectives of the Study

The main objective of the study was to investigate the Perspectives of Library Practitioners on Awareness and Readiness about adoption of AI in libraries operations and services in Nursing and Allied health sciences institutes in Khyber Pakhtunkhwa-Pakistan," The specific objectives of the study were to:

- ☆ Examine the awareness of library practitioners serving at Nursing and Allied health science institutes on the adoption of Artificial Intelligence (AI) systems into library operations and services in Pakistan;
- ☆ Determine the perception of librarians on the readiness of libraries

toward the adoption of Artificial Intelligence (AI) systems into operations and services in Pakistan;

☆ Identify the challenges associated with the of Artificial Intelligence (AI) for library operations and services in Nursing and Allied health science institutes of Pakistan;

Research Frame Work Of The Study

Awareness of AI Adaptation

Awareness of Artificial Intelligence (AI) typically involves independent and dependent variables that help researchers to investigate and understand the level of awareness and the factors that influence AI adaptation. Here's an elaboration of these variables:

Independent Variables

***Awareness of Artificial Intelligence (AI) in Libraries*:** This variable represents the level of knowledge and understanding of AI technology among library practitioners. It can be measured on a scale to determine the extent to which librarians are aware of AI and its potential applications in library operations and services.

Dependent Variables

Awareness and Understanding: Consider the level of awareness and understanding among library administrators and staff regarding the potential benefits and challenges of AI. A positive attitude towards AI and a clear understanding of its applications can contribute to successful integration.

Perceptions and Attitudes of Library Practitioners

This variable represents theses opinions, beliefs, and attitudes of library practitioners in Khyber Pakhtunkhwa-Pakistan toward the integration of AI in library operations and services. It can be assessed through surveys, interviews, or questionnaires to measure their level of support, uncertainty, or resistance towards AI adoption.

Barriers to AI Integration

This variable encompasses the obstacles and challenges faced by library practitioners in adopting AI technologies in their libraries. These barriers may include financial constraints, lack of resources, resistance to change, or concerns about job security. Qualitative data can be collected to understand the specific barriers that library practitioners perceive.

Training and Education

Library staff should receive proper training and education on AI technologies. Workshops, webinars, and courses can help them understand how AI can be integrated into library services.

Collaboration

Libraries can collaborate with local educational institutions, tech companies, and AI experts to build awareness and share knowledge about AI technologies.

Readiness of AI Adaptation

Readiness of Artificial Intelligence (AI) Adaptation," researchers typically examine the factors that affect an organization's or a

system's preparedness to integrate AI technologies effectively. This involves both independent and dependent variables. Here's an elaboration of these variables:

Independent Variable

Readiness of Nursing and Allied health sciences Libraries: This variable represents the preparedness and capability of Nursing and Allied health sciences institutes in Khyber Pakhtunkhwa-Pakistan to integrate artificial intelligence (AI) into their operations and services. It encompasses various factors that contribute to the libraries' readiness, such as infrastructure, funding, staff expertise, and policy support. Readiness can be assessed through different indicators and measurements, including infrastructure evaluation, budget allocation for AI projects, and staff training programs.

Dependent Variables

Integration of Artificial Intelligence: This variable reflects the actual extent to which AI technologies have been incorporated into the operations and services in Nursing and Allied health sciences institutes in Khyber Pakhtunkhwa-Pakistan," It can be assessed through quantitative and qualitative measures, such as the number of AI applications in use, the percentage of library functions utilizing AI, the effectiveness of AI tools integrated, and the impact on library services and operations.

Perceived Readiness: How library practitioners perceive the level of readiness of their libraries to adopt AI technologies and integrate them into library operations and services.

Perceived Barriers and Facilitators: The obstacles and enablers that library practitioners identify when it comes to implementing AI in library settings.

Expected Benefits and Challenges: The anticipated advantages and disadvantages that library practitioners associate with the integration of AI in their work.

Willingness to Participate: The willingness of library practitioners to actively engage in AI projects and adapt to new technologies.

In this study, the independent variable is the readiness of Nursing and Allied health sciences libraries to adopt AI for library operations and services, and the dependent variables relate to the actual integration of AI and the perspectives of library practitioners on this integration. The research aims to explore how the readiness of libraries influences the actual integration of AI and how these integrated technologies are perceived by library practitioners in Khyber Pakhtunkhwa-Pakistan.

To collect and analyze data related to these variables, various research methods, such as surveys, interviews, document analysis, and case studies, may be used to assess the level of readiness, measure the extent of AI integration, and understand the perspectives of library practitioners in Khyber Pakhtunkhwa-Pakistan regarding AI adoption in their libraries.

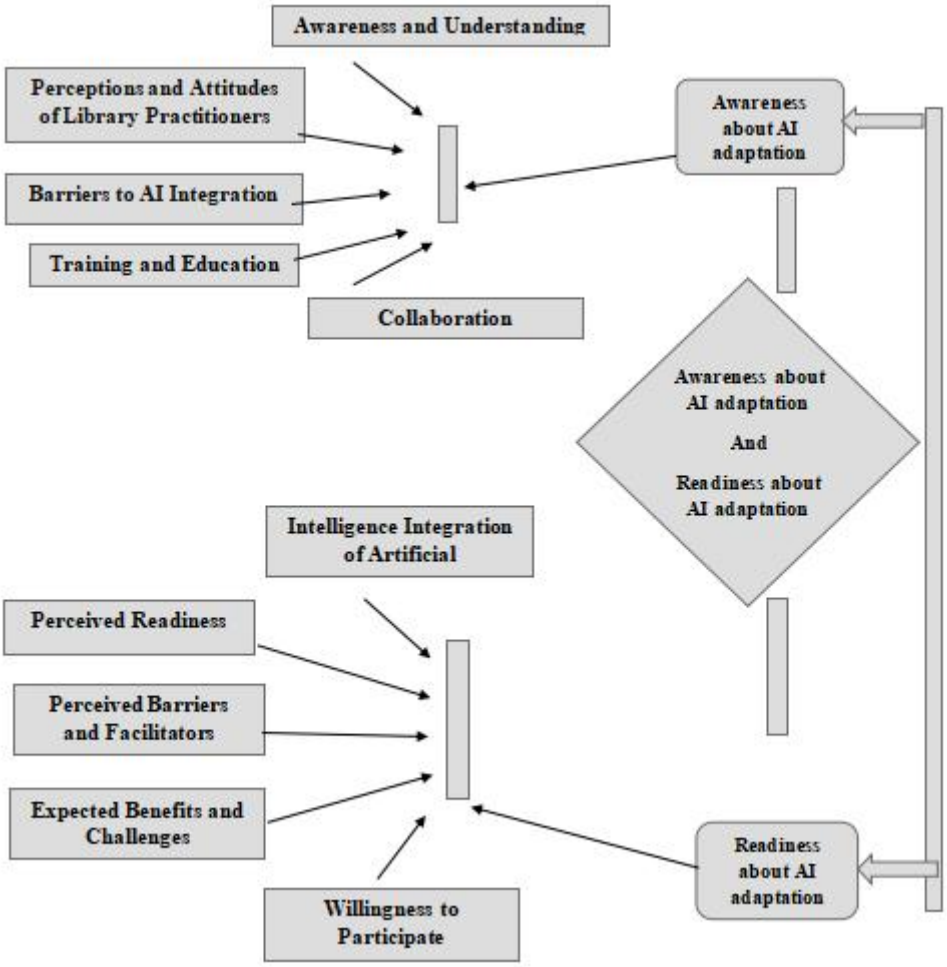

Figure 1- Diagrammatical representation of Awareness and Readiness of AI variables

Methods and Procedures

The methodology employed in this study, titled "Perspectives of Library Practitioners on Awareness and Readiness about adoption of AI in libraries operating in Nursing and Allied health sciences institutes in Khyber Pakhtunkhwa-Pakistan," is designed to provide a comprehensive understanding of the current state of awareness and readiness among libraries in Pakistan regarding the adoption of artificial intelligence (AI) into their operations and services. This research is pivotal in shedding light on the adoption and preparedness of Khyber Pakhtunkhwa-Pakistan Nursing and Allied health sciences institute's libraries in the era of AI, which is increasingly influencing library management and services worldwide.

Research Design: This study's research design used a mixed-methods approach to thoroughly examine the viewpoints of Nursing and Allied health sciences institutes in library practitioners about their awareness and preparedness towards AI in libraries of Khyber Pakhtunkhwa-Pakistan. In order to collect organized data on Nursing and Allied health sciences institutes in libraries' awareness and preparedness for integrating artificial intelligence, a quantitative survey was first carried out. Qualitative interviews and

focus group discussions were used to augment this, enabling a deeper comprehension of the refinements surrounding practitioners' perspectives. The robustness of the research design was improved by the combination of quantitative and qualitative methods, which also gave a more comprehensive understanding of the intricate landscape of AI integration in library operations and services in the Khyber Pakhtunkhwa-Pakistan context.

Population and Sampling: This study's population consists of library practitioners who work at Nursing and Allied Health Sciences Institutes in Khyber Pakhtunkhwa, Pakistan. This comprises librarians, information experts, and administrators who are actively involved in library operations and services at these institutes.

This study will use both purposive and random sampling strategies. Purposive sampling will be used to assure representation from a variety of library practitioners, including librarians, information specialists, and administrators, in order to collect varied views. Random sampling will then be used within each category to choose participants from the population, guaranteeing a fair and impartial representation of the overall group.

The sample size will be selected using saturation principles, with the goal of including enough participants to achieve data saturation, which occurs when no new themes or insights emerge from further individuals. This technique would allow the study to collect comprehensive data on awareness and readiness for AI implementation in library operations and services at Nursing and Allied Health Sciences Institutes in Khyber Pakhtunkhwa, Pakistan.

Data Collection

Data will be collected through surveys and semi-structured interviews. An online survey will be administered to a larger sample of library practitioners to assess their awareness and readiness levels concerning AI integration. Subsequently, in-depth interviews will be conducted with a selected group of participants to gain deeper insights into their perspectives and experiences.

As the study is mixed method in nature. In the first phase of this study, a questionnaire will be sent to all the selected libraries. WhatsApp and email of each librarian will be used as communication channel. The contact numbers and emails of the librarians will be acquired from the concerned libraries. Telephonic calls will be used as a follow up tool. Efforts will be made to get maximum responses. The second phase of the study will be interviews. The library in charge (chief librarian) of Allied health sciences institutes will be conducted for getting their consent for interview. The interviews will be conducted as per schedule obtained from contacting the librarians in advance. Telephonic /WhatsApp calls will be used for conducting the interview.

This study will use two instruments for data collection.

(a) Questioners, for survey.
(b) Interview schedule, for interview.

Survey Instrument

The survey questionnaire will be designed to measure participants's awareness of AI technologies, their understanding of AI's potential applications in library operations and services, and their readiness for AI adoption. It will also include questions about demographics and library characteristics.

Data Analysis

Quantitative data from the surveys will be analyzed using statistical software to generate descriptive statistics and assess trends. Qualitative data from the interviews will be subjected to thematic analysis to identify key themes and patterns in participants' responses. The study investigates Pakistani library practitioners' viewpoints on Nursing and Allied health sciences institutes in libraries' knowledge of incorporating artificial intelligence (AI) into their daily operations and services. It looks at the potential and constraints that practitioners see in this environment and attempts to gauge how prepared these libraries are to use AI technologies. The research illuminates the state of AI integration in Khyber Pakhtunkhwa-Pakistan Nursing and Allied health sciences institutes in libraries by exploring the perspectives of library professionals, offering important insights into future developments and enhancements. The results add to the conversation around artificial intelligence (AI) in library settings by providing a more nuanced picture of Pakistani library practitioners' awareness of and readiness to adopt AI for improved operations and services.

Ethical Considerations

Ethical considerations will be paramount throughout the research process. Informed consent will be obtained from all participants, and their identities will be kept confidential. The research will observe to ethical standards for conducting human research. In order to ensure that the rights and privacy of library users are protected throughout the implementation process, a thorough consideration of ethical principles is necessary when examining the perspectives of library practitioners on AI integration in Khyber Pakhtunkhwa-Pakistan Nursing and Allied health sciences institutes in libraries. Since AI technologies handle enormous volumes of data, ethical questions about the responsible and transparent use of information surface, necessitating the adoption of strict data protection laws and regulations. In order to prevent unintentional discrimination in library services, the study should address potential biases in AI algorithms and decision-making processes, highlighting the significance of fairness and inclusivity. Accountability, transparency, and the disclosure of AI's involvement in library operations are further ethical considerations that go hand in hand with creating a responsible and trustworthy environment for users and library professionals working with AI-

driven

Delimitations of the Study

The study may have limitations related to the representativeness of the sample and potential biases in responses. However, efforts will be made to mitigate these limitations through a diverse sample and rigorous data analysis. Potential selection bias is one of the study's limitations because the viewpoints collected from library practitioners might not accurately reflect the wide range of opinions found in the larger community. Furthermore, the study's emphasis on Pakistan might have limited the findings' applicability in other institutional and cultural contexts. Reliance on self-reported data and other methodological limitations could lead to response bias and compromise the accuracy of the findings. Lastly, given how quickly both artificial intelligence and library practices are developing, some findings may become less relevant or outdated over time.

Results and Discussion

This portion of the paper discussed the major findings of the study. The question sought to find out the Perspectives of Library Practitioners on Awareness and Readiness for Adoption of AI in Library Operations and Services in Nursing and Allied Health Sciences Institutes in Khyber Pakhtunkhwa, Pakistan. Respondents were asked to submit their replies in response to various queries. The analysis of the queries revealed that 80 (80%) of respondents were aware of the concept of AI technologies in library operations, whereas the rest were unaware of AI technology.

The respondents were asked to report about the Awareness query,

"I am aware of the concept of Artificial Intelligence (AI) in the context of library operations and services", majority (80%) of the library practitioners were agreed with the mentioned statement. Leaders, practitioners, and scientists in Indonesian libraries know the concept of AI and its awareness and applications in libraries (Harisanty, Anna et al. 2022). In response to another query "I have knowledge of how AI can be integrated into library services, specifically in Nursing and Allied Health Sciences Institutes libraries", a good proportion (72%) of the librarians of Institutes of Allied and Health Science have supported the above query. A considerable lack of knowledge about the use of artificial intelligence (AI) technologies reported about risk assessments in building projects(Miller, Severance et al. 2021).

The librarians of Nursing and Allied health Sciences institutes were asked to reply about the statement *"I am strongly aware of the potential applications of Artificial Intelligence in library operations and services"*, majority (80%) of the library practitioners were agreed with the stated declaration. In a similar study, it was depicted that the discoveries illustrate Artificial Intelligence's huge potential to improve library operations and services in university libraries in Nigeria (Miller, Severance et al. 2021).To answer another query "*I believe that integrating Artificial Intelligence*

in Nursing and Allied Health Sciences Institutes libraries can enhance the efficiency of library services ", a good proportion(85%) of the librarians of nursing and Allied Health Science institutes were in support of the given query. The people's preparedness for technology and awareness can improve the efficiency and efficacy of a wide range of library services, from cataloging and searching to user support and data analysis (Flavián, Pérez-Rueda et al. 2022). In response to another query *"Intelligence is sufficient to understand its potential impact on library operations*", a reasonable number (75%) of library practitioners were agreed with the specified statement in the given query. Leaders, practitioners, and scientists in Indonesian libraries had reported a positive and encouraging impact on AI. Library operations necessitates not just intellect, but also encourage constant education, cooperation, and flexibility in order to properly traverse the changing environment of technological integration.

(Harisanty, Anna et al. 2022).In response to another query *"My institution provides training or resources to enhance awareness and understanding of AI in library operations",* majority (85%) of the library practitioners were agreed with the mentioned statement. In a similar study, Raising understanding of Artificial Intelligence to increase awareness and knowledge of AI in The results demonstrate my institution's commitment to providing training and resources to increase awareness and knowledge of AI in library operations (Karvonen, Heikkilä et al. 2019).

The librarians of nursing and Allied health Sciences institutes were asked to reply about the statement *"The management in our Nursing and Allied Health Sciences Institutes library actively seeks information about AI and its relevance to library services",* the reasonable number (80%) of the library practitioners were agreed with the stated query. In a similar study, The proactive pursuit of AI knowledge by our library administration emphasizes the critical importance of being aware and adaptive in an ever-changing technology context, assuring preparation for any implications on University library services in Nigeria(Miller, Severance et al. 2021).In response to another query *"Integrating Artificial Intelligence in Nursing and Allied Health Sciences Institutes libraries can improve information retrieval and access for users",* a good proportion(85%) of the librarians of Nursing and Allied Health Sciences Institutes were of supported the given question. In a similar study, library cooperation and integration can provide users with a more efficient experience by improving information retrieval and access, thereby satisfying their information demands.(Haug and Drazen 2023).In response to another query *"AI can help in automating routine tasks, allowing library staff to focus on more complex and strategic activities",* the proportion(82%) of the librarians of nursing and Allied Health Science institutes have supported the given query, Integrating artificial intelligence into library operations automates boring

chores, allowing staff to focus difficult activity, improving efficiency and service quality(Kong, Yuan et al. 2021).In response to another query *"The integration of AI in Nursing and Allied Health Sciences Institutes libraries can lead to a more personalized and user-friendly experience for library patrons",* majority (87%) of the library practitioners were agreed with the mentioned statement. In response to another query, Integrating artificial intelligence into libraries may provide users with a more customized and user-friendly experience, increasing engagement and satisfaction with library services (Darbari, Kumar et al. 2021).The librarians of Nursing and Allied health Sciences institutes were asked to reply about the statement *"AI can contribute to the development of advanced data analytics for better decision-making in library management",* the a good proportion (72%) of the librarians of nursing and Allied Health Science institutes were of agreed with the given query. College students' understanding of artificial intelligence of AI application in libraries can provide enhanced data analytics, allowing library managers to make better decisions for more effective strategies(Ghotbi and Ho 2021).In response to another query *"I am concerned about potential job displacement due to the integration of AI in library operations",* majority (87%) of the librarians were agreed with the declared statement. The knowledge and perception of artificial intelligence (AI) into library operations raises valid worries about possible job displacement, needing careful study of measures to limit negative effects on employment while maximizing the advantages of technological advancement. (Owsley and Greenwood 2024).In response to another query *"The lack of financial resources is a significant barrier to implementing AI in Nursing and Allied Health Sciences Institutes libraries",* a good proportion (90%) of the librarians of Nursing and Allied Health Sciences Institutes have supported the given query, The results demonstrate how inadequate financial resources are a key obstacle to AI adoption in libraries (Ghotbi and Ho 2021).

The respondents were asked to report about the readiness query,

There is a need for more training opportunities to enhance the skills of library practitioners in AI technologies", a good proportion (70%) of the librarians of Nursing and Allied Health Sciences Institutes have positively approved the given query. The Vietnamese Medical Information System's readiness for AI integration highlight the importance of extra training to improve library practitioners' skill in AI technologies, allowing them to successfully apply these breakthroughs in library contexts(Vuong, Ho et al. 2019). In response to another query *"The integration of Artificial Intelligence is necessary for the future development of Nursing and Allied Health Sciences Institutes libraries",* majority (75%) of the library practitioners were agreed with the mentioned statement. In response to another query, Evaluating the organizational structure of Western Europe's exhibition industry library in the incorporation of artificial intelligence is critical for

the future growth of libraries, improving services and increasing accessibility for clients globally (Hradecky, Kennell et al. 2022).

In response query *"I believe that Nursing and Allied Health Sciences Institutes libraries in Khyber Pakhtunkhwa Pakistan are adequately prepared to adopt Artificial Intelligence technologies"*, a reasonable number (80%) of the library practitioners were agreed with the stated query. In response to another query *"The current technical infrastructure of Nursing and Allied Health Sciences Institutes libraries supports the implementation of Artificial Intelligence",* the proportion (82%) of the librarians of nursing and Allied Health Science institutes were of supported the given query, Exploring the futures of artificial intelligence through technological readiness levels infrastructure of libraries serves as a firm basis for the effective deployment of Artificial Intelligence, allowing for improved services and resource management to suit customers' changing demands (Martínez-Plumed, Gómez et al. 2021). The librarians of Nursing and Allied health Sciences institutes were asked to reply about the statement *"There is a need for additional training and development in AI technologies for library staff",* the proportion(80%) of the librarians of nursing and Allied Health Science institutes were of supported the given query, To properly exploit AI's technologies is required for library personnel to fully realize their potential, enabling efficient service delivery and improved user experiences in libraries (Lazanyi 2018). In response to another query *"Users of Nursing and Allied Health Sciences Institutes libraries would benefit from AI-powered services",* majority (70%) of the library practitioners were agreed with the stated declaration. In response to another query *"Library practitioners are willing to provide support and training to users for AI-powered tools",* The reasonable number (85%) of the library practitioners were agreed with the stated statement. In response to another query, Assessing artificial intelligence adoption readiness are keen to provide users with assistance and training for AI-mechanical products, therefore developing digital literacy and leveraging the benefits of technology in libraries(Alsheibani, Cheung et al. 2018).In response to another query *"I am concerned about the ethical implications of using AI in Nursing and Allied Health Sciences Institutes libraries",* a good proportion(75%) of the librarians of nursing and Allied Health Science institutes were of supported. In response to another query *"Measures are in place to address privacy concerns associated with AI implementation in library services",* a good proportion (75%) of the librarians of Nursing and Allied Health Sciences Institutes were of supported the given query, A questionnaire-based study to assess medical professionals' and students' willingness to accept artificial intelligence AI library services are addressed using strong steps to ensure user data stays private and confidential. These safeguards include strong data protection methods and open rules to promote confidence among library patrons (Boillat, Nawaz et al. 2022).To

answer another query *"Sufficient financial resources are allocated for the integration of AI in Nursing and Allied Health Sciences Institutes libraries",* majority (80%) of the library practitioners were agreed with the mentioned statement. In a similar study, the conclusions demonstrate how inadequate financial resources are a key obstacle to AI adoption in libraries.

In response to another query *"Adequate staff and time resources are dedicated to the successful implementation of AI initiatives",* the *reasonable number (85%) of* the library practitioners were agreed with the stated announcement. In response to another query *"I am optimistic about the positive impact that AI can have on the efficiency of Nursing and Allied Health Sciences Institutes library operations",* the reasonable number (86%) of the library practitioners were agreed with the stated announcement In answer to another query, AI has the potential to change library operations by automating processes and processing data more intelligently (Karaca, Çalışkan et al. 2021).

In response to another query *"Continuous evaluation and updates are essential for the sustained success of AI integration in Nursing and Allied Health Sciences Institutes libraries",* a proportion(92%) of the librarians of nursing and Allied Health Science institutes were of supported the given query, Continuous review and upgrades are critical for guaranteeing the long-term viability of AI integration in libraries (Ayanwale, Sanusi et al. 2022).

Conclusion

Theoretical Implications

Exploring library practitioners' perspectives on awareness and preparedness for AI use in libraries serving nursing and allied health sciences institutes in Khyber Pakhtunkhwa, Pakistan, has important theoretical implications across several disciplines. First, from a technology standpoint, this study adds to the literature on AI deployment in library settings, particularly in the context of healthcare education. The study offers insight on the integration of new technologies into traditional library operations by analyzing library practitioners' degrees of awareness and preparedness to use AI. The study also adds to the literature on professional growth and capacity-building in the library profession. Understanding the methods by which practitioners learn and share best practices allows theoretical models of professional development to be updated to better meet the changing demands of librarians in the digital age. Furthermore, the findings have implications for information science theory, specifically in terms of information access and retrieval in healthcare education libraries. Theoretical frameworks such as Information Seeking Behavior models and Human-Computer Interaction theories can be used to investigate how AI technologies influence library users' information-seeking activities. Understanding the cognitive processes and user experiences connected with AI-enhanced library services can contribute to theoretical models of information behavior and

retrieval. The study on the viewpoints of library practitioners in Khyber Pakhtunkhwa, Pakistan, advances theoretical knowledge in technology adoption, organizational transformation, professional development, and information science. By situating empirical data within known theoretical frameworks, this study improves our knowledge of the complex dynamics surrounding AI adoption in library operations and services, opening the way for future theoretical breakthroughs in related disciplines.

Practical Implications

The practical consequences of investigating library practitioners' opinions on awareness and preparedness for AI use in libraries serving nursing and allied health sciences colleges in Khyber Pakhtunkhwa, Pakistan, are numerous. To begin, knowing these practitioners' perspectives can help with strategic planning and policymaking related to the integration of AI technology into library operations and services. This knowledge can aid in identifying possible hurdles to adoption and developing effective solutions to overcome them. Second, by analyzing library practitioners' awareness and preparedness, institutions may adapt training and capacity-building programs to improve their abilities and understanding of using AI technologies and resources successfully. This can result in increased efficiency and effectiveness in library services including information retrieval, resource management, and user assistance. Furthermore, the findings of this study might help libraries in the region collaborate and share expertise, creating a conducive environment for AI deployment.

Libraries may learn from one another's experiences and best practices, hastening the adoption process and maximizing the benefits of AI in improving information access and services for nursing and allied health professions students and researchers. Finally, by identifying the possible influence of AI on library operations and services, stakeholders such as librarians, administrators, and policy makers may address ethical, legal, and privacy concerns about AI deployment. This can guarantee that AI technologies are used responsibly and equitably while maintaining data security and user confidentiality in library environments.

In short, investigating the perspectives of library practitioners on AI adoption in libraries serving Nursing and Allied Health Sciences Institutes in Khyber Pakhtunkhwa, Pakistan, provides valuable insights that can guide strategic decision-making, capacity-building efforts, collaborative initiatives, and ethical considerations, ultimately contributing to the advancement of library services in the region.

Limitations and Future Research Directions

Understanding the limitations and proposing future research directions for the topic "Perspectives of Library Practitioners on Awareness and Readiness to Adopt AI in Library Operations and Services in Nursing and Allied Health Sciences Institutes in Khyber

Pakhtunkhwa, Pakistan" is critical for advancing scholarly inquiry and practical applications in this area. One disadvantage is the study's narrow focus on library practitioners at Nursing and Allied Health Sciences Institutes in Khyber Pakhtunkhwa. While this provides valuable insights into a specific context, future research could broaden the scope to include other regions in Pakistan or even extend to international comparisons. This gives useful insights into a specific setting, future study might expand the scope to include other areas of Pakistan, or even worldwide comparisons. This would enable a more thorough analysis of the elements that influence AI uptake in healthcare education libraries. Another disadvantage is the dependence on self-reported data from library staff, which may result in response bias or subjective interpretation. Future study might use mixed-method techniques, such as surveys and interviews or observations, to triangulate data and gain a better understanding of the intricacies involved in AI adoption in library settings. Furthermore, the study may miss the opinions of other stakeholders, including as students, teachers, and IT professionals, who all play an important role in the integration of AI technology in libraries. Future study might include multi-stakeholder views to provide a more comprehensive understanding of the difficulties and potential related with AI implementation in healthcare education libraries. Furthermore, the study's emphasis on awareness and preparation may have overlooked other critical aspects of AI adoption, such as organizational culture, infrastructural needs, and financial limits. Future study might go deeper into these characteristics, providing practical advice for overcoming hurdles to AI adoption in library operations and services.

Future study options include longitudinal studies that follow the growth of AI use in healthcare education libraries across time, allowing researchers to discover patterns, assess the efficacy of interventions, and assess the long-term viability of AI programs. Furthermore, comparison studies might look at the efficacy of other AI deployment tactics or interventions in similar circumstances, offering significant information for policymakers and practitioners. Overall, while the study of library practitioners' perspectives in Khyber Pakhtunkhwa, Pakistan, provides valuable insights into AI adoption in healthcare education libraries, addressing the identified limitations and pursuing future research directions can help us better understand and inform evidence-based practices in this emerging field.

In conclusion, this study sheds light on the perspectives of library practitioners regarding the awareness and readiness for the adoption of AI in library operations and services within Nursing and Allied Health Sciences institutes in Khyber Pakhtunkhwa, Pakistan. Based on the findings, it is obvious that incorporating AI into library operations and services at Nursing and Allied Health Sciences colleges in Khyber Pakhtunkhwa, Pakistan, offers both

potential and obstacles. The survey found that library practitioners had various levels of awareness of AI's potential to improve efficiency and service delivery. While some practitioners are enthusiastic and eager to embrace AI, others are concerned and lack faith in their capacity to adapt to technological advances. Furthermore, limited resources, insufficient training opportunities, and organizational reluctance to change all impede AI adoption preparedness.

This study has major implications, including the urgent need for focused interventions to bridge the gap between knowledge and preparedness for AI adoption among library practitioners. This might entail creating complete training programs centered on AI basics and practical applications targeted to the unique requirements of healthcare education libraries. Furthermore, efforts should be made to improve access to technical resources and foster an organizational culture that promotes experimentation and innovation.

Comprehensive study and analysis have revealed that, while there is rising understanding of AI's potential benefits in improving library functions, practitioners still need to be more informed and prepared. Training, infrastructure, and institutional support are critical factors in ensuring effective integration. Addressing these issues via focused initiatives can result in more efficient and creative library services, benefiting both staff and customers in the healthcare education sector. As AI evolves, libraries must embrace its promise while also ensuring that practitioners have the information and tools they need to properly use its powers. This study is an important step in understanding the current landscape and charting a course for a technologically enhanced and responsive library environment in Khyber Pakhtunkhwa healthcare education sector.

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