

The Impact of COVID-19 on Library Users with Disability and Efforts of Academic Libraries in India: A Systematic Literature Analysis

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ABSTRACT

The COVID-19 outbreak has locked down the world and restricted digital facilities, affecting many users and organizations. Due to this heavy dependence on online libraries, disabled users have first seen the adverse effects of lockdowns in academic institutions in India. However, many academic libraries in India have been contributing toward the welfare of disabled users. Most academic libraries are also facing a budget crisis and are dependent on some costlier digital resources such as e-journals, e-books, and digital databases. Accessibility infrastructure has brought into use facilities available information in printed text and graphic forms for people with low vision or blindness. The paper focuses on the perception of initiatives taken by academic libraries in India, understanding the needs of differently abled users through several academic research articles to develop tools and facilities such libraries provide.

KEYWORDS: Library Users with Disabilities, Impact of COVID 19, Accessibility, ICT, Assistive Technology.

INTRODUCTION

The 2019 coronavirus outbreak has had a far-reaching influence on higher education worldwide, as most students, faculty, and administrative staff are compelled to stay at home due to indefinite lockdowns by respective countries. Given the global need to prevent the virus from spreading further, there is an unprecedented move to digital platforms for education, research, and administrative purposes. The move toward digital transformation of libraries to virtual platforms is the same, at least at the global level for the academically and technically advanced ones. Whereas this growth may seem very smooth, it is not so in reality, whether catering to the diversified needs of user groups or differently-abled persons.

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• Background of COVID-19 Pandemic

Very little is understood about the impact of COVID-19 on the disabled users of academic libraries in India. At a time when social distancing and isolation purport to be the "new norm" to flatten the curve and prevent further outbreaks, their means of access to educational resources and social activities are cut off. Though most academic libraries in India either facilitated remote access to their electronic resources or developed an online collection amidst the COVID-19 outbreak, has its challenges for disabled users. In this light, this research paper studied the impact of the COVID-19 pandemic on disabled users in India and the steps academic libraries took toward their inclusiveness and access to information.

2020 has changed how we used to work, socialize, travel, and educate ourselves. The impact of the coronavirus continues as its new alternate strains are emerging worldwide. As a result, many aspects of the campus experience have gone virtual. In India, most academic libraries have either extended the expiry of books or waived off the late fees. They have facilitated remote access to their electronic resources and have developed online collections so that the teaching, learning, and research activities are unaffected. Despite these measures, there are several issues for all the users who want to access the literature from the academic library. Disabled users have their set of challenges.

REVIEW OF LITERATURE

The present paper is all about reviewing the literature on the services of libraries for disabled users during the pandemic. Libraries are moving toward online and remote offerings in response to the COVID-19 pandemic, which has led to a further proliferation of technological innovations in social media and library websites to promote information and access to resources. Other challenges libraries face include budgetary constraints for new ICT infrastructure and improvements to internet service. The pandemic has reiterated the importance of libraries as legitimate information providers and support systems to their users in times of crisis. Despite these adjustments, the services for persons with different abilities remain inadequate, with a few public libraries providing accessible facilities and resources in alternative formats. To avert such shortcomings, libraries should emphatically look into acquiring electronic resources while digitizing their print materials to enhance availability to all users [85], [100], [101], [102].

OBJECTIVES OF THE STUDY

- ✓ To study the impact of COVID 19 on the library users with disabilities
- ✓ To study the role of academic libraries in supporting library users with disabilities
- ✓ To study the challenges and opportunities to academic libraries in context of COVID-19

RESEARCH METHODOLOGY

The present paper includes a literature review. This study digests the data available in peer-reviewed journals and case studies. It focuses on the invoking power of ICT and Assistive Technology in determining how libraries would make access available to disabled users.

• Methods of Data Collection:

This paper is a literature review of the impact of the COVID-19 pandemic on academic libraries during the period 2020-2024. The extent to which, during this period, academic libraries have changed their services to respond to the

particular needs of students with disabilities is investigated in the paper. Literature searching in peer-reviewed articles, conference papers, and chapters between 2011 and 2024 produced a related dataset about disabled users in academic libraries. It will identify strategies that have been successful and unsuccessful in addressing both the disability issue and the impact of the pandemic on library services. The keywords used to identify relevant sources were "COVID-19," "disabled users," "library readiness," "ICT," and accessibility "assistive technology."

- **Analytical Framework:**

The cornerstones of this analysis are the principles of inclusive service design and digital accessibility. The framework considers how libraries used ICT and assistive technology to ensure service continuity for disabled persons during the pandemic. Results are expected to gain insight into fine-grained details about the experiences of the disabled user and an idea of the efficacy of the library response to identify areas that need further research in improving accessibility and inclusivity within the academic library.

- **Scope:**

The study is based on using academic libraries and their services on a general basis while considering disabled users who are under accessibility. Data and literature for the study were considered from 2011 to 2023, with a particular emphasis on ICT and Assistive Technology. The synthesis of results presented how COVID-19 has uniquely impacted disabled users and how academic libraries responded, including strategies that worked and those that have failed.

- **Limitations:**

This review is inherently limited by the data and reporting on the use of Assistive Technology available in libraries. It might miss some pertinent studies due to language barriers or lack of access to full texts. Articles focused on public libraries or non-academic settings and studies that never mention disabled users or whose results have no significant relevance for academic libraries have been excluded from the study. Due to the fast rate at which technology and library services change, some findings might date quickly with new practices emerging.

DATA ANALYSIS

Understanding Disability and Accessible Services:

A better understanding of disability and accessible services is very crucial for the benefit and care of people with disabilities. From the Indian perspective, there are several core issues and challenges about disability and rehabilitation services. According to [1], one of the major issues is that there are concerns like accessibility, availability, and utilization of rehabilitation services both at the local level and, specifically, in rural areas where a massive chunk of disabled people reside. Research has been conducted in India regarding the prevalence, patterns, and determinants of disabilities to help in intervention strategies. Factors that modulate the accessibilities of various government services provided to the disabled include education, residence, health promotion, and caste. Rehabilitation and social services for people with disabilities should be further improved; activity is needed at the level of governments and regions [81]. Furthermore, the educational landscape in India regarding students with disabilities needs to be improved at par with accessibilities, classroom functions, examination accommodations, communication and social attitudes, and other employability challenges [3]. There is also a need to evaluate the disabled-friendly infrastructure features, such as road transport facilities, to meet the varied needs of all categories of disabled persons [2].

- **Types of Disabilities:**

Various disabilities are a class of conditions involving the acute effects of disability on the physical, mental, and emotional aspects of an individual. In the context of India, a number of studies have outlined certain characteristics concerning the extent of disabilities within the country. For example, [81] have found that locomotor disabilities hold the highest contribution to prevalence, followed by mental disabilities. This prevalence is further supported by the fact that cerebral palsy has been considered the most common form of motor disability during childhood. Cerebral palsy represents a disorder of movement, posture, and complex motor function associated with sensory complications, neurological complications, and musculoskeletal complications [4]. Moreover, arthritis, and more specifically osteoarthritis, is considered the prime cause of disability in the Indian subcontinent and has quite a wide prevalence in the population [6]. According to [5], the other major cause of major disability within the country is stroke.

In this context, understanding the spatial distribution of disabilities across different regions of India becomes essential. Literature suggests that even the population with disabilities follows a spatial pattern whereby a particular type of disability shall be concentrated in a specific zone. For instance, the speech-disabled population is relatively high in the western zone, while the visually disabled are more in the eastern zone of India [7]. This requires that the intervention be target-oriented. The prevalence of disabilities varies with socioeconomic and geographical factors; therefore, there are only a few districts in the states of Madhya Pradesh, Maharashtra, Karnataka, Tamil Nadu, Telangana, and Punjab that stand at higher rates of disability [8].

Therefore, education and health are the two primary components of addressing disabilities in India. According to [9], children with disabilities are increasingly being enrolled in schools now, but it differs across states, genders, and the nature of disability. Therefore, education and health are the two primary components of addressing disabilities in India. According to [10], the gender disparity in health expenditure by persons with disabilities is a significant issue that needs attention. [11] suggested that regional and national-level efforts can be directed toward supporting people with disabilities, a critical pathway to achieving well-being and social inclusion improvement among such people.

- **Barriers to Accessing Library Services**

Some barriers to access to library services can be referred to as all kinds of challenges a user may encounter in properly working with library resources. The physical, attitudinal, informational, and many other barriers regarding the availability of services are characteristic and often visible. Some physical barriers are easily recognizable, like the lack of automatic doors or accessible parking spots [14]. Challenges to access to library services in the Indian context include but are not limited to library staff shortages, restricted opening hours, or even an orientation program for freshers [13]. Moreover, jargon in libraries may work as a barrier to their use by changing users' perceptions of the services offered. The results show that jargon is a barrier to the uptake and use of services [15].

The social model of disability demonstrates that libraries' role in advancing social justice is to break down as many barriers as possible to library use for disabled persons [16]. Co-location of academic services within the library decreases the obstacles for students, particularly first-generation students [17]. It is essential to understand the information-seeking behaviour of library users since if the material needs to be more adequate, it will impact their

use of resources from the library in other ways [18]. In addition, while the web-based service is aimed at making available digital resources in a library, it only sometimes replaces the need for physical resources like print books, which remain essential for many library users [12]. Students with disability need to have a specially tailored library service that could be much more convenient and accessible than otherwise [19].

Inadequate facilities, non-availability of value-added services, outdated collections, and poor internet/ICT services are some prominent causes of low user satisfaction with library services [20]. A study by [21] evaluated the use of library services and the barriers to such use among hospital clinical staff. The barriers identified were leaving the ward to use the services, accessing Information Technology resources at work to access the services, and being charged for services. The identified problems of practicality and availability of resources define what accessibility to library services means.

In a study by [22], assistive technologies were evaluated, which indicates that visually disabled users are facing problems with the assistive technologies available in libraries. Librarians must make the required changes to accommodate this user community so that their problems can be understood better.

Moreover, digitalization is another significant stride in what may be considered a milestone in library services. A typical example is the Digital Library Remote Access (DLRA) services, which have made access to all forms of literature and scientific knowledge much more inclusive for users [23]. Offering electronic resources and databases to all users, regardless of their disabilities, helps to make library services available to all and thus makes the library inclusive and efficient [24].

COVID-19 and its Impact on library's' disabled users

The digital divide and internet connectivity issues were challenges during COVID-19 [25] Users with disabilities have yet to access digital information services, which is one of the main difficulties they face [26].

This expedited move from the traditional manual systems to digital platforms, because of the coming of Information and Communication Technologies, proved the ability of the profession to adapt [27]. It is with such concerns that libraries must open their online services and make them user-friendly to eradicate the problems encountered by people with disabilities. Equally, librarians must improve their digital literacy to offer the best research services to all users [28].

In this regard, the library should identify problems associated with providing modern library services in order to develop strategies and innovations in which it could remain relevant in the provision of knowledge and community engagement services [29]. There is a need for libraries to commence the exercise of assessing user satisfaction related to the references services and engaging in public relation techniques to enhance the user-partner interaction [100].

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• Challenges Faced by Disabled Users and the libraries during the Pandemic

The COVID-19 pandemic has intensified challenges for people with disabilities, highlighting the need to understand their unique needs and enhance access to digital resources [30]. Individuals with visual impairments in India face increased accessibility to digital resources and assistive aids to make library services more convenient [26]; [24]. Libraries have undergone significant changes due to the invention of Information and Communication Technology, leading to a shift from traditional manual systems to digital platforms, especially in academic libraries [27]. Research has shown that understanding and satisfying disabled users is essential for library services [19]; [36]; [37]. Accessibility guidelines like WCAG2.1 are crucial for web-based information services [38] and fully online library services have been focused on people with disabilities [39]. Inclusive primary schools face challenges in early reading learning for students with special needs, necessitating exceptional support [32]. Disability resource professionals noted that students with disabilities faced academic and access challenges during the pandemic, requiring tailored support and accommodation [31]. South Africa's lack of preparedness for the pandemic, inadequate emergency remote teaching responses, and loss of library resources negatively impacted their learning [33]. Research suggests that libraries must review policies focusing on people with disabilities by acquiring adequate facilities, training staff and users on using assistive technology, and considering user feedback in technology acquisition [24]. The impact of COVID-19 on library services included challenges such as a lack of written policies for pandemic response, information communication technology skills, and resources, indicating the need for solid strategies to adapt library services during times of crisis [35].

Role of Academic Libraries in Supporting Disabled Users:

One needs to empower people with disabilities by making provisions for accessibility and inclusive services within the academic library and promoting awareness of persons with disabilities. According to [40], libraries have made a bit of history standing against the dehumanization of persons with disabilities; they can do more in building the community of people with disabilities through inclusive programming, specialized collection development, and research guides. [41] point out that there are legal, technical, and ethical obligations that the academic library has so committed itself to ensure access to all, including persons with disabilities, and it promoted accessibility.

[101] establishes best practices for serving students with disabilities under the Americans with Disabilities Act and Department of Justice regulations. A 2022 survey of libraries by [42] found that 88% of libraries actively provide services for persons with disabilities, such as material retrieval and extended checkout. [44] built off of this in 2020 by studying how academic libraries in the Northwest United States proactively meet the needs of users with disabilities regarding streaming media. Academic libraries also extend their services to the community and provide disability awareness training for their employees to handle disabled users better. [45] further support the need for holistic access by seeking knowledge from the perceptions of different library users on accessibility in libraries.

• Existing Services and Resources

Academic libraries should extend as many services and resources as possible to users with disabilities.

➤ Existing Services and Resources for Disabled Users:

- The role of the academic library in catering to the needs of people with disabilities was highlighted in research from India, Pakistan, and South Africa by [36] and [19].
- The present research carried out in Aligarh, India, and Lahore, Punjab, has revealed that there is an acute need for ramps, elevators, Braille, and vast print resources to help the disabled [36].

- There are no written policies on services for students with a disability in the academic library, despite some initiatives that have been taken in places like Tanzania, is of concern and requires urgent attention and action. This was revealed through a study by [19].
- Hence, it should be considered that more young people with disabilities have increased access to higher education, and as such, academic libraries should be attuned to their special needs [45].

➤ **Challenges and Opportunities:**

- Challenges brought in by the pandemic on service delivery opened opportunities for academic libraries toward digital transformation and embracing new technologies [49]; [50].
- The educational institutions shifted to virtual, and libraries had to very quickly turn to supporting remote learning, teaching, and research with online services [50].
- The crisis highlighted the role of academic libraries in providing authentic sources of information, supporting research efforts, and raising public awareness about health crises [51].
- It is the moment for academic libraries to reassess their services, address challenges they have faced during the COVID-19 pandemic, and rethink strategies for the post-pandemic future [49].

Innovations and Adaptations during COVID-19

The COVID-19 pandemic of 2020 thus gave the impulse for which many academic libraries worldwide started the process of reorienting themselves toward meeting the locked-down or otherwise restricted user [46]; [47].

- In this very situation, visionary strategies such as book delivery, electronic resources, and online transmission of information made sure that services were still within the reach of users who could not physically go to the concerned facilities [46].
- COVID-19 social distancing requirements have entailed collections digitization and online resources provision, which has shifted towards virtual services [47].
- Academic libraries have been involved in the fight against the pandemic in that they have disseminated online information on preventive measures, supported research teams with pandemic-related information, and raised health awareness among the public [48].

During the pandemic, academic libraries made online information available for prevention measures supported research teams with pandemic-related details and ensured continuity without disruption [48];[52]. Academic libraries under the NEP 2020 purview support diversified quality access to resources, lifelong learning, and fostering of research and innovation; they collaborate for and enhance digital literacy skills, thereby contributing to an overall educational landscape [53].

The COVID-19 pandemic has accelerated the significant changes in an academic library, therefore gearing it towards open science, digital literacy, and leading-edge information technologies. The shift in a bid to ensure the best possible health-protective access to information resources has been very instrumental [54], [55], [56]. Academic health libraries have formed collections of resources, facilitated clinical care through education, and done outreach activities, thus demonstrating a lot of flexibility and dedication to service [57]. Indeed, many studies have shown that academic libraries modified their reference services, augmented virtual interactions, and sustained services to keep users connected with the best information [58], [47].

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Globally, academic libraries have implemented many proactive measures and innovations to tread through online services, safe access to resources, and overcome the challenges with their vision for the post-COVID-19 era [49], [63], [64]. Digitalization, online resources, and e-learning are paramount for academic libraries to be more effective in the current service delivery to their users [59], [62]. In addition, academic libraries have equally ventured into disruptive technologies to create virtual library spaces and increase service delivery [65].

Academic libraries have focused explicitly on service re-energizing post-COVID-19 service, interventions for service provisions during COVID-19 times, and positioning for adequate e-learning support [60], [61]. University libraries have, over the transition process to the new normal, adapted practices to be in a position to disseminate information interactively within the times when the library space may not be physically accessed [59].

Case Studies of Academic Libraries in India

- **Best Practices and Success Stories**

Academic libraries in India are measuring several assessment standards to provide better services and meet the requisite needs of the users. Various articles present several aspects of the change management and services of academic libraries in India. According to [66], the study focuses on using web technology to enhance information services in academic libraries. Designing specific information programs can provide better information services to the user. Focus on user measurement on the expectation and perception of quality of library services offered in the noble academic institutions as quality is seen from the user end ranging from the process and outcome of the library always rely on the user satisfaction [67]. [82] underscore the significance of knowledge management frameworks in academic libraries to cater to the diverse needs of users with rapidly evolving requirements and delve into librarians' perceptions of knowledge management in Indian academic libraries, shedding light on the challenges and benefits associated with its application

[68] stated that the opening utilization of open-source digital repository software is that of an initiation to the use of open-source applications for library management in India. Indian librarians are more familiar with DSpace than Greenstone digital library software. [69] stated the common steps that are generally followed for digital libraries in India which can be considered as standardization and some good practices at par with international standards for digital library development globally.

Academic libraries in India have a growing responsibility to fulfil as they strive to meet the swiftly changing requirements of users and stakeholders. The obligation towards good practices and effective technological solutions resources are improving Knowledge Management Systems (KMSs). The outcomes and recommendations extracted from this research will further accelerate usable growth and continuous improvements in service in the education institute in the Indian context.

Regarding the domain of academic libraries in India, particularly best practices and success stories related to COVID-19 and disabled users, major emerging themes are: Academic libraries have been undergoing digital transformations by dwelling on automation, digital services, and digitization of resources [70].

Questions have been raised regarding the inadequacy of information resources and access systems, and staff have been trained to use assistive technologies within university libraries in the Indian context [71]. Other studies have reviewed the satisfaction of people with disabilities with library services in particular institutional settings within India. [36] underscore a need to understand and meet the unique needs of this user group.

Most academic libraries in India now realize the concerns of accessibility and inclusivity in serving users with disabilities. Some developments are made, like in the case of assistive technologies and website sections. However, a lot remains to be met, such as more resources, better-trained staff, and access to information for disabled users.

Challenges and Opportunities for Academic Libraries

The COVID-19 context has posed several challenges and opportunities to academic libraries regarding their capacity for adjustment in the face of the new standard and attention toward requirements arising from disabled users. The COVID-19 pandemic has accelerated the digitization process among libraries across the world; for instance, such events hastened the digital transformation of an academic library to make sure access to information remains uninterrupted despite constraints posed by a pandemic [49]. In the absence of face-to-face interactions, libraries have had to innovate and develop initiatives to avail services and resources online [37].

According to [16], academic libraries worldwide have been solely preoccupied with the issues of accessibility and disability services. This focus on the various needs brings in users with disabilities. It reflects a deficiency that should be covered in order to overcome a lack of support for such clients with disabilities. It is often mentioned that specific pages on an academic library website serve users who have some disability. It is, therefore, an appreciation for making the information or services available in accessible formats [43]. Assistive technologies are essential in integrating library services to ensure the digital inclusion of students with visual impairments [72].

In other words, it is already long overdue since digital collection and service availability remain one of the core challenges for academic libraries experiencing the pandemic. If an institution does not have these services, offering remote access to collections becomes a significant challenge [64]. Further, according to [73], the crisis has brought out another issue: the continuous professional development in academic libraries is given to keep up with the pace of technological change and ensure that services offered are not interrupted.

Against the pandemic, academic libraries have reconsidered and redefined their services and spaces toward digital literacy and online learning support [56]. Therefore, the change in direction toward digital services has been very vital to regain from the pandemic's negative impact on collection development, social distancing requirements, and limited physical access to library resources [74]. It is suggested by [75] that academic libraries need to engage in the continuous professional development of their librarians and aggressively advocate for the same. The COVID-19 pandemic has had a massive effect on academic libraries worldwide, making every library reassess its operations and offerings to meet emerging user needs [76].

To this extent, academic libraries and librarians are getting increasingly involved in universities' RDM practices and processes, traits radiating into their changing identity in managing research data [77]. This has shown that academic

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libraries should develop strategies to increase students' awareness and usage of online resources such as LibGuides, improving library services for patrons' needs [78]. Whereas libraries use social media platforms challenges still exist in patrons' awareness of, and eventual utilization of these facilities. According to [79], an increase in patrons' consciousness towards social media initiatives bumps engagement with services at the library. Gamification in library services engages well, promotes user interaction with library resources. Librarians' awareness. Effective implementation will require an understanding of their awareness, perception, and readiness on the matter [80].

Staff training and awareness become the most challenging and suitable issues in the framework of academic libraries in India and worldwide if they are to improve their services to users and support research projects to remain relevant in the changing nature of patron needs. These could be achieved through training programs, raising awareness about the availability of resources, and, more importantly, using technology and social media sites to try to retain the academic library as one of the key players in the academic circle.

CONCLUSION AND RECOMMENDATION

Academic libraries have been continually available to support their users, including people with disabilities, during the COVID-19 pandemic. The COVID-19 pandemic brought tremendous change in the academic library environment regarding operations and services delivered worldwide. In the COVID-19 period, academic libraries have been providing information related to preventive measures online and supporting research teams working on pandemic-related information [48]. The impacts of the pandemic on library use patterns, in terms of both visits and online uses, can be understood, given the way changes happened in user behaviours [47]. In this respect, challenges include the need for written policy regarding pandemics, financial limitations, and lack of awareness about the new services offered among users [35].

The pandemic hastened the digitalization of library collections and the use of online resources for further developments in the future [64]. On this note, academic libraries have supported users remotely through varied services during the pandemic [56]. As such, academic libraries in the Philippines adjusted to the present situation: they provided online services and resources, dealt with the challenges, and looked forward to the post-COVID-19 era [49]. Principally, it is the provision of e-services that most academic libraries have focused on in their response to the pandemic to facilitate online learning [37].

Academic libraries have been leaders in the battle with the issues brought to all by COVID-19. In these extraordinary circumstances, libraries supported users through digital technologies and online services. The pandemic accelerated the digitization process for academic libraries and called for greater agility and creativity in covering various user needs, especially for those with any disability. The COVID-19 pandemic has influenced the professional work of academic libraries worldwide, including in India. Academic libraries have risen to the challenge of the pandemic, serving their users in general and those with disabilities in particular. The literature available provides several futuristic directions about the roles and responsibilities of academic libraries during COVID-19 in serving the disabled user community.

In this case, the leadership of an academic library becomes very instrumental in identifying and responding to the challenges brought about by the pandemic. Certain leadership styles have also been important in keeping libraries productive and responsive to the crisis caused by COVID-19 [60]. Library leaders with pragmatic leadership qualities give institutions reassurance and guidance that they are able to change and respond effectively to the needs of new users—including those with diverse abilities—with confidence in being able to adapt.

Reducing the barriers to library service in the Indian scenario will undoubtedly require a multidimensional approach to the inbuilt financial, cognitive, and structural challenges in upgrading facilities, collections, and ICT services. Only after understanding the barriers and mitigating their effects can libraries effectively service their heterogeneous clientele with equal access to information and knowledge.

RECOMMENDATIONS AND SCOPE FOR FUTURE RESEARCH

The COVID-19 pandemic has influenced tremendously on academic libraries in India, increasing the changes and strategic planning for the future. Research showed a pattern change of library use, including in-person visits, online uses, reference transactions, and library resources use before and during the COVID-19 pandemic [47].

In the Indian context, academic libraries will be required to develop digital policies, enhance their present provisions for e-services, sufficiently digitize staff and users, and acquire suitable IT infrastructure to effectively reposition academic library services during this post-COVID era [61].

Additionally, the study shows the role of academic libraries in disseminating online-based information related to the pandemic preparedness and supporting researchers during the disaster [48].

The outbreak of COVID-19 resulted in several changes that were significant concerns for academic libraries in India, and reformation in a more positive perspective was more or less unavoidable. The discussion that follows is intended to draw attention to the area of concern of this paper, i.e., the existing barriers to access to academic libraries, and look at the scope of future work on integrating differently abled users into the library experience. This discussion looks at the current challenges faced by academic libraries, especially in helping users with disabilities, and suggests future research to enhance library services.

1. Several directions for future work are recommended, particularly the need to establish models and concepts that seek to integrate the PWDs within professional library services. Investigate the current state of library access, what assistive technologies would be the most efficient, and how these tools can best be used in library systems. In addition, it examines how best to empower library personnel to assist disabled patrons and participate in library services.

2. Further studies should analyze successful staff training practices aimed at skill acquisition for assisting users with disabilities. This involves using assistive technologies such as audio or computer magnifiers, among other specialized devices. Future research can also examine the advantages of introducing library user training, especially for those unfamiliar with the accessible features. It would be helpful to appreciate the difficulties experienced by staff and users of assistive technologies about library use to develop better strategies for enhancing library usability or accessibility.

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3. Following these works, it is recommended that subsequent studies evaluate the approaches that public libraries can adopt to make their sites more user-centred for disabled people. These involve producing web resources that meet accessibility requirements, embedding assistive devices in digital libraries, and providing distance services irrespective of the user's physical ability. Other studies may explore the possibilities of using cloud computing and artificial intelligence to improve library service for PWDs [90], [87], [84], [86], [94].

4. The study may also seek to develop comprehensive emergency management frameworks that incorporate the needs of disabled users. This could include formulating protocols for maintaining access to library facilities during crises and investigating means of sustaining participation in the remote and online libraries' services. Further research should also consider orienting library personnel for extreme situations where they must utilize the necessary technologies for service delivery to all clients, including persons with disabilities [85], [88], [89], [96].

5. Accredited surveys should seek durable, transferable AT devices that remain operational during crises and throughout disabled users' contact with services. This includes investigating assistive technologies like AT services using the cloud, artificial intelligence, and devices oriented to disabled users. Studies may also be able to describe how libraries may partner with tech companies and policymakers so that these assistive technologies are not restricted to availability but also affordability and accessibility, especially in developing countries [83], [85], [92].

6. Research should investigate the factors shaping the legal and policy frameworks for delivering inclusive library services. This can be related to analyzing international documents, such as instructions from IFLA or UNESCO on providing library access to disabled users or other disabled people [71], [91], [93], [95].

7. With this regard, here is a suggestion for future work on what new content should be integrated into the present communication training tools, which would enable the appropriate library professional to assist disabled users in the future better. Digital content like podcasts and basic images, HTML, and, in turn, the content production and legal aspects encompassing the access issues physically or in their home environment through the current provision. Telephone devices and handsets have become standard in making library packages inclusive to strengthen the guidance users receive whenever seeking help. Research can also examine how library customers staff in civil interactions during mobile spaces training

Even though scientific libraries are attempting to cope with the situation attributed to the COVID-19 pandemic, much remains to be done in terms of serving differently-abled people. There still needs to be an incomplete vulnerability gap that followed the attacks. Furthering this research should explore novel concepts related to accessibility issues, enhancing user engagement in interactions and creating tailored, unifying emergency interaction strategies.

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