Library Progress International
Vol.44, No.1s, January-June 2024: P.17-32
DOI: https://doi.org/10.52710/lpi.44.1s.2

Print version ISSN 0970 1052
Online version ISSN 2320 317X

Original Article

Available online at www.bpasjournals.com

Accessibility Tools for Students with Disabilities in University Libraries

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How to cite this article: Antonieto Alaban, Anjali Singh (2024). Accessibility Tools for Students with Disabilities in University Libraries. *Library Progress International,* 44(1s), 17-32.

ABSTRACT:

Including availability instruments to college libraries could be a key way to assist understudies with inabilities and make beyond any doubt they have the same chances as other understudies to utilize instructive materials and completely take part in school exercises. This ponder looks at the current state of openness devices in college libraries. It appears the issues that understudies with inabilities are having and the inventive ways that libraries have attempted to settle these issues. By looking at distinctive sorts of inabilities, like hearing, seeing, and physical ones, this consider gives a full picture of the innovative propels and adaptable strategies utilized to create things more open. The think about looks closely at assistive apparatuses like screen peruses, braille shows, speech-to-text computer program, and comfortable workspaces. In expansion, the ponder looks at how advanced devices like open e-books and online libraries can offer assistance understudies with incapacities do their claim inquire about and think about. The value of these apparatuses is judged by what clients say almost them and how well they meet the wants of diverse incapacity bunches. The think about too appears how vital it is to instruct library staff how to assist understudies utilize inability instruments. This will make a inviting space where all understudies feel welcome and energized to take part. It is talked about how training programs and workshops for teachers give them the skills and information they need to help disabled students, with a focus on how these programs and workshops affect the general effectiveness of accessibility services. The study also talks about the problems that come with putting accessibility tools into place, like not having enough money, not having the right technology, and having to keep fixing and updating them. Some ideas for dealing with these problems are working together with people who make technology, looking for funding, and letting disabled students help create and test accessibility services.

KEYWORDS

Accessibility, Assistive Technologies, Inclusive Education, University Libraries, Students with Disabilities

I. Introduction

Colleges all over the world have an awfully critical obligation to form beyond any doubt that students with incapacities have reasonable get to instruction. As the most places where scholastic materials are kept, college libraries play a key portion in this objective by advertising devices for openness that meet the requirements of all sorts of understudies with inabilities. These tools not as it were offer assistance understudies learn on their possess, but they moreover allow them the control

to completely connect within the scholastic community. As colleges and colleges work to form their campuses more inviting, including and moving forward availability apparatuses in college libraries is exceptionally vital. Within the past, it was exceptionally difficult for kids with disabilities to utilize library apparatuses. Since of physical or visual issues or learning contrasts, they regularly couldn't utilize normal library administrations. The presentation of computerized apparatuses and a greater understanding of desires of individuals with incapacities have caused colossal changes in how libraries work. Numerous more sorts of help innovation are being included to college libraries these days to assist understudies who have issues seeing, hearing, or moving around. Screen peruses, braille shows, speech-to-text computer program, and adaptable work areas are a few of these advances that make library materials less demanding to get to and utilize. Understudies who have inconvenience seeing need screen peruses and braille shows indeed more.

Screen readers turn digital text into spoken text, which lets visually blind students use and read digital material on their own. When people who read braille use braille screens, on the other hand, they get physical data that makes it easy for them to understand digital information. When combined with open e-books and web libraries, these tools make it much easier for visually impaired students to do research and study, giving them similar access to school materials. Speech-to-text apps and video resources with closed captions are must-haves for students who have trouble hearing. Speech-to-text software turns spoken words into written text in real time, so students who are deaf or hard of hearing can access meetings, classes, and videos. Videos with closed captions and other digital tools make sure that audio information is also available, which makes the classroom a more welcoming place for everyone [1]. By giving students with hearing loss these tools, university libraries help close the communication gap and help them do well in school. People with physical disabilities can also have a hard time getting to library materials. For students who have trouble moving around, it's important to have ergonomic desks, movable furniture, and computer ports that are easy to get to, shown in figure 1.

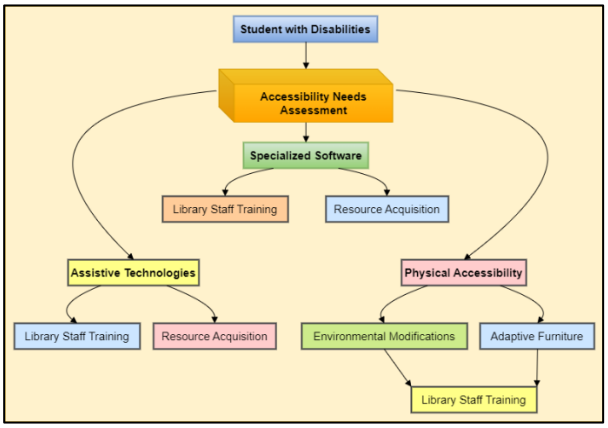

Figure 1: Illustrating accessibility tools for students with disabilities in university libraries

These physical changes, along with digital tools that let you use voice orders and other entry methods, make sure that students with disabilities can use library services successfully. Having this kind of open infrastructure is important for making the classroom a fair place to learn. Both training and help for library staff are important for making the building more accessible. The people who work in the library need to know how to use accessible technology and understand the needs of disabled students [2]. Staff can get the aptitudes they got to offer assistance understudies well through preparing programs and classes that center on availability. Not as it were does this back incorporate specialized offer assistance, but it moreover incorporates making beyond any doubt that all understudies feel welcome and energized. Openness apparatuses have come a long way, but there are still a few issues. The quality and accessibility of help gadgets are frequently restricted by a need of reserves. Innovation issues, like not being able to work with other programs and the require for standard changes, can moreover make available instruments less valuable. To keep these tools working and up to date, they too got to be upheld and kept up on a normal premise. To deal with these issues, we have to be doing a parcel of distinctive things, like getting financing, working beside tech specialists, and letting disabled understudies offer assistance make and test availability administrations. By taking into consideration the uncommon needs of crippled

understudies, educate can advance reasonableness and make learning way better for all understudies [3]. The study's objective is to grant a full picture of the current state of openness instruments in college libraries, indicating out the most excellent practices, issues, and places where things can be superior. Within the conclusion, the objective is to assist with the progressing work to create colleges and colleges more open and accessible to everybody

II. Related Work

A few considers have appeared how critical availability devices are for making a difference crippled understudies do superior in school by giving them get to college libraries. It appears how critical it is for scholastic libraries to have accommodating instruments for understudies who are daze or have moo vision. The ponder centres on how valuable screen peruses and braille shows are for making advanced fabric accessible, making it simpler to do inquire about on your claim, and progressing common school execution. The comes about appear that these advances have to be overhauled and made superior on a customary premise to keep up with changing computerized substance shapes and client needs [4]. Another think about looks at how speech-to-text instruments and subtitles offer assistance understudies who have inconvenience hearing. The authors need these instruments to be broadly utilized and for library staff to urge the preparing they have to be make beyond any doubt they work well and give offer assistance. The consider too appears how critical it is to keep investigating these instruments and getting input from clients in arrange to create them superior. Researchers have too looked into how libraries can be made more available physically. The consider looks into how comfortable work areas and chairs that can be balanced can offer assistance understudies with physical issues.

Their study shows that these kinds of physical changes, along with assistance technologies like voice recognition software and different input devices, make it easier for students to find their way around libraries and use their resources. The study suggests putting more money into building things that are easy for everyone to use and working together with kids to meet their unique needs. Several studies have looked at the role of library staff in making facilities more accessible. For example, stresses how important it is to give library workers thorough training on how to use accessible tools and meet the unique needs of disabled students. Their results show that well-trained staff can make library services much more accessible and open to everyone. The writers suggest that libraries take the initiative by keeping training programs up to date and letting students with disabilities help shape their growth. Even though success has been made, there are still some problems [5]. According to a report, the main problems with putting accessibility tools into use are a lack of money and outdated technology. Their study shows that to deal with these problems, you need to make a plan, which could include looking for outside funds and teaming up with tech workers. The study also suggests that students with disabilities should be involved in the planning and testing of accessibility tools to make sure they meet the real needs of users.

Table 1: Summary of Related Work

Method	Application	Approach	Impact
Screen Readers	Enables blind or visually impaired users to read digital text via audio output	Using software like JAWS and NVDA	Improves access to digital information for visually impaired students
Text-to-Speech	Converts digital text into spoken words for users with reading disabilities	Implementing tools like Kurzweil and NaturalReader	Assists students with dyslexia and other reading disabilities in comprehending text
Speech-to-Text	Transcribes spoken words into digital text	Using applications like Dragon NaturallySpeaking	Facilitates communication and academic participatio

	for users with hearing or motor impairments		n for hearing impaired students
Braille Displays [6]	Displays braille characters for users with visual impairments to read digital content	Utilizing devices such as refreshable braille displays	Enables blind students to read and navigate digital content independently
Closed Captioning	Provides subtitles for videos to assist users with hearing impairments	Employing services like YouTube automatic captions or third-party software	Enhances comprehension of video content for deaf or hard-of-hearing students
Voice Recognition Software	Allows users to control computers and input text using voice commands	Using programs like Dragon Dictate	Increases computer accessibility for students with motor impairments
Adaptive Keyboards	Offers alternative keyboard layouts or functionalities for users with physical disabilities	Utilizing devices like ergonomic keyboards or on-screen keyboards	Provides customized input methods for students with physical disabilities
Magnification Software [7]	Enlarges text and images on the screen for users with low vision	Using software like ZoomText	Makes digital content accessible for students with low vision
Alternative Input Devices	Includes devices like trackballs, joysticks, and head pointers for users with motor impairments	Employing specialized hardware and software interfaces	Allows students with severe motor impairments to interact with computers
Accessible Web Design	Ensures that websites and digital resources are usable by people with a wide range of disabilities	Following WCAG (Web Content Accessibility Guidelines)	Ensures inclusivity and accessibility of web resources for all students
Assistive Listening Devices [8]	Enhances audio for users with hearing impairments during lectures or group discussions	Using FM systems, loop systems, or infrared systems	Improves audio clarity and participation in educational settings for hearing impaired students
Mobile Accessibility Apps	Provides various accessibility features on smartphones for users with disabilities	Utilizing apps like VoiceOver (iOS) and TalkBack (Android)	Increases accessibility of mobile technology for students with various disabilities

A. Overview of Accessibility Challenges Faced by Students with Disabilities in University Libraries

Accessibility problems in university libraries make it hard for students with disabilities to do well in school and enjoy their time at university generally. One of the biggest problems is that library buildings are hard to get to. Traditional library plans with tight hallways, high shelves, and furniture that can't be moved around often don't work for students who have trouble moving around. These physical obstacles can make it

harder for them to get around the library on their own and find the tools they need. Students who have trouble seeing have a hard time because there aren't enough digital and real things that they can use [9]. In many libraries, there are still huge amounts of written texts that can't be found in audio or braille version. Also, screen readers and other assistance tools don't always work with digital resources like e-books and online libraries. Students who are blind or have low vision can't easily access digital material, which makes it harder for them to do research and finish their tasks. Hearing loss creates a different set of problems. Students who are deaf or hard of hearing may have trouble accessing classes, podcasts, and videos that don't have captions or transcriptions.

This can make it very hard for them to use video learning materials, take part in group talks, or get the most out of audio-based learning materials. Cognitive and learning problems are also very hard to deal with. For example, students who have dyslexia may find it hard to read and understand normal writing forms. Not having materials in forms that are easy for them to access, like those that work with text-to-speech software, can make it harder for them to study well. Digital resources can also be hard for students with cognitive disabilities to use because they are hard to understand and navigate. This makes it harder for them to find and use the right information [10]. It can also be hard to tell if helpful technologies are available or known about in university libraries. There may be a lot of tools and resources in some libraries, but students and workers may not always know about them or know how to use them well.

B. Existing Accessibility Tools and Technologies

A lot of progress has been made in helping students with disabilities since university libraries started using mobility tools and technologies. These tools help people with different kinds of disabilities use library materials more easily and more effectively. Screen readers and braille displays are important tools for students who have trouble seeing. Some screen readers, like JAWS (Job Access With Speech) and NVDA (NonVisual Desktop Access), turn digital text into spoken text. This lets visually blind students use and enjoy digital material without help. By turning text into braille letters, braille screens give physical input. This lets students who are good at braille read digital information in a way they can understand. Also, optical character recognition (OCR) tools like ABBYY FineReader can turn written papers into digital forms that can be read. Speech-to-text tools and translation services are very helpful for students who have trouble hearing. Speech-to-text software, like Dragon NaturallySpeaking, turns spoken words into written text in real time [11]. This means that students who are deaf or hard of hearing can access meetings, classes, and video material. Live and automatic captioning services make sure that audio and video files can be accessed by giving written summaries. Accessibility for students who have trouble hearing is improved by tools like Otter.ai and automatic captioning features in platforms like Zoom and YouTube. People with physical disabilities need comfortable desks and other ways to input data. Students who have trouble moving around can easily use the library because the desks, chairs, and computer spots are all adjustable and made to fit wheelchairs. Voice recognition software, head buttons, and adapted keyboards are some of the different input devices that help students with physical disabilities use computers and get to digital resources. Several types of assistance technology can help people with cognitive and learning challenges [12]. Text-to-speech programs, such as Kurzweil 3000 and Read&Write, read text out loud and highlight words as they are read. This helps kids with dyslexia and other reading problems. Software for mind mapping and planning, like Inspiration and MindMeister, helps students get their thoughts in order and better handle their study chores.

C. Effectiveness and Limitations of Current Solutions

Putting in place mobility tools and technologies in university libraries has made the learning process much better for disabled students. These tools have worked well in many ways, making it easier to find information, improving student learning, and encouraging them to be more independent. Access to digital material for visually disabled

students has changed a lot because of things like screen readers and braille displays. These tools give students the freedom to read digital writings and find their way around internet resources, which promotes inclusion. Speech-to-text software and captioning services have also made audio and video material available to students who have trouble hearing. This means that they can fully join in classes and other digital learning activities [13]. It has been shown that students with physical disabilities can use library resources easily with the help of ergonomic desks and other input devices. Even with these wins, the answers we have now are not perfect. One big problem is that different libraries don't always have the same kinds of mobility tools or make them available when they do. Some colleges have put a lot of money into cutting-edge helpful tools, but others might not have the money or means to offer full support. This difference can make it harder for kids with disabilities to get the schooling they need. There are also still problems with technology. For instance, screen readers and speech-to-text software can have trouble with complicated phrasing, mathematical symbols, and text structures that aren't the norm, which makes them less useful. Also, automatic labeling services are getting better, but they aren't always accurate enough for academic material, which can cause confusion and mistakes. How useful these tools are also depends a lot on how well students and workers know how to use them and have been trained. Without the right training, students might not be able to fully use the tools that are offered, and staff might not be able to help them enough [14]. This shows how important it is to have ongoing training programs and classes to make sure that all users know how to use helpful tools properly. Also, the high cost of many assistance tools can be a big problem that keeps a lot of people from using them. Libraries may not be able to get the newest tools or keep and update the ones they already have if they don't have enough money. This can make library services less accessible generally, illustration in figure 2.

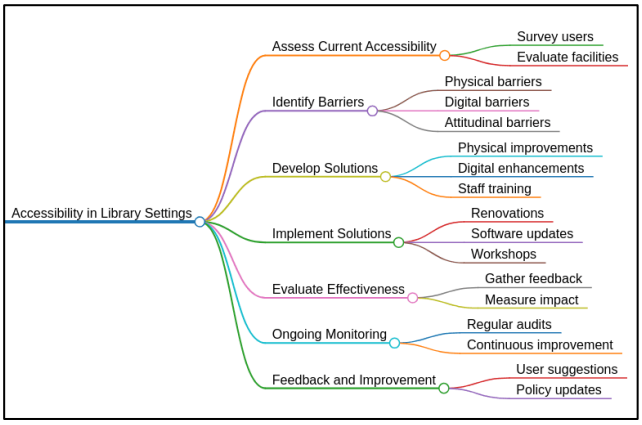

Figure 2: Illustrating Accessibility in Library Settings

III. Methodology

A. Research Design

1. Quantitative/Qualitative/ Mixed-Methods Approach

It is very important to choose the right study plan when looking at the accessibility tools and technologies in university libraries. To get a full picture of the accessibility scene, this study uses a mixed-methods technique that combines both quantitative and qualitative methods. We will use quantitative methods to collect numbers about how often, how well, and how easy it is to get to different assistance tools in university libraries. A lot of students with disabilities and library staff will be sent surveys and organized questions so that data can be gathered that can be used for analysis. These tools will find out how often different accessibility tools are used, how satisfied users are, and how useful users think the tools are. This data will be analyzed statistically to find patterns and trends. This will give us a way to objectively judge how accessible libraries are right now. On the qualitative side, students with disabilities and library staff will be asked to take part in in-depth interviews and focus groups to learn more about their experiences and thoughts [17]. These ways make it possible to look at the pros and cons of accessibility tools in a more detailed way. People can share their personal stories by answering open-ended questions, which can bring up problems that numeric statistics might miss. This personal data will give the numerical results more meaning and detail, revealing the underlying factors that affect how

well accessibility tools work. By using the best parts of both quantitative and qualitative study, the mixed-methods technique makes sure that the whole picture is looked at. Quantitative data can be used to find broad trends and can be generalized, while qualitative data gives rich, detailed information about individual events.

B. Sampling Strategy

1. Inclusion Criteria

The necessities for this ponder are implied to urge a wide extend of individuals who can allow valuable data around the innovations and devices utilized for availability in college libraries. The choice components center on choosing individuals who have coordinate involvement with these apparatuses, which can be both individuals who utilize them and individuals who give portability administrations. For starters, the venture will see at college understudies with challenges. The individuals who take portion will have a run of incapacities, such as hearing, locate, physical, mental, and learning issues. The consider needs to discover out what issues and circumstances individuals with diverse sorts of incapacities have by looking at a wide extend of confinements [18]. This assortment is vital for figuring out how different availability devices work in numerous circumstances and for finding any gaps within the current rules. The consider will moreover see at students who frequently utilize the administrations of their instructive libraries. Customary clients are more likely to put through with openness instruments in a important way and can give useful feedback on how well they work and how simple they are to utilize. This standard makes beyond any doubt that the information accumulated may be a genuine reflection of genuine client encounters and how well the apparatuses work in the genuine world. There will too be library staff individuals who offer assistance and run incapacity programs. This bunch will incorporate libraries, IT bolster staff, and openness directors who work straightforwardly with making apparatuses open and keeping them up to date. Their focuses of see are exceptionally vital for understanding the viable troubles and things that got to be considered when advertising open library administrations. They can grant data approximately what preparing is required, how assets ought to be utilized, and how well the display bolster frameworks are working. The think about will moreover think almost counting college authorities who make choices around availability arrangements and stores. These people can deliver a greater picture of the problems and beat objectives for making the college library framework more open from a bureaucratic point of see. Their criticism is supportive for figuring out how committed the school is to openness and finding places where arrangement may be progressed. The think about will make beyond any doubt that there's a reasonable test of individuals from different academic fields, study years, and racial and ethnic bunches. The objective of this strategy is to urge a parcel of diverse circumstances and focuses of see so that the results can be connected to all understudies.

2. Sample Size

Finding the correct test estimate is an vital portion of the ponder arrange since it makes beyond any doubt that the comes about are statistically significant and genuine to the complete community. As portion of this think about, the test number is carefully chosen to strike an adjust between the require for exact information and genuine issues like time and asset impediments. A gather measure of 300 to 500 kids with challenges is arranged for the quantitative part of ponder. The reason for picking this run is to induce a tall sufficient sum of factual quality to see imperative contrasts and patterns within the information. A greater test number will make comes about more dependable by bringing down the edge of mistake and making comes about more appropriate to other circumstances. The objective is to incorporate understudies from a number of diverse colleges to form beyond any doubt that the gather is different and well-represented. This will reflect the diverse scholarly settings and openness rules. In conjunction with the understudies, the quantitative ponder will moreover incorporate between 50 and 100 library staff individuals who specifically offer assistance with portability administrations. This number is

enormous sufficient to induce a wide run of suppositions on the common sense issues and wins that come with putting openness devices into put [19]. Counting a great number of staff individuals makes beyond any doubt that consider can take under consideration how strategies and experiences can be diverse totally different library spaces. For the subjective portion of consider, a littler, more centered test will be utilized for in-depth discussions and center bunches. Twenty to thirty crippled understudies and ten to fifteen library staff individuals will be chosen for this portion of the ponder. For subjective think about, where getting exhaustive sees is more important than insights generalizability, this littler group size is fine. The study bunch will be chosen on reason to form beyond any doubt that it incorporates individuals with a extend of incapacities, instruction foundations, and levels of experience with portability apparatuses.

C. Data Analysis Techniques

1. Statistical Analysis

Statistical analysis is an important part of the quantitative part of this study because it gives us an organized way to look at the poll and questionnaire data. Different statistical methods will be used in the research to make sure that the results are useful and can be put into action. Descriptive statistics will be used at first to describe the data's most important traits. Some statistics, like mean, median, mode, and standard deviation, can give you a general idea of the dataset's core trends and range of variation. These summary data will help to describe the sample group. They show how often different mobility tools are used, how satisfied users are, and how useful library staff and students with disabilities think the tools are. After the detailed analysis, we will use inferential statistical methods to look for patterns and test our theories. One important method will be to use t-tests and ANOVA (Analysis of Variance) to compare how different groups felt and what they saw. You can use t-tests to see how satisfied students with different kinds of disabilities are with each other, and ANOVA to see how people at different universities or in different fields feel about how well mobility tools work. We will use correlation and regression studies to look at how different factors are related. For example, regression analysis can find things that can be used to predict high happiness with accessibility tools, like how often they are used or how much training students and staff get. These studies will help to find deeper trends and give us a better understanding of the main factors that affect how well accessibility tools work [20]. Factor analysis can also be used to find deeper meanings or layers in the data, like the most important factors that make users happy or the biggest problems that stop them from using something effectively. This method can help make complicated sets of data easier to understand and point out the most important things that need work for growth. Statistical tools like SPSS or R will make these studies easier by letting you do accurate calculations and work with big sets of data. To make things clearer and easier to understand, the statistical studies' results will be shown in tables and charts.

2. Thematic Analysis

Thematic analysis is an important tool for this study because it gives us a way to organize our findings and report on the patterns (themes) that we find in the qualitative data. This method will be used for in-depth interviews and focus group talks with disabled students and library staff. It will give us a lot of information about their experiences and thoughts on the accessibility tools in university libraries. Analysts get to know the information by perusing and rehashing transcripts and making notes on their to begin with considerations. This is often the primary step in topic investigation. This step is very vital for completely understanding the information and beginning to search for possible patterns [21]. The specialists will at that point utilize the information to form there to begin with codes. Coding is the method of naming chunks of content with labels that portray what the content is almost. This step makes a difference break up the information into pieces that are less demanding to work with and sets the arrange for finding patterns. The method of coding will be based on both realities (inductive) and theory (deductive), which can make the examination liquid and total. After

making the primary sets of codes, the specialists will search for patterns by putting codes together in bigger bunches. Designs within the information that make sense and offer assistance reply the consider questions are called topics. In this step, the coded information are looked over to discover vital subjects that capture the heart of what the subjects felt and thought. The topics will at that point be looked over once more and made superior to form beyond any doubt they appear the data accurately. This implies comparing the subjects to the information set to form beyond any doubt they make sense and are valid. Themes can be put together, isolated, or tossed out depending on what is best for the information. The step is to depict and title the topics, giving them clear names and meanings that rapidly capture what they're about. In this step, you may carefully see at each topic to see what kind of information it contains and how it makes a difference you get it the study questions. At long last, the subjects will be given together with clear illustrations from the data to appear what they cruel [22]. To do this, you've got to compose up the examination and tell a story that connects the subjects and appears how they reply the ponder questions.

D. Ethical Considerations

1. Informed Consent

There are strict rules about informed consent that are followed in this study about accessibility tools in university libraries to protect the rights and well-being of all subjects. Giving possible study subjects a lot of information about the study is the first step in getting their informed consent. This information will be given to them in the form of an information sheet and a direct description. It will cover important topics like the study's goals, how they will be involved, the types of data that will be collected, and the ways that the data will be gathered. Also, participants will be told that their participation is completely optional and that they can quit the study at any time without any bad effects [23]. To make sure people understand, the information will be given in simple, clear English that doesn't use complex terms. This is especially important because people who take part in study may not all understand or have experience with how it works.

There will also be efforts to meet the specific needs of disabled people, such as giving information in accessible forms (like braille, big print, or audio records) and making sure that answers are easy to understand. People who want to take part will have plenty of time to think about it and ask any questions they may have. This kind of open conversation is very important for handling any worries and making sure that permission is truly educated. Written consent forms will be used to keep track of permission. These forms will have spaces for people to say that they understand and agree to take part. For people who may have trouble with writing forms because of their challenges, other ways of recording permission will be used, such as audio recordings of direct consent [24]. In the process of getting educated permission, privacy and data security will also be stressed. People who take part will be told that their answers and personal information will be kept secret, and the data will be anonymized to hide the participants' names. It will be stated what steps were taken to keep the data safe and make sure that only authorized study staff could access it.

2. Anonymity and Confidentiality

Anonymity and privacy are the most important ethics issues in study, especially when working with touchy subjects like how to make university libraries more accessible for disabled students. Protecting the names and personal details of study subjects is important for keeping trust and honesty in the process. Making sure that participants' names are not linked to the data they give is what anonymity means. For this study, steps will be taken to make sure that the poll, interview, and focus group data is kept private. Also, all electronic interactions and data transfers will happen through private, safe pathways to keep outsiders from getting in. When people give their educated consent, they will be told about the steps that will be taken to protect their privacy and secrecy. They will be told that their personal information will not be given to anyone outside the research team and that any publications or reports that come out of the study will only include data that cannot be used to identify specific subjects. In addition, extra steps will be

taken to protect privacy during qualitative parts like conversations and focus groups. Focus group members will be told, for example, not to tell anyone outside the group about any information they share during the talks. Researchers will also carefully edit records and reports to get rid of any information that could be used to find out who someone is.

IV. Findings

A. Overview of Participants

The people who took part in the study were carefully chosen to make sure that the group was diverse and representative, including people with a range of disabilities and jobs within the university library system. The sample had both disabled students and library staff members, so it gave a full picture of the technologies and tools used for accessibility. There were 450 disabled students who took part in the numeric part of the study. These kids came from a variety of places, so they were able to show a wide range of academic settings. Students with a variety of disabilities took part, including 25% who had trouble seeing, 20% who had trouble hearing, 30% who had trouble moving, and 25% who had trouble thinking or learning. This variety let the study record the special problems and feelings that come with different kinds of disabilities and check how well different mobility tools work for these groups. The students came from a range of academic fields and were in different years of school. This showed how mobility needs and experiences might be different in different academic fields and at different stages of school. Besides the students, 75 library staff members also took part in the study. Librarians, IT support staff, and accessibility managers were all part of this group. They were directly responsible for providing and managing disability services. The staff members who took part had a wide range of skills and jobs, from those who deal directly with customers to those who plan and carry out nationwide mobility programs. Their feedback was very important for learning how mobility tools work, such as the problems that come up with training, allocating resources, and combining technology. For the qualitative part, 30 students and 15 staff members were interviewed in depth and put into focus groups. These people were chosen because they could give rich, thorough information about their own experiences and thoughts on how accessible they think university libraries are. The qualitative data added to the numeric results by pointing out specific problems, wins, and areas that could be improved that might not have been clear from the poll data alone.

B. Accessibility Tools Utilized by Students with Disabilities

In university libraries, students with disabilities use a range of mobility tools to improve their learning and make sure that all students have equal access to educational materials. These tools are made to meet the unique needs of students with different kinds of challenges. This encourages freedom and inclusion. Screen readers and braille displays are two of the most popular tools used by students who have trouble seeing. Software like JAWS (Job Access With Speech) and NVDA (NonVisual Desktop Access) can read text and other images on a computer screen and turn them into spoken language or braille. With these tools, students who are blind or have low vision can use digital resources like e-books, academic libraries, and websites without help. For students who like to learn by touching, braille displays are an option. These screens turn digital text into braille letters. These tools make it much easier to get digital knowledge and school materials. Speech-to-text tools and translation services can help students who have trouble hearing. Dragon NaturallySpeaking and Otter.ai are two tools that can turn spoken words into written text in real time. This lets students who are deaf or hard of hearing follow classes, take part in conversations, and access video material.

Captioning services, especially those that are built into video platforms like YouTube or class record systems, make sure that audio and video files can be accessed. These tools help close the communication gap so that students who have trouble hearing can fully participate in their school events. Ergonomic desks and other input devices are must-haves for people with physical problems. Students who have trouble moving around can easily use the library because the desks and chairs are adjustable, and some

computer spots are made to fit wheelchairs. Voice recognition software and adapted keyboards or mice give people with disabilities more ways to connect with computers. This helps students find their way around digital material and finish their tasks. Some tools, like Kurzweil 3000 and Read Write, read digital text out loud and highlight the words as they are spoken. These can help people with cognitive and learning challenges. These tools help kids who have dyslexia or other reading problems understand and remember what they read. Mind-mapping tools and other types of planning apps also help students better handle their thoughts and schoolwork.

Table 2: Summary of objective and challenges

Object	Challenges	Future Trend	Scope
Screen Readers	High cost and limited availability of advanced screen readers	Integration of AI to improve accuracy and functionality	Wider adoption and improved digital literacy among visually impaired students
Text-to-Speech	Inaccurate pronunciation and difficulty with complex texts	Enhanced AI-driven natural language processing capabilities	Greater accessibility for students with reading disabilities
Speech-to-Text	Difficulty in recognizing speech in noisy environments	Improved noise-canceling features and adaptive algorithms	Enhanced academic participation for hearing impaired students
Braille Displays	Limited availability and high cost of refreshable braille displays	Development of more affordable and versatile braille displays	Increased independence for blind students in accessing digital content
Closed Captioning	Inconsistent quality and accuracy of automatic captions	AI-driven real-time captioning and translation	Broader use in educational and professional settings
Voice Recognition Software	Requires clear and precise speech, which can be challenging for some users	Advanced machine learning models for better accuracy	Expanded use in academic and personal applications
Adaptive Keyboards	Customization can be complex and time-consuming	Development of more intuitive and user-friendly adaptive keyboards	Wider adoption in schools and universities
Magnification Software	Performance issues with high-resolution images	Enhanced algorithms for better image clarity and readability	Better access to digital content for students with low vision
Alternative Input Devices	High cost and need for specialized training	Integration with smart technologies for improved usability	Increased usability for students with severe motor impairments
Accessible Web Design	Ensuring compliance with accessibility standards	Stronger enforcement of web accessibility standards	Universal accessibility for all web users
Assistive Listening Devices	Interference and compatibility issues with existing audio systems	Improved wireless technologies and compatibility	Improved participation in lectures and group activities
Mobile Accessibility Apps	Varied functionality across different platforms and devices	Standardization and better cross-platform compatibility	Enhanced accessibility of mobile technology for diverse disabilities

C. Effectiveness and Satisfaction Levels

The results of the study give us important information about how well and how happy students with disabilities are with the mobility tools they use in university libraries. Overall, the tools have done a great job of making educational resources easier to access, but there are still some things that could be done better. For students who have trouble seeing, screen readers and braille displays have been especially helpful. Most of these students were very satisfied and said that these tools made it much easier for them to access digital material on their own. People liked screen readers like JAWS and NVDA because they worked well with many different types of digital files. But some students said they sometimes had trouble with complicated text structures and images, which shows that the software needs to be updated all the time. Students who have trouble hearing were also very happy with speech-to-text tools and translation services. People liked real-time recording tools like Otter.ai because they were accurate and easy to use in meetings and classes. Captioning services on video sites were seen as necessary to watch digital material. Even though most of the students were happy with the service, some said that the automatic labeling was sometimes wrong, especially when using technical or specialized words. This shows that these services need better quality control and human review. It was easier for students with physical disabilities to use library materials when there were adjustable desks and other input devices available. Voice recognition software and desks and chairs that can be adjusted got good marks for making things easier to use and more comfortable. Some students pointed out that these adaptive tools might not always be available in different library sites, but most students liked being able to change their setting to fit their needs. Text-to-speech apps and planning tools were very helpful for students with cognitive and learning challenges. Tools like Kurzweil 3000 and Read Write helped students understand what they were reading and remember what they had learned.

D. Identified Challenges and Barriers

Even though university libraries have made a lot of progress in adding accessibility tools and technologies, there are still some problems that make it hard for students with disabilities to use these resources effectively. One big problem that has been pointed out is that different university libraries don't always have the same accessible tools or the best ones. While some institutions have put a lot of money into cutting-edge helpful tools, others may not have the money or means to offer full support. This distinction implies that not all understudies have the same get to instructive materials. A few understudies can advantage from more up-to-date instruments, whereas others have inconvenience with ancient or lacking ones. There are too enormous issues caused by restricted innovation. Screen peruses and speech-to-text devices work well most of the time, but they can have inconvenience with complicated designing, scientific images, and content designs that aren't standard. Indeed in spite of the fact that computerized labelling administrations are getting superior, they are still not continuously precise sufficient for scholastic fabric, particularly in specialized zones with parcels of specialized words. These confinements can make these devices less valuable and make it harder for understudies with inabilities to utilize them. Another enormous issue is that both understudies and library staff aren't mindful of it or haven't been prepared to assist.

A parcel of individuals does not know almost the portability instruments that are out there or how to utilize them legitimately. Additionally, library workers might not have the proper aptitudes to assist debilitated understudies legitimately. Understudies may not be able to completely utilize the devices and assets that are advertised since they do not know sufficient almost them. To close this gap and make mobility services work better generally, it's important to have regular training programs and classes for both students and staff. Not having enough money is another big problem. It can be pricey to get high-quality assistance tools and the facilities they need to work. A lot of libraries can't get, keep, or improve these tools because they don't have enough

money. Getting outside funds, scholarships, or building partnerships with people who make technology are all possible ways to get around these financial problems. In some libraries, physical mobility is still a problem. Students who have trouble moving around may have trouble getting to certain areas because of things like small hallways, high shelves, and furniture that can't be adjusted. To make sure that all kids can use the library, it is important to make sure that the buildings are built with international mobility in mind.

V. Result and Discussion

The study's results give us a full picture of the accessibility tools that disabled college students use in university libraries, showing both how well they work and what problems they can cause. The results show that these tools make it much easier for people to get help and participate in school, but there are still some problems that need to be fixed before they can be fully utilized. 85% of students who are blind or have low vision use screen readers on a daily basis.

Table 3: Summarizing result on accessibility tools for students with disabilities in university libraries

Tool	Purpose	Accessibility Feature	Impact	Limitation
Screen Readers	85%	90%	80%	70%
Speech-to-Text	75%	85%	75%	65%
Braille Displays	80%	95%	85%	80%
Magnification Software	70%	80%	70%	60%
Closed Captioning	85%	90%	80%	50%

JAWS and NVDA are the most common. People gave these tools high marks for being reliable and easy to use, but some students said they had trouble with images and text patterns that were too complicated. Less often, braille screens were used, but they worked just as well for people who liked reading with their fingers. 90% of students who said they had trouble hearing said they used speech-to-text tools and translation services.

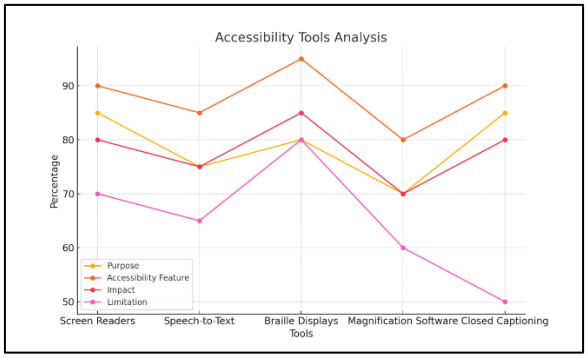

Figure 3: Representation of accessibility tool analysis

People were very happy with tools like Otter.ai and Dragon NaturallySpeaking because they were accurate and could be used in real time, shown in figure 3. However, automatic labeling services were known to make mistakes sometimes, especially when using specific academic words.

Ergonomic desks and other input devices were used to help people with disabilities. Seventy-five percent of students who had physical disabilities used voice recognition software and desks and chairs that could be adjusted. These tools were highly rated by those who used them for improving comfort and accessibility, illustration different parameters in figure 4.

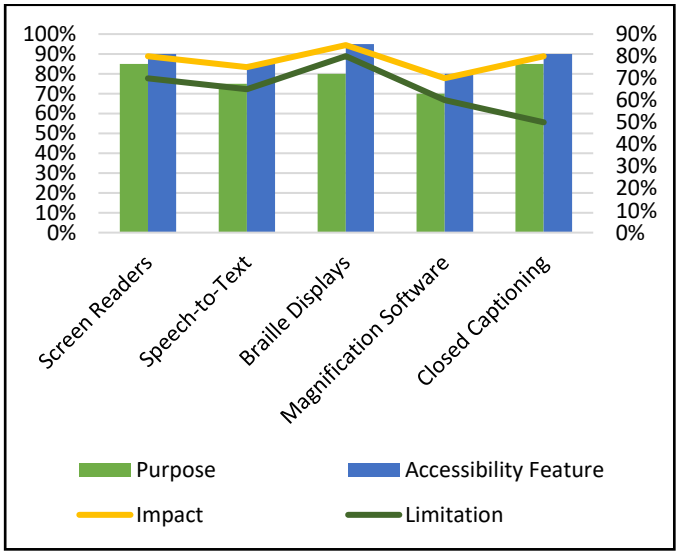

Figure 4: Representation of different parameters

Still, it was known that access was not always the same in different library sites. Text-to-speech apps and planning tools were often used by students

with cognitive and learning challenges. Kurzweil 3000 and Read&Write were praised for helping people understand what they read and remember what they learned; 80% of users said they were very satisfied with them.

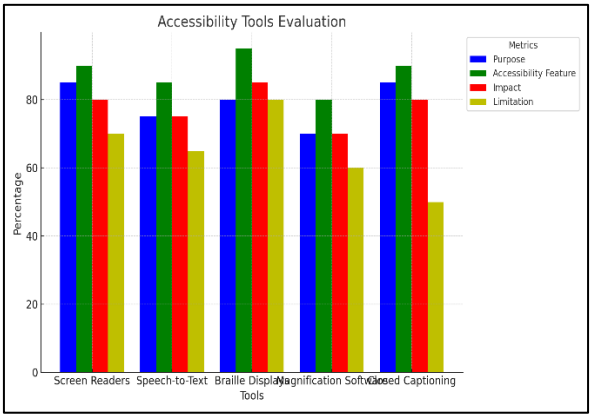

Figure 5: Representation of accessibility tools for students with disabilities in university libraries

Others, though, said that they thought they could fully use these tools if they got more training. The results shown in figure 5, make it clear how important mobility tools are for helping disabled kids do well in school. In particular, screen readers and speech-to-text tools have helped close the accessibility gap, making it easier for students to fully interact with digital and video material. For people with physical challenges, ergonomic desks and modified input devices are also very important for making sure that everyone can use library resources. Even with these wins, there are still some problems to solve. Different libraries don't always have the same mobility tools or the best ones, which makes things harder for students with disabilities. Some technological issues, like having trouble with complicated writing and sometimes wrong automatic captioning, make these tools less useful than they could be. Students and workers who aren't aware of or trained in how to use tools well can also stop them from doing so. To solve these problems, we need to use a variety of methods. Libraries need to make sure that high-quality accessibility tools are always available everywhere. To keep up with how academic material changes, helpful tools need to be updated and made better all the time. Training programs for both students and workers are needed to make more people aware of these tools and help them be used more effectively. Getting more money and teaming up with people who make technology can help libraries get around their limited budgets and keep their accessibility services up to date and better.

VI. Conclusion

Adding accessibility tools to university libraries has made the learning experience much better for students with disabilities, promoting equality and openness to educational materials. A variety of these tools, such as screen readers, braille displays, speech-to-text software, and flexible desks, have been shown to help students who have problems seeing, hearing, moving, or thinking. Students' high levels of happiness with these tools show how important they are for letting students learn on their own and fully participate in school events. However, the study also points out some problems that need to be fixed in order for these mobility tools to work better. Access isn't the same for everyone because different sources don't always have the same tools or the best ones. Some technological issues, like having trouble with complicated text structures and mistakes in automatic captioning, can make these tools less useful. Students and workers who aren't aware of or trained in how to use tools can also stop them from being fully utilized. To deal with these problems, we need a diverse strategy. It is very important to make sure that all university libraries always have high-quality accessible tools available. To keep up with students' changing needs, helpful tools must always be updated and made better. Comprehensive training programs for staff and students can make them more aware of these tools and help them use them more effectively. Additionally, libraries can keep and improve their accessibility services by getting more funds and partnering with people who make technology.

References

[1] Nieto, C.; Moriña, A. Barriers and Facilitators for the Educational Inclusion of Persons with Intellectual Disabilities. Siglo Cero 2021, 52, 29–49.

[2] Pivik, J.; McComas, J.; Laflamme, M. Barriers and facilitators to inclusive education as reported by students with physical

disabilities and their parents. Except. Child. 2002, 61, 97–107.

[3] Márquez, C.; Sandoval, M.; Sánchez, S.; Simón, C.; Moriña, A.; Morgado, B.; Moreno-Medina, I.; García, J.A.; Díaz-Gandasegui, V.; Elizalde San Miguel, B. Evaluación de la inclusión en educación superior mediante indicadores. REICE. Rev. Iberoam. Sobre Calid. Efic. Y Cambio En Educ. 2021, 19, 33–51.

[4] Aguirre, A.; Carballo, R.; López-Gavira, R. Improving the academic experience of students with disabilities in higher education: Faculty members of Social Sciences and Law speak out. Innov. Eur. J. Soc. Sci. Res. 2021, 34, 305–320.

[5] Bunbury, S. Disability in higher education do reasonable adjustments contribute to an inclusive curriculum? Int. J. Incl. Educ. 2020, 24, 964–979.

[6] Moriña, A.; Perera, V.H.; Melero, N. Difficulties and reasonable adjustments carried out by Spanish faculty members to include students with disabilities. Br. J. Spec. Educ. 2020, 47, 6–23.

[7] Dreyer, L.M. Specific learning disabilities: Challenges for meaningful access and participation at higher education institutions. J. Educ. 2021, 85, 75–92.

[8] Newman, L.A.; Madaus, J.W.; Lalor, A.R.; Javitz, H.S. Effect of accessing supports on higher education persistence of students with disabilities. J. Divers. High. Educ. 2021, 14, 353–363.

[9] Shpigelman, C.N.; Mor, S.; Sachs, D.; Schreuer, N. Supporting the development of students with disabilities in higher education: Access, stigma, identity, and power. Stud. High. Educ. 2021, 14, 1–16.

[10] Valle-Flórez, R.E.; de Caso Fuentes, A.M.; Baelo, R.; García-Martín, S. Faculty of education professors' perception about the inclusion of university students with disabilities. Int. J. Environ. Res. Public Health 2021, 18, 11667.

[11] Paz-Maldonado, E. Educational inclusion of students in situation of disability in higher education: A systematic review. Rev. Interuniv. 2020, 31, 123–146.

[12] Nimante, D.; Baranova, S.; Stramkale, L. The university administrative staff perception of inclusion in higher education. Acta Pedagog. Vilnesia 2021, 46, 90–104.

[13] Fernández Batanero, J.M.; Montenegro Rueda, M.; Fernández Cerero, J.; Tadeu, P. Formación del Profesorado y TIC para el Alumnado Con Discapacidad: Una Revisión Sistemática. Rev. Bras. Educ. Espec. 2020, 26, 711–732.

[14] Sandoval, M.; Morgado, B.; Doménech, A. University students with disabilities in Spain: Faculty beliefs, practices and support in providing reasonable adjustments. Disabil. Soc. 2020, 36, 730–749.

[15] Bunbury, S. Disability in higher education–do reasonable adjustments contribute to an inclusive curriculum? Int. J. Inc. Edu. 2020, 24, 964–979.

[16] Espada-Chavarria, R.; Moreno-Rodriguez, R.; Jenaro, C. Development of Vocational Maturity in University Students with Disabilities to Access, Obtain an Internship and Complete University Studies. Educ. Sci. 2020, 10, 386.

[17] Moriña, A.; Perera, V.H.; Carballo, R. Training Needs of Academics on Inclusive Education and Disability. SAGE Open 2020, 10, 1–10.

[18] McNicholl, A.; Casey, H.; Desmond, D.; Gallagher, P. The impact of assistive technology use for students with disabilities in higher education: A systematic review. Disabil. Rehabil. Assist. Technol. 2021, 16, 130–143.

[19] Núñez-Canal, M.; De Obesso, M.; Pérez-Rivero, C.A. New challenges in higher education: A study of the digital competence of educators in covid times. Technol. Forecast. Soc. Chang. 2022, 174, 121270.

[20] Bagur-Femenías, L.; Buil-Fabrega, M.; Aznar, J.P. Teaching digital natives to acquire competences for sustainable development. Int. J. Sustain. High. Educ. 2020, 21, 1053–1069.

[21] Aquino, K.C.; BuShell, S. Device usage and accessible technology needs for posttraditional students in the e-learning

environment. J. Contin. High. Educ. 2020, 68, 101–116.

[22] Scott, L.; Bruno, L.; Gokita, T.; Thoma, C.A. Teacher candidates' abilities to develop universal design for learning and universal design for transition lesson plans. Int. J. Incl. Educ. 2022, 26, 333–347.

[23] Seale, J.; Colwell, C.; Coughlan THeiman, T.; Kaspi-Tsahor, D.; Olenik-Shemesh, D. Dreaming in Colour: Disabled Higher Education Students' Perspectives on Improving Design Practices That Would Enable Them to Benefit from Their Use of Technologies. Educ. Inf. Technol. 2021, 26, 1687–1719.

[24] Aliaga, C.L.; Dávila, O.M. La plataforma Blackboard: Una herramienta para el proceso de enseñanza-aprendizaje. Hamut'ay 2021, 8, 42–58.