



Establishing Information Seeking Behavior on Access to Digital Resources by Students with Visual Impairment: A Case Study of Nairobi University Library Services, Kenya

Cheptoo K. Priscah^{1*}, Khamadi I. D. Shem¹ and Maina Jane²

¹*Department of Computing and Information Science, Maasai Mara University, P.O BOX, 861-20500, Narok, Kenya.*

²*Department of Information Science, Kisii University, Kisii, Kenya, P.O BOX, 408-40200, Kisii, Kenya.*

Authors' contributions

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ABSTRACT

Information is power, very important and valuable commodity in everyday human activity as evidenced with the current digital divide that equal access to information is essential to the development of information society which also applies to people with disability. The aim of the study was to establish the information seeking behavior of visually impaired (VI) students at University of Nairobi library services. The total population of the study comprised of two units of analysis which were 32 visually impaired students and 6 librarians in charge of the visually impaired students. The study carried out a survey by means of questionnaires. The study employed Wilson's (1999) theory of information behavior model which provided a framework in mapping the student's information patterns. Statistical Package for the Social Sciences (SPSS) and Microsoft excel 2016 were used to analyze the data. The response rate was 78.95% from all the units of analysis. The findings indicated that majority of the respondents 72% were female. The findings further revealed that most Visually impaired students were getting assistance from a sighted person or by use of computers,

*Corresponding author: E-mail: priscahkirwa@gmail.com;

speech synthesizers, screen readers, brail prints, and audio books. A smaller number of the respondents (2.44%) used mobile app called tap tap. The study indicated that majority 68.3% of the Visually impaired students relied on aiding tools.

Keywords: Information; visual impaired; digital resources; university of Nairobi.

DEFINITIONS, ABBREVIATIONS

<i>Term</i>	: <i>Definition for the term;</i>
<i>DR</i>	: <i>Digital Resources;</i>
<i>ER</i>	: <i>Electronic resources;</i>
<i>JAWS</i>	: <i>Job Access with speech;</i>
<i>SPSS</i>	: <i>Statistical Package for the Social Sciences;</i>
<i>UON</i>	: <i>University of Nairobi;</i>
<i>VI</i>	: <i>Visually Impaired.</i>

ACRONYMS,

academic researchers was print out resources. Presently quite a number of resources for example encyclopedias, books and other journal also theses, scientific articles and open for access in electronic databases in digital media [2]. In today's world however the data and information systems and also the internet has gained a very big popularity as a worldwide avenues and channels for information propulsion due to its ability to incorporate global gathering of information [3].

1. INTRODUCTION

A growing number of countries have recognized the high potential of information to contribute to national economic and social development. As Kenyans development enters a new stage of digital, it also requires an updated 'information' strategy for its economic and social transformation. Information is a vital commodity, as it has the very basis of human existence. The modern society depends fully on information and therefore when the information is utilized effectively it brings growth and wealth to the development of the society. Library users are in general key founders to information seeking with the post war that increased the scientific literature that was recently released or newly published from war-time restrictions led, in 1948, to the Royal Society Scientific Information Conference (1948), was the beginning of the modern study to information seeking behavior by the human beings [1]. However, the subject goes rather further back in time.

In today's world there has been a rapid and tremendous change in the world of digital technology, that is to say that the way of acquiring data have dramatically transformed due to compelling reasons like rapid transformation in the knowledge of computer and international network (internet) which for that matter is mushrooming daily.

Even though digital resources (DR) give out creativity non-changeable choices in the order of price and time, other individuals are still adhering to printed resources. Previously, the most suitable and preferred method of resources for

Information is needed to all and this modern world has been termed as the period of knowledge or information provision whereby the information is provided in different format [4].

Taking into consideration the flourishment works in modification of repositories, portals, intranets, information and collection encouraging the utilization of web 2.0 discipline, which allows anyone to create and share any electronic information or materials they have created, it may appear to line interests to control that content is available to all, Concerns to design accessible web pages for visually impaired users should especially be taken into consideration [5].

Lack of visual ability can hinder people with vision problems from coding precise vital information more specifically the print document that need a lot of navigation to access or read [6]. With the informed society more people with disability are not left behind they also join institution of higher learning to equip themselves with knowledge in this case it's the obligation of the library management to provide the same range of information to the users with challenges regardless of its format, this implies that access to information should be equal for all categories of users [3], to increase the probability for the visually and blind to obtain jobs and propel in obtaining there degrees in institution of higher learning libraries and information centers should equip themselves with relevant/ wider resources that can be either non- fiction and references materials in wider format that suits the access. In this case this will justify equal access to digital information resources that will be available for the betterment of the disadvantaged group. The

appropriate information material in electronic format should be made available and in large variety [7]. The library management should be at forefront in acting upon the needs of the students with disabilities by making the resources comprehensive and need to listen to their voices and continuously improving their services [8].

Libraries are service institutions that renders services without partiality to its several consumers, which include both the sighted and the visually impaired. Libraries should sufficiently incorporate digital resources that suit the disadvantaged, People who are disabled often found aware of the most recent technologies/equipment and dwell on training to exhaust its benefits [9]. The growing of assistive and adaptive technologies has given a bigger chance for persons who are disabled to rapidly change their mode of living in a the most flourishing method, efficient and result oriented way Academia de Studii Economice [10]. With the change of technology on how to access information, assistive and adaptive technology is an important tool for the visually impaired students towards accessing the digital resources and the library management should consider and factor in, in library policy making [11]. When the institution of higher learning considers and improve the library resources for the visually impaired their education will be at par with the sighted group of people considering the fact that the access to digital resources is well supported by the assistive technology.

The University of Nairobi is an institution of higher learning situated in Nairobi County, it is situated at the center of Nairobi, Kenya's capital city along university way. The institution was established in 1970's and later [12]. The outstanding library was constructed in nineteen eighties (1980, s) with the immense or rapid growth another library was born that was mainly established for the sake of postgraduate student this was the known Gandhi memorial library, which provide its services to the college of humanities, architecture, social sciences and engineering students. The main University of Nairobi (UON) library can accommodate approximately 2,500 learners at a time with 160 librarians that are working in all the section in the library with the increased admission of 60,000 students annually [13].

The library is considered among the biggest academic library the country has. Its coverage includes both print and electronic resources(ER);

among them are e-books-thesis, electronic past papers e- journals etc. with the changing technology the library have also embraced change whereby it has fast forward the digitization of library collection among them are the local content that are obtained within the institution, this local content provides a platform for the ranking of institution some of these include the Institution, electronic past examinations, undergraduate e-projects, electronic thesis and electronic journal articles. Moreover, the library also factored in the establishment of sections that enable the students with hearing, visual and physical disability, this indicates that the library has enhanced equal access to information resources regardless of any challenges library user might have.

Library and Information science dictionary, defines accessibility as the ease with which library user, researcher, academician, student may enter any given information Centre and gain access to its online resources or any digital content, use the resource and acquire any given information no matter its format. In the web environment, accessibility refers to the way to make every individual including the visually impaired have access to the web and internet in whole and thus being functional to everyone or library consumer regardless of any person's disability. The library is being a sole information giver to all students including visually impaired, has significant impact on information seeking behaviour. Therefore, it is necessary for a depth study to explore the information seeking behavior of visually impaired students on digital resources.

2. METHODOLOGY

2.1 Research Design

The case study approach was used in this study to investigate the information seeking behavior of visually impaired students on digital resources at the UON library in Kenya. A case study is used to learn more about an individual, a specific group of people, or a single exceptional case. Since sub-methods such as observation and questionnaire can be used inside the study, a case study provides for an in-depth assessment.

2.2 Research Approach

The combined method of qualitative and quantitative approach was employed in this investigation. It entailed combining quantitative

and qualitative ways to generate new knowledge, and it may involve the employment of these two types of methodologies concurrently or sequentially [14]. Its underlying principle is that the combination provides a greater knowledge of research challenges than each strategy alone [15]. The researcher was able to develop a level of detail as a result of his involvement in the real experience. Despite the fact that its design is less structured in terms of description, it formulates and constructs new theories. It entails the deliberate use of describing, explaining, and interpreting the obtained data.

2.3 Target Population

The research population is regarded as an important component of every survey. A target population is made up of all elements or units of analysis for whom survey data is collected. What or who is investigated, what is officially referred to as units of analysis, varies widely in social scientific research. Units of analysis are those that we investigate in order to generate summary descriptions of all such units and explain differences between them [16]. This study will focus on two distinct populations: visually impaired pupils and digital librarians.

2.3.1 Visually impaired students

The first aspects of analysis were 32 visually impaired students who were given the questionnaires according to criteria employed by Shunmugan [17]. They were either completely blind or visually impaired. They were registered students at UON; and they were known to the UON Disability Unit, registered as blind or visually impaired. They used or required one or more of the specialist support services made available to them on campus to help with their learning and integration.

2.3.2 Digital librarians

The second element of analysis was six (6) digital librarians at UON Library main campus who are the main information providers to the VI students, they were selected because they assist the VI in meeting their information seeking needs at university of Nairobi library. Questionnaires was administered to them this was structured differently from the VI questionnaire. They were used as key informants in accordance with the definition of Bobbie and Mouton [18] that an informant is someone well versed in the social phenomenon that you wish

to study and willing to tell you what he or she knows.

2.4 Sample Size and Sampling Technique

The target population being Visually impaired students from UON that are made up of 32 VI students and 6 key informants, the researcher opted to involve all of the sightless students and the information providers who would give consent to participate in the research.

The total population sampling technique was employed in the research for visually impaired students at the UON library. Total population sampling, according to Lærd [19], is a sort of purposive sampling technique that entails analyzing the entire population that has a certain set of characteristics (e.g., specific attributes/traits, experience, knowledge, abilities, exposure to an event, etc.). In the case of total population sampling, the units of interest tend to have certain unusual properties. The uncommon characteristics are those characteristics that we are interested in. In this case the uncommon characteristics are the fact that the people (i.e., units) of interest are all visually impaired. On the other hand, five information providers were sampled purposively. Because they can provide the required information in the area concerned. The selected groups of information providers were few in number, easily accessible and with some experiential knowledge concerning information seeking behavior of VI students. As they were interacting frequently with VI students, the intimacy helped information providers to develop some knowledge concerning information preference, role of people in academic life of visually impaired students and some more.

2.5 DATA Collection Instruments

According to Kumejpor, 2002 [20], there are different categories of instruments that can be used to collect primary data, in social examinations requires that information should be collected from human beings or institution's that are specifically have that defined topic to be captured, therefore in choosing or deciding on the instrument to be used to collect the data the following should be factored which includes; resources available, the skills of the researcher, the features of the population above all the purpose of the study influence all. Moreover the background of the study also forms the main part of the study. Instrument. Some of the target population may not feel comfortable in a specific

technique used, the researcher should therefore examine well the instrument to use this is because the main point is to collect enough data freely by the population. Therefore, in making the choice or deciding the particular tool to use, the researcher also should factor the following examine the kind of people to choose, their description, the mood and the social environment not forgetting their mind set [21]. This study employed the questionnaire that were both open and closed and observation protocol method to gather primary data.

2.5.1 Questionnaires

The first instrument of data collection that the study used was through the use of questionnaires. Questionnaires are a set of written questions that the respondent answers in writing. The questions in the questionnaire were designed and structured according to the research objectives. The questionnaires were used for the reasons: that they are able to give the respondent's adequate time to respond to the items; they offer a sense of security or confidentiality to the respondent; and they are objective since no bias resulting from the personal characteristics of the respondent can influence the data collected. Questionnaires gave the key informants and visually impaired student's freedom to express their views in their own way.

2.5.2 Direct observation

Data was gathered primarily through close visual inspection of the natural setting. The researcher strived to be unobtrusive as possible so as not to bias the observations and also detached from actively participating in the setting. The researcher observed keenly the behavior of the Visually impaired students such how they interact with the adaptive technology, how they seek the information and barriers to information access. This was achieved through the use of observation protocol or schedule data collection instrument. One advantage of direct observation was, it offered contextual data on settings, interactions, or individuals. The observation results were to complement the questionnaire from both the digital librarians and the VI students.

2.6 Data Collection Procedure

The questionnaire for visually impaired students, were transcribed to Braille format to make it

easier for respondents to answer. The questionnaire was administered to visually impaired students and key informants by the researcher. The answered braille copy of the questionnaire was then sent to the Resource Centre to transcribe their responses from Braille format to print format. All respondents were asked the same questions with the same wording and in the same sequence [22]. The researcher had face to face contact with each and every respondent to collect the data in the respondents' spare time. In the case of information providers, the questionnaire prepared was different from the guideline that was prepared for VI students. This guideline contained questions that concerns their knowledge gained about VI academic experience. For those Visually impaired students who had the challenge to fill the braille questionnaire the researcher assisted them to fill on behalf of them

2.7 Piloting of Data Collection Instruments

Pre-testing of the questionnaires were done to eliminate any ambiguities and mistakes by giving two experts from the department of computing and information science Maasai Mara University to judge whether all items in the instrument were really related to the objectives. On the other hand, to ensure the stability of the questionnaires, a pilot study was carried out before the actual study whereby the questionnaires were administered to two (2) Visually impaired students and (2) digital librarians who were purposively selected from Kenyatta University, this was a location that was used during the main study. The scores was further correlated to understand the reliability of the instrument in measuring the variables of the research. The main purpose of the test and retest was mainly to test how reliable and valid the instrument were, reduce the uncertainty and polish the instrument effectively thus collecting the data accurately or truthfully. In doing pilot study it allowed the researcher to; identify any uncertainty and ambiguous questions, making words clear, enhance rephrasing of sentences in providing enough room for answers in doing so the layout of the instrument will be revised to attain the objective of the study. It was therefore necessary to adjust the changes for that reason before the commencement of the actual data collection process the tools that was questionnaire was there after adjusted accordingly to suit the objectives. Pre testing

feedback was mostly positive. The people involved in the pretesting were satisfied with the length of the questionnaires based on its purpose.

2.7.1 Validity of research instruments

Validity is the ability of data collection instrument or tool to gather information that is accurate, relevant and appropriate with regards to the study variable. The construct and content validity of the questionnaire was given to the experts in the department to ensure that the tool was designed in an appropriate way that would enable the researcher to gather the intended information.

2.7.2 Reliability of research instruments

Reliability involves measurements of the degree to which the study instrument delivers consistent results after repeated trials. This allowed the respondents to have the opportunity to give more information into the research problem. To ensure consistency of the responses among the respondents the researcher subjected the instrument to Test-Retest Technique as a method of testing reliability. The researcher used Cronbach Alpha reliability test to measure the consistency of the questions. With a total correlated value of Alpha more than 0.7 reliability coefficient, the questions were considered to be reliable. The findings of the pre-test data obtained in selected Visually impaired students helped to restructure the questionnaires by paraphrasing questions that seemed vague to the respondents. Cross-checking of the research instruments was also prepared out under the supervision of the study supervisor. This aimed at improving the quality of the research instruments.

2.8 Data Analysis Procedure

After completion of data collection, the quantitative and qualitative data collected from Visually impaired students and information providers was analyzed using mixed method. Mixed methods research combines elements of qualitative and quantitative research approaches for the purposes of breadth and depth of understanding and substantiation [23]. Mixed methods research involves collecting both quantitative and qualitative data and merging, linking, or combining of the two sources of data, and then conducting research as a single study or a longitudinal project with multiple phases [24].

There are six mixed methods design strategies. Among these, sequential explanatory mixed method design is used for this study. Sequential explanatory mixed method design characterized by collection and analysis of quantitative data followed by a collection and analysis of qualitative data to use qualitative results to assist in explaining and interpreting the findings of a quantitative study [15]. In this study, the quantitative data of Visually impaired students and information providers was analyzed using SPSS software and Microsoft excel 2016, data was presented graphs and tables. To support and enhance the result of quantitative data analysis, the qualitative data was analyzed and described in words. Similarly, the interpretation of both quantitative and qualitative data analysis brought to conclusion. Finally, the convergent result of analysis was used to illustrate information seeking behavior of Visually impaired students on digital resources.

3. RESULTS AND DISCUSSION

3.1 Questionnaire Return Rate

A sum of 38 questionnaires were distributed to the visually impaired students and key informants at the University of Nairobi. Out of 38 questionnaires, 30 responses were obtained from the respondents, this constituted a response rate of 78.95% with the rest of the respondents either not giving their consent or not finding time to respond to the questionnaire, this was however considered to be adequate for the research study.

3.2 General Information

Part of the questions in the questionnaire issued to visually impaired students at the University of Nairobi covered their general information. The general information for this research study included; gender of the responses, age, mode of study, and level of study.

The general information provided by the respondents of this research helped the researcher to acquire relevant information on the information seeking behaviour on digital resources by visually impaired students at the university of Nairobi library services, Kenya.

3.2.1 Gender of the respondents

The data obtained from the study on the gender of the respondents is illustrated in Fig. 1.

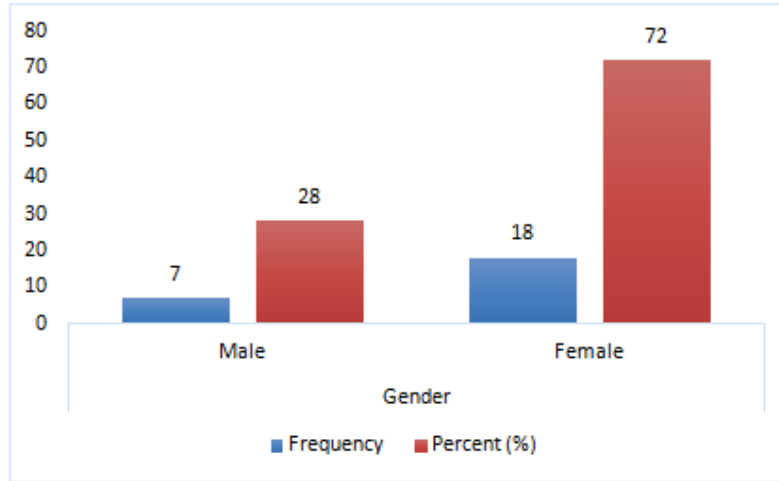


Fig. 1. Gender of the respondents

The findings revealed that majority of the sightless students were female (18) 72% of the total respondents while the male (7) accounted 28% of the respondents. The findings indicated that most of the visually impaired students were female. This agrees with Ndegwa et al. [25] in his study, he established that females had higher prevalence of visual impairment compared to males. The study further administered questionnaires to the key informants, where two were male and three were female. This was done to get a better insight on the information seeking behaviour on digital resources by visually impaired students at the University of Nairobi library.

3.2.2 Age of the respondents

The age of the respondents is presented in Fig. 2.

The study noted that the respondents were between the age bracket of 19-28 years. From Fig. 2, majority (8) 32% of the respondents were 23 years old, followed by those at the age of 22 years with response rate of (6) 24%. Respondents with the age of 20 years were (4) which represented 16% of the total population. Those at the age of 19 years and 21 years both had a similar response of (3) students each which represented 12% of the total population each. Lastly, one of the respondents was at the age of 28 years, this represented 4% of the total population. The information showed even though the students were VI they were able to be at the university at younger age.

3.2.3 Mode of study

The mode of study of the Visually Impaired students is illustrated in Fig 3.

Mode of study majorly influences the performance of students at different stages of their education. It was therefore important to know the modes of study of the Visually impaired students from the University of Nairobi. From the findings of this study (Fig.3), it was established that majority 52% of the Visually impaired students were part time while 48% were full time. However, the smaller difference, the study was concurred with those of Marinelli et al., [26], who revealed that there was low enrolment of Visually impaired students in regular schools or on full time basis. Marinelli, cited inadequate motivation, negative attitude, inflexible curriculum, lack of resources and poor teaching methods as to the reason Visually impaired students prefer part time mode of study.

3.2.4 Level of study

The level of study of the VI student was of key importance on establishing information seeking behaviour on digital resources by visually impaired students since different stages of education will require one to have advanced digital resources. The findings of the study on the level of study of the Visually impaired students is illustrated in Fig. 4.

From Fig. 4, the study revealed that majority (7) 28% of the VI both were in their third and fourth

year of study each. It was followed by (6) 24% of the students who were in their first year of study. Similarly, (6) 24% of the respondents were in their second year of their study. Lastly, one of the respondents which comprised 4% of the total population was at master's level.

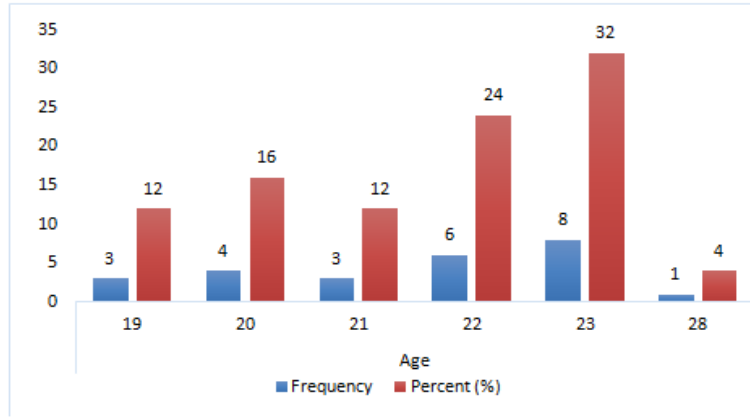


Fig. 2. Age of the students

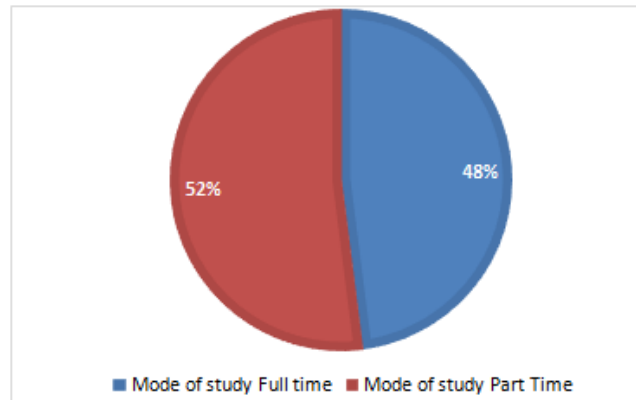


Fig. 3. Mode of study

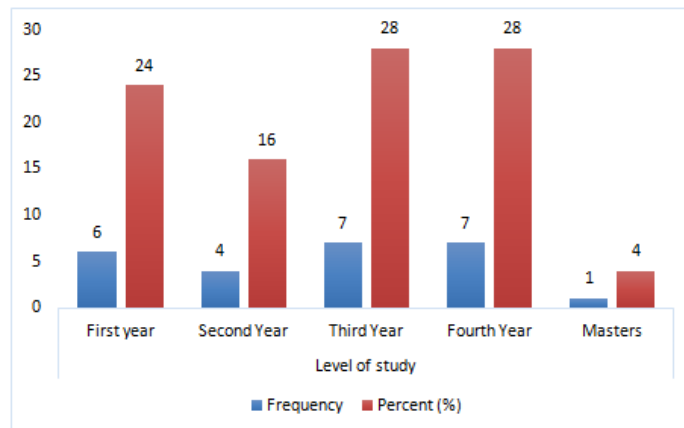


Fig. 4. Level of study

3.3 Establishing Information Seeking Behaviour by Students with VI in Accessing Digital Resources

3.3.1 Information needed by Visually impaired students to support their Learning

The study sought to find out the information needed by the Visually impaired students in order to support their learning. The analysed data is illustrated in Table 1.

The findings of the study showed that most of the Visually impaired students 17 (31.48%) believed that getting information on how to use aiding materials such as braille books, white cane and handheld magnifiers will support the learning which in turn better their learning process. It was followed by 12(22.22%) of the Visually impaired students who revealed that getting information on to use computers to search information, reading and doing their assignments and research will support their learning at a higher extend. Some of the VIS believed that getting information on the use of voice induced reading materials was likely to bettering their learning. Similarly, 4(7.41%) of the Visually impaired students believed that knowing their level of disability will enable them to know the exact materials to use during their learning without struggling since most of them said that they were slow in grasping the information which could have resulted from the use of wrong devices or reading materials. The finding also indicated that 3(5.56%) of the Visually impaired students each believed that locating of rooms, barrier free access to the disabled and information on scholarly research and project work is the main information that they need to support their learning. Smaller percentage, 2(5.56%) each of the Visually impaired students said that provision of the curriculum in an alternative format and independent reading of text books will support their learning. Finally, 1(1.85%) of the respondent believed that their ability to locate or find people in crowds was likely to support their learning.

One of the respondents said that:

"...the most important information that I think is very necessary is how to use a wide variety of digital assistive devices present in our library and how to get access to the programs that are in the internet and websites" [respondent 1 from University of Nairobi, July 2021].

Another respondent added that:

"...I need braille prints, regular prints, tactile symbols and some recorded materials for effective communication" [Respondent 2 from University of Nairobi, July 2021].

Still on the information needed by Visually impaired students to support their learning from University of Nairobi library, another respondent added that:

"...as a visually impaired learner I would like to be more conversant with digital resources such as computers, the internet, e-books, other e-learning resources and other audio devices...this can be achieved by being more oriented about how to access these resources, how to use them effectively for learning purposes, as well as how to retrieve information and keep the information well for the purpose of future reference". [Respondent 7 from University of Nairobi, July 2021].

Some students believed that obtain what is needed to support their learning will give them an equal opportunity just like their sighted friends. The respondent said that:

"...I need to get information on how to utilize or use a broad range assistive technologies such as screen readers screen magnifiers, and sound recognition software's that are available in our library to provide us access to information in electronic databases and on the internet, will give me an equal opportunity as my sighted friends." [Respondent 9 from University of Nairobi, July 2021].

Copyrights prevents the access of information and thus hindering learning for most VI students, the know-how on whether certain information is restricted or not will make their learning efficient. One respondent said that:

"...I need to know how to use digital texts, how to download onto a PC to enable me as visually impaired user to choose my own preferred method of access whether by screen magnification, speech or Braille output. Although there are many texts that are available in digital format now, there are many more that are not in our library, particularly new publications that are copyright protected so having skills on the usage of these resources will make my work easy"

since digital collections that are freely accessible contain only documents that are copy-right free.” [Respondent 16 from University of Nairobi, July 2021].

Visually impaired students believed that hearing isn't enough but knowing how something looks like will give them a better insight of understanding. The respondent said that:

“...first you should know that we do it by touch and also hearing, so when it comes to information we need to do this as if there is a way in which we can do learning through a talking computer and then it will be very good for us to learn very well...Again we need some people to guide us on how this learning goes who can either be a resource person, ..At some point we have something that we hear through listening but don't know how this looks like or is it an object and which type of an object is it and that is why we need a guide, at some point the braille machine isn't enough for us to learn we need to hear more information”. [Respondent 17 from University of Nairobi, July 2021].

The findings of the study from the Visually impaired students were in agreement with those of the key informants who noted that they need to know the vision level of the students, students' knowledge on the use of assistive technologies like braille and the attitude towards visual disability.

One of the key informants noted that:

“...I need to understand his/her braille background, the attitude towards the visual disability and to understand the extent of blindness”. [Key informants C from University of Nairobi, July 2021].

3.3.2 Equipment mostly needed by visually impaired students to enable them get information for effective learning

Visually Impaired students rely on various equipment on their learning process. Among the learning equipment, the respondents provided the equipment listed in Table 2.

Table 1. Information needed by visually impaired students to support their learning

Information needed to support Learning for VI Students		
	Frequency	Percent (%)
Use of aiding tools	17	31.48
Use of Voice induced reading materials	7	12.96
Research work/Projects	3	5.56
Use of computers	12	22.22
Provision of curriculum in alternative format	2	3.70
Barrier free access to disabled	3	5.56
Independent reading of text books	2	3.70
Finding People in a crowd	1	1.85
Locating rooms	3	5.56
Level of disability	4	7.41

**Information needed by Visually impaired students to support their learning*

Table 2. Equipment mostly needed by Visually impaired students for effective learning

Equipment mostly needed by Visually impaired students for effective learning		
	Frequency	Percent (%)
Optical Character Recognition (OCR)	6	11.32
Screen readers/speech synthesizer	10	18.87
Braille	10	18.87
Digital Computers	10	18.87
Audiobook	2	3.77
Electronic texts	2	3.77
Magnifiers	5	9.43
Human Readers	3	5.66
Audio Cassettes	3	5.66
Headphones	2	3.77

**Equipment mostly needed by Visually impaired students for effective learning*

The findings established that most of the Visually impaired students 10(18.87%) each trusted that provision of Screen readers/speech synthesizer, Braille, and Digital computers are most commonly needed equipment by Visually impaired students with VI. It was followed by 6(11.32%) of the Visually impaired students who believed that Optical Character Recognition (OCR) is mostly needed equipment by Visually impaired students for effective learning. Magnifiers followed as the mostly needed equipment by Visually impaired students with 5(9.43%). Other equipment that was mostly needed are human readers and audio cassettes with response rate of 3(5.66%) each. Finally, headphones, electronic texts, and audiobooks were as well needed with response rate of 2(3.77%) each.

This showed that most of the Visually impaired students mostly need equipment such as; screen readers, Optical Character Recognition (OCR), Screen readers/speech synthesizer, Braille, Digital Computers/Computers, Audiobook, Electronic texts, Magnifiers, Human Readers, Audio cassettes and headphones. One of the respondents narrated that:

"...I think an Optical Character Recognition (OCR) system is more efficient and reliable for me because it is able to scan a printed document into a computer and convert the image into text characters and words, which screen readers and braille embossers cannot recognize. For example, if a pre-scanned electronic image is already available (e.g., if you have a PDF file), OCR systems can convert synthesized speech, screen enlargers, and Braille embossers". [Respondent 1 from University of Nairobi, July 2021].

Similarly, in relation to equipment needed by Visually impaired students in University of Nairobi Library, the respondent said the following:

"... I need screen readers, braille displays such as focus, and some software such as braille notes and Google braille back, and special sound recognition software." [Respondent 2 from University of Nairobi, July 2021].

Another respondent stated that equipment that are more advantageous to them in terms of convenience are the most appropriate equipment

that they mostly need to enable them get information and learn effectively. The respondent said that:

"...Electronic texts (computer text files). With this, I can load an electronic text in computer and read the text from computer using screen magnifying software, I can also print the text in large print and read it from paper, I can read text using braille bar that is attached to the computer and can have the text read out loud by the computer, using screen reader, it is more convenient and quite advantageous for me". [Respondent 9 from University of Nairobi, July 2021].

One of the respondents further explained that;

"...I think speech synthesizer or a screen reader is best for me because it reads aloud the texts displayed on the screen compared to the braille display which only accesses one line at a time and does not caption the whole page on the screen, it is not very convenient in accessing digital information". [Respondent 16 from University of Nairobi, July 2021].

Further, the findings of the study from the key informants indicated that the equipment mostly needed by the Visually impaired students at the University of Nairobi are; the screen readers, computers, mobile phones, braille printers, braille translation software, headphones and Job Access with speech (JAWS). The findings were in agreement with that from the VI students.

3.3.3 Ways through which VI student search for information in libraries

Searching of information is very critical in any learning/research environment, however, it is more crucial for Visually impaired students since most of them are slowly in grasping information as well as locating the study spaces. The study therefore sought to establish the ways through which Visually impaired students search for information in a library. The analysed data of the study was presented in Table 3.

The results from the study revealed that majority 10(24.39%) of the Visually impaired students finds it hard to search for information in the library not unless they get assistance from a sighted person which can be friends or the librarians. It was followed by 7(17.07%) the Visually impaired students who had digital skills

and were able to search for information from computers and search engines/web browsers. The findings also indicate that 4(9.76%) of the Visually impaired students used to search of information in libraries by use of speech synthesizers. Similarly, a total of 6(14.64%) of the respondents revealed that they search for

information by use of screen readers, braille prints, audio books and by the help of orientation mobility skills (Fig. 5 and Fig. 6). Furthermore, one of the respondents which represented 2.44% searched digital information using mobile app called tap tap.

Table 3. How Visually impaired students search for Information in Libraries

Ways Visually impaired students search for Information in Libraries		
	Frequency	Percent (%)
Screen Readers	3	7.32
Assistance from sighted person/librarians	10	24.39
Use of Braille printers	3	7.32
Use of search engine/web browsers	7	17.07
Use of audio books	3	7.32
Computer	7	17.07
Orientation and mobility skills	3	7.32
Use of mobile app tap tap	1	2.44
Speech synthesis	4	9.76

**Search for Information in Libraries*

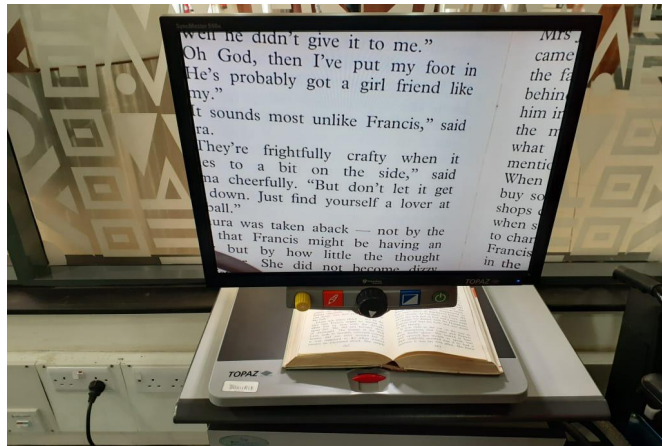


Fig. 5. Screen reader



Fig. 6. Braille printer

The findings revealed that most of the Visually impaired students from University of Nairobi were getting assistance from their sighted friends when searching information in the library. One respondent explained that:

"...I request a sighted person to visually skim a website to find the section I want to read then I do the same with screen reader as the website's content has been coded with proper header tags". [Respondent 2 from University of Nairobi, July 2021].

Similarly, the Visually impaired students search information from the University of Nairobi library by use of computers as well as by browsing from the search engines with the help of internet. The respondent gave the following information:

"... Screen readers are available in our library which helps us to transmit the text that is displayed on the computer screen into a form that we can process. The software helps by providing synthetic voice to read the text aloud and also to communicate it through e-mails...We also have screen magnification software with speech suitable for computer users with low vision which magnifies computer screen from 1 to 60 times its usual size, it is a nice device". [Respondent 1 from University of Nairobi, July 2021].

Furthermore, on the ways through which visually impaired students search information in University of Nairobi Library, the key informants identified the following ways: Help by their classmates/library personnel, online catalogues, screen readers, JAWS and their mobile phones. This information from the key informants was in agreement with those of the VI students.

4. CONCLUSION

The study concluded that the University of Nairobi library had digital resources such as computers, braille, screen readers, human readers, JAWS, magnifiers, audio cassettes, headphones, electronic texts, and audiobooks for VI students. However, these equipment's/learning materials were inadequate and provision of more of the equipment's for the Visually impaired students was suggested so as to better the learning of VI students. It was also established that majority of the Visually impaired students were finding it hard to search for information in the libraries not unless they get assistance from a sighted person or by use of

computers/search engines/web browsers, use of speech synthesizers, use of screen readers, brail prints, audio books and by the help of orientation mobility skills and use of mobile app called tap tap.

DISCLAIMER

The products used for this research are commonly and predominantly use products in our area of research and country. There is absolutely no conflict of interest between the authors and producers of the products because we do not intend to use these products as an avenue for any litigation but for the advancement of knowledge. Also, the research was not funded by the producing company rather it was funded by personal efforts of the authors.

CONSENT

The researcher sought relevant authorization before the commencement of the study. Informed consent was established by the researcher engaging the respondents in a conversation explaining to them what the study was about as well as giving them room for voluntary participation. Respect and confidentiality of the respondents was very well preserved as the information gathered was for academic purposes. The results were made available at Maasai Mara University and the National Council of Science and Technology Libraries, where they were made available to all. Findings may also be distributed in academic workshops and conferences as well as publication in academic research journals so as to disseminate the findings.

ETHICAL APPROVAL

As per international standard or university standard written ethical approval has been collected and preserved by the authors.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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