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Technology and Online Learning Trends among Students: A Study of Thiruvananthapuram District, Kerala

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Abstract

Internet technology has advanced significantly over the past decade, having a profound impact on many fields, particularly education. Digital technologies have brought about a transformation in the creation, utilisation, and cross-platform sharing of educational media. Given how mobile and wireless technologies are changing and defining new literacy in teaching and learning, new media and their integration could be incorporated into the educational programs. As a result of its participatory nature, the internet has led to the development of numerous inventions and services. Wireless networks and ubiquitous, low-cost microprocessors have made it possible for us to access and manage information virtually anywhere, at any time. As a result, mobile devices have become widely used. Education providers, sociologists, neuroscientists, and theorists from a variety of disciplines believe that learning today involves entirely new tools, which include a wide range of media forms like images, video and audio clips, hypertext, hypermedia, software applications, and web pages. This is due to the significant rise of digital resources in diverse types and forms.

Keywords: Online educational resources, digital library platforms, social learning theory, connectivity learning

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Introduction

As a result of the widespread impact of globalisation, the modern era is witnessing an unprecedented period of change in human history. Digital technologies are being widely adopted due to the globalisation of education. Digital educational resources increase widespread access to learning, allowing materials to be accessed anywhere, anytime, and at the fingertips, enhancing course materials with diverse texts, images, videos, and other interactive forms (Atkins, D. E. 2007). Online teaching was first embraced by educational institutions globally due to the COVID-19 epidemic, even though online platforms were first utilized proactively for classrooms, resource sharing, evaluations, and academic management. Online education platforms offer flexibility in learning options, enabling students to access courses from anywhere, accommodating diverse learning requirements and schedules (Dynarski, S. M. 2017).

The development of abilities necessary for students' performance, such as problem solving, structural thinking, and process knowledge, is greatly aided by digital technologies. For students to succeed professionally, the skills and attributes they acquire through digital technology are essential. Students can participate more actively in their education when they use computers and other devices in addition to

their digital tools. The use of electronic devices and platforms in the classroom, or "digital classrooms," has completely changed the nature of education. Since education is essentially a form of communication, the internet has made it easier to communicate by creating new channels that have expanded the ways in which educational content can be accessed and transformed. A new kind of culture and civilisation has been guaranteed by the introduction of new communication technologies. Incorporating online technologies into the education sector enhances traditional learning and fosters the development of critical skills essential for the professional success of students. As Picciano et al. (2022) note, "Blended learning environments that integrate digital tools promote active engagement and critical thinking among students." The study is both empirical and analytical, with data collected through a survey. Questionnaires were distributed using Google Forms. A total of 104 participants from Thiruvananthapuram district, Kerala, were selected using a simple random sampling method for the study. The data was analysed by frequency distribution, and various inferences were made from these frequency analyses.

The domain of cyberculture, also known as e-culture, deviates greatly from conventional ideas of universality. Even when the components are different, heterogeneous, and disconnected, interconnections nevertheless shape this universality. Globalization's branch, cyberculture, is reflected in many ways, one of which is a rising inclination for popular culture over traditional culture. The verb network creates a new referential, a massive hyperdocument that is available to all users globally. Cyberculture demonstrates how digital interconnectedness makes happen a redefinition of cultural boundaries and the emergence of new global narratives, significantly shifting the dynamics of traditional and popular cultural interaction in all fields, especially education (Smith & Johnson, 2022). The network democratizes opportunities and gives everyone an equal chance to contribute significantly as our cyberspace grows and becomes more participatory. This change casts doubt on the premise that there is a single source of knowledge radiation since people and new concepts are influencing how information is changing. In cyber culture, information is not merely consumed but actively produced and disseminated, leading to new forms of knowledge creation and distribution." (Jenkins, 2006, p. 23).

Cyberspace provides humanity with a new means of empowerment founded on diversity, endless possibilities, and testimonies. It serves as a virtual environment where global collective intelligence develops unhindered by ingrained customs and beliefs. In this online age, an expansive exchange of ideas, transcending cultural boundaries are facilitated by cyberspace, enabling a more inclusive, vibrant, and dynamic global dialogue (Davis & Lee, 2023)."Cyber culture fosters both unprecedented connectivity and profound alienation, blurring the boundaries between the physical and virtual realms." (Castells, 1996, p. 117). The creation of a collective intelligence is thought to be a throbbing force that will produce a wide range of experiences and solutions. The Connectivism Learning Theory might be considered significant in the context of cyberspace and cyberculture. George Siemens and Stephen Dower introduced connectivism for the first time in 2005.

Siemen and Dower discuss how technology plays an important part in education and how students can now obtain material more quickly thanks to the digital era. According to Siemens, in online or virtual learning environments, people share their interests, knowledge, perceptions, experiences, and opinions, which leads to modern learning

occurring through network connections. Through these links, users may directly access information from millions of sources, which they can duplicate, distribute, and critique within their tiny networks. They can also remove, reject, and discard material that is erroneous, irrelevant, or untrustworthy. Nussbaum-Beach, S. and Hall, L.R. (2012) claim that modern students are "do-it-yourself" instructors. Connectivism, which draws knowledge from a variety of contemporary sources, describes learning as an informal process that makes people into "models" of themselves who are equally equipped to share their knowledge and evolve into a shared community.

Another theory that explains the phenomenon of cyberculture and its influence on online educational activities is the Social Learning Theory proposed by Albert Bandura (Bandura,1977), which describes the tendency of individuals to observe and follow others in activities if they are worth rewarding and not follow actions if they follow with unfavourable responses. He opined that individuals are either directly or indirectly influenced and molded by the behaviours and the consequences of others. In the context of cyberculture, it can be applied to understand how society and individuals are learning through social interactions and engagements in the virtual world. This process is exponentially accelerated by the introduction of new models of online platforms and digital communities. These platforms provide opportunities for individuals to observe and learn in a virtual environment (Dabbag & Kitsantas, 2012). The importance of collaborative activities, feedback from persons of the same interests, effective methods, and successful models in a digital environment to mold society is explained in social learning theory (Garrison & Cleaveland-Inns, 2005). The advent of online educational platforms like Open Educational Resources (OER) and massive open online courses (MOOC) has further accelerated social engineering and the emergence of a virtual reality ingrained new generation is also understood in the context of social learning theory (Kop,2011).

These theories provide the context of this present study, which tries to understand the reality of the penetration of online educational resources among the students of higher education in the state of Kerala. This study will try to connect the Opportunities and challenges in online educational resources in the context of the theories of connectivity theory and social learning theory.

Access to Online Resources Among Students in Thiruvananthapuram: An Analysis

This study is based on the analysis of data collected through a survey conducted among 104 students of higher education in the Thiruvananthapuram District of Kerala. The data was analysed through the method of frequency distribution, and inferences were made according to the analysis. Since the students of higher education in Thiruvananthapuram District is around 1.2 lakh as per the report of the All-Kerala Higher Education Survey Report 2020-2021, this 104-sample chosen by the simple random method, will have a confidence level of 90 % and a marginal error of 10 % according to Krejcie and Morgan Table. (Krejcie& Morgan (1970).

Demographic Details

Table 1, Gender, Age and Education Profile

Category	Subcategory	Percentage
Gender Profile	Male	80.8%

	Female	19.2%
Age Profile	18-24	92.3%
	25-30	7.7%
Education Level	Undergraduate	49%
	Postgraduate	46%
	Other	5%

Source: Survey 2023

The majority (80.8%) of the respondents are male, and only 19.2% of the respondents are female. Out of the 104 respondents, the majority (92%) fall in the category of 18-24, and the rest of 8% comes from the age group of 25-30. This reflects the generational interest in using new technologies as well as awareness about it in the younger generation. Undergraduate and postgraduate students form the lion's majority of respondents (95%), and 5% are from others, including diplomas and other unconventional degrees.

Table 2, Types of Institution

Institution Type	Representation
Government School/College	24%
Private School/College	24%
Government Aided School/College	22.1%
Other	29.8%

Source: Survey 2023

The data indicates that the respondents almost equally come from all major types of educational institutions in Thiruvananthapuram (government college, private college, government aided college, and other institutions) from where the samples were collected and were eager to respond to this subject and this indicates that online library usage and awareness of its important is preventing in all sections of the student community in Kerala.

Patterns of Access and Usage

Table 3, Speed of the Internet

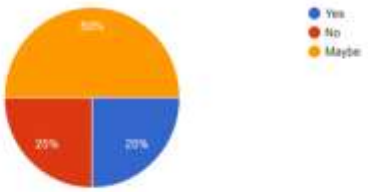
Speed Category	Percentage
Very Fast	8.7%
Fast	42.3%
Average	43.3%
Slow	1.2 %
Very Slow	4.5 %

Source: Survey 2023

The data on internet speed reveals that most of the students (85.6%) are experiencing average to fast internet speed, enough for them to use and experience major online library sources like e-books and educational websites. Only a small fraction (8.7%) is availing high-speed internet, which is essential for them to use in high-speed and complex applications, thereby giving them a chance to use and experience advanced high-end applications and however, the majority of the students lack high-speed internet, which may hamper their access to some applications if they

need it. Since internet penetration in Kerala is one of the highest in India, (according to State of India's Digital Economy (SIDE) Report, 2024, Kerala is ranked first in connectivity, harnessing the internet for apps and solutions and innovation) the next stage in the development of internet in Kerala needs to be in ensuring the speedier and reliant internet connectivity and ensuring high-speed internet as a basic right for every citizen, especially for the students (Deepak et al., 2024).

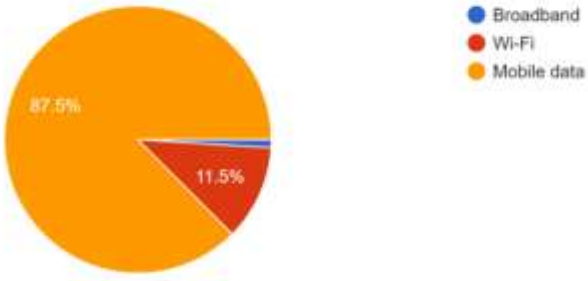
Fig. 1, Connectivity Issues while accessing online resources



Source: Survey 2023

Altogether 25 % of the students face connectivity issues while browsing online resources, as some resources require relatively higher speed internet to function, like video classes etc. The rest of the 75 % of students are neither aware or not facing issues in internet connectivity while accessing online resources. As mentioned earlier, it is essential to have an uninterrupted network connection for online resource usage, and the need for a comprehensive plan in Kerala for the same is inferred from this information.

Fig.2, Types of Internet Service Providers

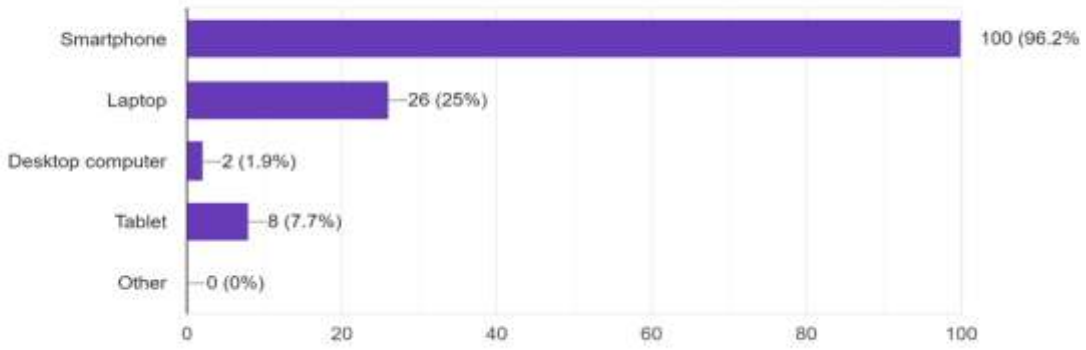


Source: Survey 2023

When analyzing the preference for internet providers, it is inferred that a lion's majority of the students (87.5%) avail the internet from mobile networks and only a small percentage avail interest from broadband and Wi-Fi Services. Any further action about network connectivity needs to focus on this phenomenon. The Wi-Fi network also shows a promising path if it is supported by the establishment of physical

infrastructure. Wi-Fi networks available in educational institutions are often criticised for their unstable connectivity and limited access.

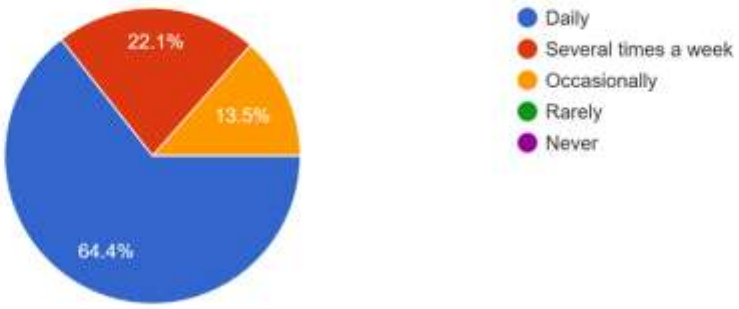
Fig. 3, Devices Used by Students to Access Online Resources



Source: Survey 2023

Corresponding with the preference for an internet service provider, this segment about the primary devices used for availing internet connectivity, shows that the majority of the students use mobile phones, especially smartphones (96.2%) for availing internet service and online educational resources. Laptops are also used by a large group of students (25%). Other devices, like tablets and desktop computers, have a small presence of almost 10%. Since mobile phone penetration is very high in India, especially in Kerala, this is not surprising. However, it shows the need for more mobile-based, user-friendly applications for online educational resources. Some applications (like my loft) are very difficult or almost impossible to use in a mobile interface, and there is a need to address this issue with urgency.

Fig. 4, Frequency of Use of Devices for Online Resources

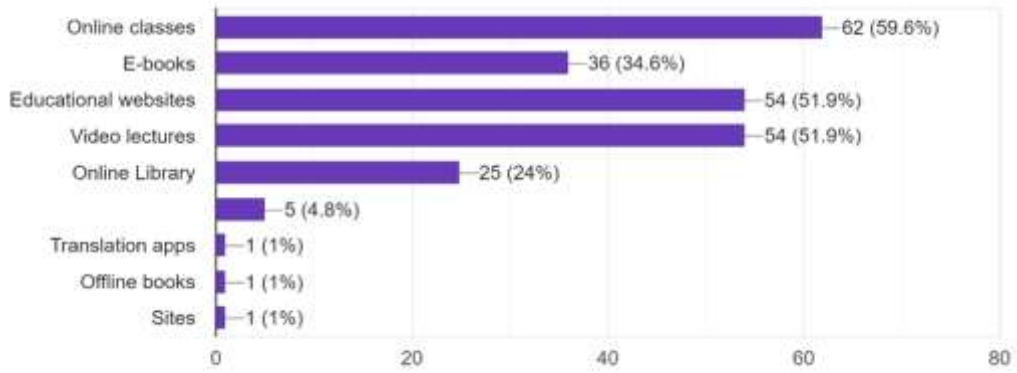


Source: Survey 2023

Considering the frequency of usage for educational purposes, it is noted that a substantial part of students (64.4%) use online educational resources daily, showing the integration of online educational resources in their academic journey and their reliance on online sources for educational purposes, and the scope of online educational resources in future education missions. Altogether, 22.1% of the students use the internet for educational purposes several times a week, showing their gradual integration with this system, while a small portion of the students (13.5%) use it occasionally, indicating the tendency to use online educational resources for specific purposes only.

The analysis of hours per day for educational resources data shows that 41 % of the students (almost half of them) use the internet more than 2 hours per day for accessing online educational resources and 10.6% of them use more than 4 hours per day, signifying the magnitude and range of use of resources through online among these groups. A large group of students (38.5%) use the internet for 1-2 hours per day, showing consistency and moderate learning level, while 20 % (one-fifth of the students) use less than 1 hour per day.

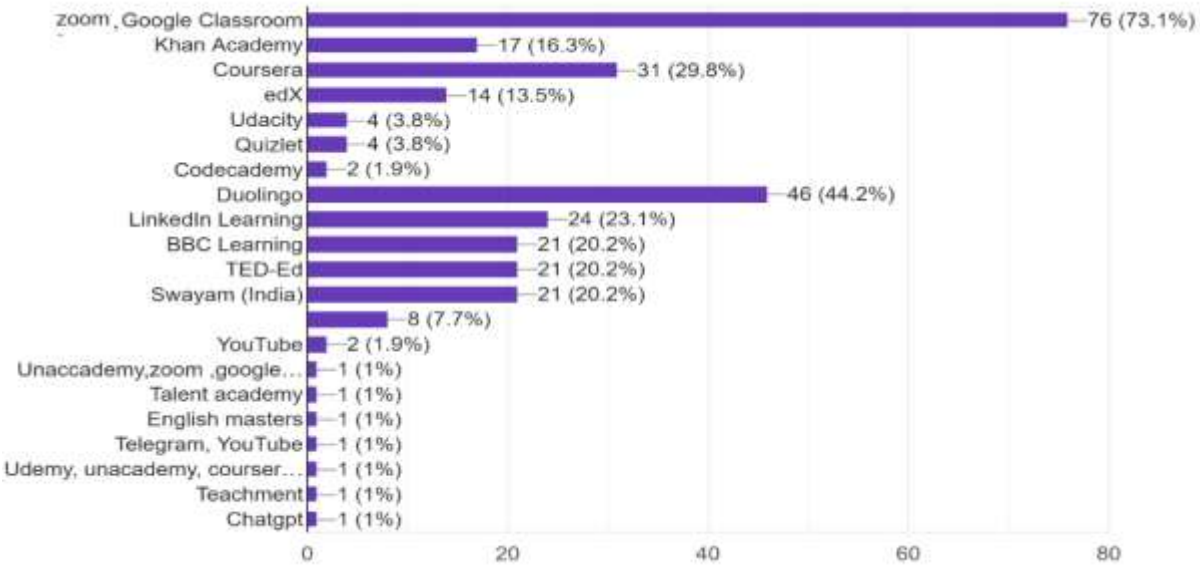
Fig. 5, Types of Online Resources Accessed



Source: Survey 2023

Different types of online resources are being used widely in the present scenario. In Kerala, as per the survey data analysis, online class emerges as the most utilized online resource by the students, as almost 60% of the respondents rely on this method of studying. This underlines the increasing demand of students for online classes. During COVID-19, when conventional classroom-based education was difficult, online classrooms proved to be a suitable and successful alternative for educational purposes. Innovations like augmented reality-based new methods and instant quizzes made education fun for the students. Altogether, 52 % of the students accessed educational websites and videos. Simple technological interfaces and entertainment value make these methods more attractive and effective for students. Online classrooms, educational websites, and video lectures are the most utilised online resources for educational purposes. Online libraries and e-books, although they provide a wide range of resources and centralised repositories-based education, remain underutilised. Only 34 % of the respondents depend upon e-books, and even a lesser 25 % of the students use online libraries. Online libraries are famous for their versatility of availability of resources, yet accessibility remains very limited. Free software-based, affordable, or free online libraries are necessary for a meaningful penetration of online resources for educational purposes.

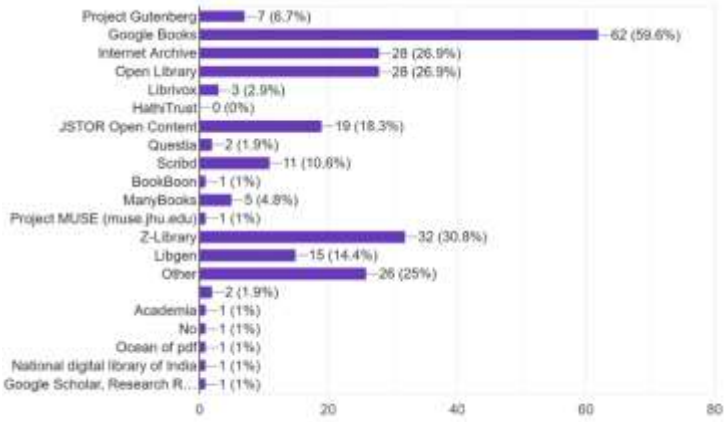
Fig. 6, Awareness of Major Digital Educational Resources



Source: Survey 2023

The data gives a detailed analysis of the students' familiarity with major online educational platforms. A large majority (73 %) of the students are familiar with Google Classroom and Zoom, as these are the widely used platforms for educational purposes, as it is affordable and easy to use. Altogether 30 % of the students are familiar with Coursera, and 45% of the respondents choose to acknowledge Duolingo as a platform for studying different languages. LinkedIn Learning, BBC Learning with their podcasts and videos, TED-Ed, and Swayam by the Indian Government are also familiar to 20 % of the students. These are novel innovations by foreign and Indian educational platforms and are gaining familiarity among students. Swayam is both an app and website-based platform, and this makes access easier for the students with mobile phones and laptops.

Fig. 7, Familiarity with Major Online Library Sources

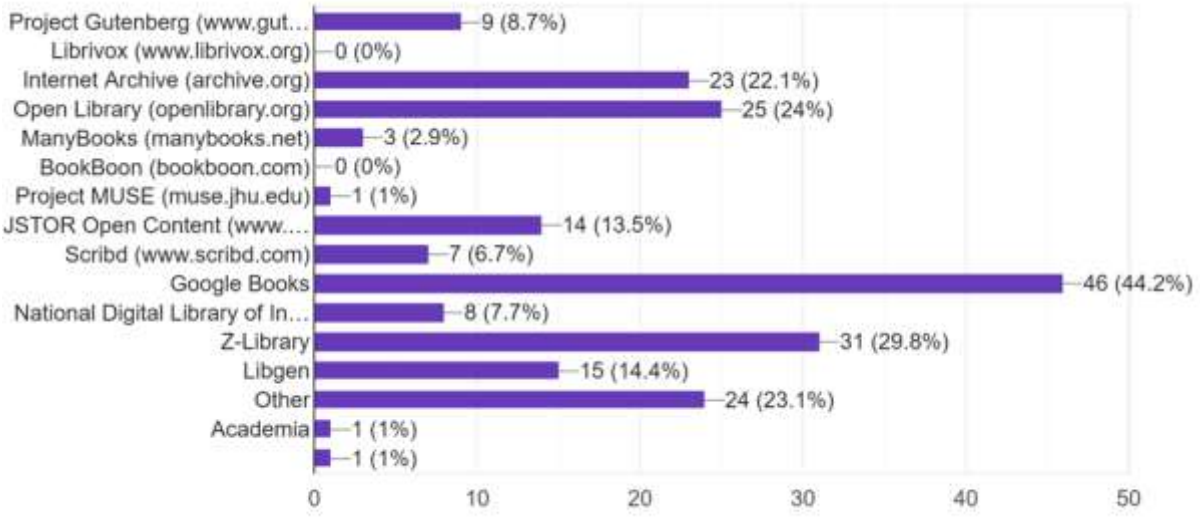


Source: Survey 2023

This study focuses mainly on the familiarity of students with major online library resources, as they are the major intended beneficiaries. The survey data reveal that Google Books stands out as the major online library students are aware of, with

almost 60% of the respondents knowing about it. It is understood as a comprehensive online library source. Z-Library which is a free online library repository allows the user to download 25 million books in different languages and sections as well as a large number of research articles for free, unlike other online libraries where only a small portion of their entire collection is available for download (Smith, J. D., & Johnson, K. L, 2020). Altogether, 31 % of the respondents are aware of the Z-Library, second only to the online library of tech giant Google. Internet archives and open libraries, which host many books, audio, and videos, are also recognised by 27 % of the students, as these platforms are quite popular and common. LibGen (Library Genesis), another free download online library, Project Gutenberg, JSTOR open content, and Scribed are also familiar to a small portion of the respondents. Other online library resources, like Hathi Trust, have a negligible presence among current student usage.

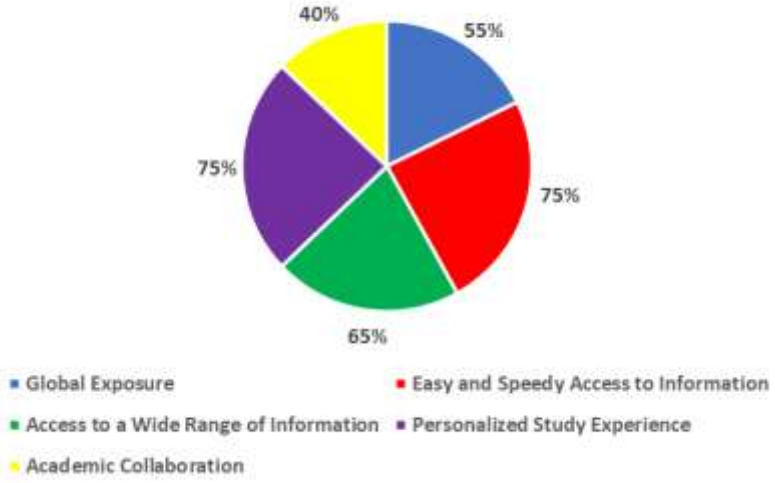
Fig. 8, Online Resources for Accessing E-books



Source: Survey 2023

When asked about the online library platforms for availing e-books, the response is quite different. For example, 60% of the respondents are aware of Google Books, but only 44% of them are using Google Books for accessing e-books. The lack of free access to all books on this platform emerges as the main reason behind it. This underlines the necessity of making all books under all major online library resources free to students. There is a slight decrease in the use of both the Internet Archive and open library in accessing e-books from the familiarity of the respondents, as 27% of the students are aware of these platforms, but 22-24% of students are using these platforms for accessing e-books. In the case of Z-Library, which gives free access to all books hosted by it, familiarity and accessibility remain the same, as 30% as in the case of LibGen (Library Genesis), which also gives complete free access, with 15% of familiarity and accessibility.

Fig.9, Enhancement of Academic Performance through Online Resources

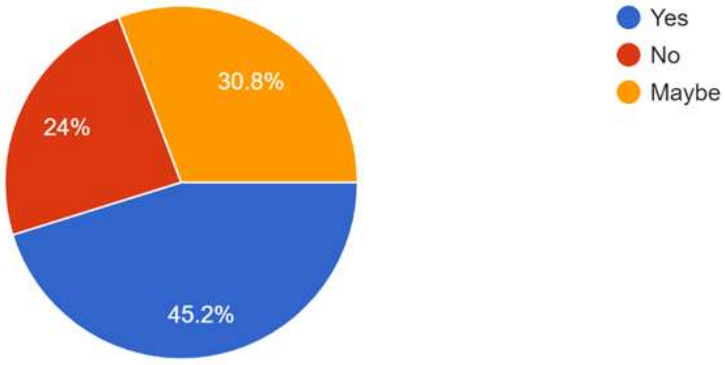


Source: Survey 2023

According to the survey, 75 % of the respondents have opined that easy and speedy access to information and personalised study experience by way of interactive and interesting technical methods are the reasons for the enhanced academic performance. Global exposure through online platforms is now relatively simple and has contributed to the increasing academic performance as per 55% of students. Academic collaborative activities are also made possible with like-minded and peer groups, thanks to the advent of relevant platforms, as validated by connectivity theory and social learning theory. Another aspect of academic performance is access to a wide range of information online.

Challenges and Suggested Improvements

Fig.10, Sufficient Access to Online Resources

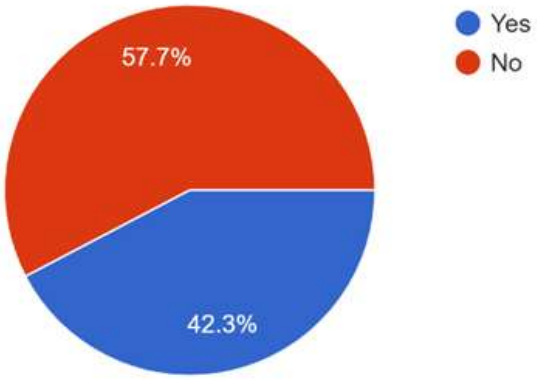


Source: Survey 2023

The data on their accessibility to online resources for educational purposes reveals that 24% of the students are facing a lack of sufficient access to online resources, and it is hindering them from realising their full potential. The rest of the respondents either have sufficient accessibility or are not aware of the issue, which indicates they are

not facing an active issue in accessibility, or they are not in need of it.

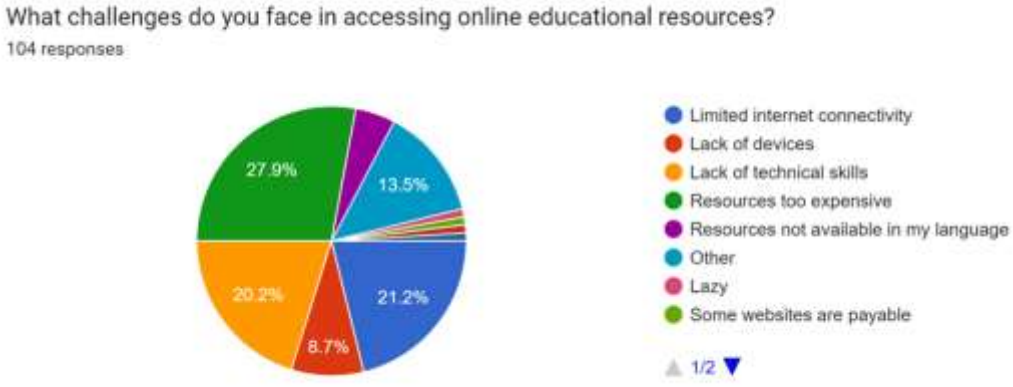
Fig.11, Impact of Limited Online Resource Access on Academic Performance



Source: Survey 2023

When asked about the impact of a lack of accessibility to online resources in their academic journey, 42% of the respondents have faced the problem of not being able to complete their work because of the lack of sufficient accessibility to online resources. The rest 58% of the students, who are the majority, have not experienced such problems, showing an advanced and improved access to online resources. However, the experience of almost half of the respondents needs to be taken care of in future policy formulation.

Fig.12, Identifying Challenges Faced in Accessing Online Educational Resources

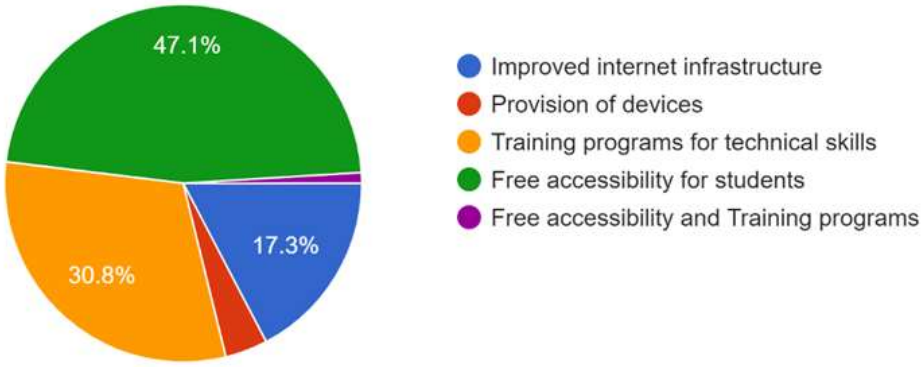


Source: Survey 2023

The data about the major challenges faced in accessing online resources reveals many reasons. The majority of the respondents (28%) have the opinion that resources are too expensive and students are unable to afford them. Limited internet connectivity and lack of necessary technical skills as a challenge was referred by 21% of the

respondents. Lack of devices and lack of resources in the native language are also a major challenge as opined by a portion of students. These challenges need to be addressed for a fair and advantageous education environment in the state. Providing necessary devices like laptops, training to access major online resources, and bringing in the steps to make major resources either free or affordable are the necessities of the students.

Fig.13, Suggestions to Improve Access to Online Educational Resources



Source: Survey 2023

When asked about their opinion of recommendations for enhanced access to online resources for academic performance, 47% of the students pointed out the need for free access to online resources for educational purposes, especially for students, as it is the major issue they faced in accessing online resources. However, 32% of them pointed out the need to conduct free training programs to improve the technical skills of students to access the major online resources. Altogether 17% opined about the need to improve physical infrastructure to enhance internet connectivity, thus ensuring uninterrupted access to online resources.

Major Findings

The top-most utilised education resources are online classrooms, educational videos, and interactive websites. These resources have more flexibility, access, and usability than traditional education systems struggle to offer.

Awareness of online library platforms is relatively high, but usage is low. Most students had recognized the names of platforms like Google Books and Z-Library, but very few had full access to content—this was because of limited access to full content, paywalls, or usability of the platforms on mobile devices.

When students were asked to make recommendations, students suggested most free access to education resources, training programs that improve technical skills, and improved technology infrastructure to make online learning smoother and more inclusive.

Most students are accessing online resources via smartphones. Some students mention they use laptops, but devices such as desktop computers and tablets are so low in number that they do not work to study. There is an indication that it is a mobile-first learning environment in the region.

Conclusion

As per the principles of Connectivism, knowledge can be kept in multiple digital formats and is dispersed throughout an information network. It is said that diversity of thought fosters learning and knowledge. Learning happens when both the cognitive and emotive domains are used; both have significant roles to play in the process of learning. Since knowledge is ever-evolving, its veracity and correctness could alter over time in response to the discovery of fresh insights on a particular topic. An individual's comprehension of a subject and capacity to learn will evolve with time. According to Connectivism, seeking out current knowledge and being able to filter irrelevant and secondary information are two critical abilities that help people learn. One of the key components of learning is the capacity to make judgments based on knowledge that has been obtained.

This study shows that inline resources can enable gathering information and filtering data because of the presence of tremendous information. Cyberspace can better offer a space for connecting with others. Understanding the patterns of access to resources is essential for policymakers and educationists to ensure a suitable environment for education. Since the educational landscape is evolving day by day, addressing these challenges and deriving possible solutions will contribute to creating an equitable environment in cyberspace.

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