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# Examining the Information and Communication Technology (ICT) Resources: Urgent Need in Higher Education of Arunachal Pradesh

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## ABSTRACT

Information and communication technology (ICT) has become increasingly important in the field of education as a result of a paradigm change in India from the conventional face-to-face teaching-learning process to a technologically oriented education system. Investigating the state of information and communication technology resources in Arunachal Pradesh's higher education institutions was the primary goal of this study. The quantitative approach to educational research was used in this study, and initial data were gathered via a telephone interview with a pre-made questionnaire to evaluate the ICT resources. The current study's findings focused on the availability and non-availability of ICT resources, including computers, newspapers, magazines, projectors, whiteboards, wireless fidelity, smart boards, e-books, audio-visual aids, television, the internet, etc. in higher education institutions.

**Keywords:** Information and Communication Technology, Higher Education, Accessibility and Availability, Arunachal Pradesh.

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## INTRODUCTION

Today, technology permeates every aspect of our lives. In the twenty-first century, technological development has led to changes in civilization. Notably, information and communication technology (ICT) is the primary factor in the education sector; it allows students to equip themselves with technological skills to meet the demands of information technology in society, makes the teaching-learning process easier and more adaptable for both learners and educators in higher education institutions (HEIs), and also aids stakeholders in expanding their knowledge, accessing information, and permeating all aspects of education. ICT is very important in the education industry. Information, communication, and technology, or ICT, is a collection that advances knowledge and improves the educational system. Students felt inspired to learn more effectively thanks to the accessibility, availability, and integration of ICT resources in educational institutions. In order to use ICT in HEIs, people have to overcome three different sorts of obstacles: equity, quality, and accessibility. ICT is becoming a crucial element of the education sector. Today, rather than using the old-fashioned "Chalk and Talk" method, numerous universities now use technology-based

instruction. ICT has the ability to support inclusive opportunities for all people and lifelong learning. The United Nations Educational, Scientific, and Cultural Organization (UNESCO, 2020) strives to implement ICT in Education Policy Guidelines and ICT Integration in Education that greatly contributes to the extension and improvement of education through the capability of ICT in connection with Sustainable Development Goal 4, i.e., Quality education (UNESCO, 2020).

### **Significance of the Study**

The National Policy on Education (1986) placed a strong emphasis on the use of technology in the classroom to raise academic standards. ICT in the classroom encourages students to actively participate in the knowledge society's processes and systems, which advances national development and gets kids ready for a globally competitive environment. According to Sarkar (2012), the use of ICT in higher education is growing quickly in the 21st century in all of India's states as well as around the globe. According to Froumin et al. (2014), transformation influences how diverse Higher Educational Institutions are. According to Infante et al. (2019), ICT improves students' skills and increases their performance in their line of work. According to the United Nations Educational, Scientific, and Cultural Organization (UNESCO, 2021), ICT in education has become an integral part of the teaching-learning process and the education sector. ICT in Education provides creative and individualized possibilities for students to learn at their own pace, preparing them to deal with the ongoing technological change in society. Technology has changed people's lifestyles. The skilful person has become an important consideration in today's era.

Information and communication technology (ICT) is a crucial component and prerequisite for citizens to acquire a deep awareness of current events and develop into intelligent, intellectual beings. ICT improves the learning process for pupils and offers high-quality instruction. Information and communication technology (ICT) is essential for disseminating information and converting knowledge in the modern era of technology. Despite the importance of ICT, there is a digital divide across the different institutions based on where the higher educational institutions are located in the state of Arunachal Pradesh. As a result, the institution's location determines how this digital gap is seen and studied. The goal of the current study was to determine how easily accessible and readily available information and communication technology resources.

The current study concentrates on the accessibility of ICT resources in HEIs, including computers, newspapers, magazines, projectors, whiteboards, Wireless Fidelity Smart boards, E-Books, Audio-Visual Aids, television, the internet, etc. It also concentrates on determining whether students can access ICT in HEIs, including internet access, connectivity data, etc. The northeastern state of Arunachal Pradesh is slowly growing in terms of its educational infrastructure. The higher education facilities in Arunachal Pradesh are dispersed throughout the country. Additionally, students may miss out on the chance to access and utilize ICT resources in their educational institution owing to a variety of additional factors such interior locations and rural areas, a lack of transportation, and a lack of communication. The proliferation of knowledge is yet another crucial factor. In the rapidly evolving society of today, it is necessary to understand information and communication technology.

The nation's future lies with its students. By facilitating a smoother procedure, increasing student participation, and enhancing learning effectiveness, ICT tools and appliances raise the caliber of teaching and learning. As a result, the current study is limited and concentrates on students of higher educational institutions in government and private degree colleges as well as central and private universities in Andhra Pradesh. The citizens and stakeholders will have a better understanding of the difficulties students face when there is a lack of ICT in the institution and how those difficulties can affect the students while they are learning if the availability and accessibility of ICT are assessed and investigated. The current study will help educational administrators, planners, and directors of education to improve systems or processes and foresee ICT's deficiencies in higher education institutions. Overcoming ICT difficulties in higher education institutions will help stakeholders monitor the ICT resources that will provide students with high-quality education and support the development of the country in future undertakings. The HEIs of Arunachal Pradesh offer the transparency of educational processes, student placement, and uniformity of high-quality instruction.

The status of ICT resources in higher education institutions in Arunachal Pradesh is the subject of the current study. The formal schooling at the state's Higher schooling Institute just began in 1964. Over the previous ten years, Arunachal Pradesh's literacy rate has increased; according to the 2011 census, the state's literacy rate was 66.9%. ICT resources were gradually adopted by HEIs, especially for the teaching-learning process. Despite this, it is observed that a number of higher education institutions are located in both urban and rural areas of the state. In addition, students are not aware of the many ICT resources available to them, and there is a lack of ICT equipment due to a lack of funding and other factors. Arunachal Pradesh's library and information science education has problems, according to a research by Komat (2021). The problems noted include the absence of a vibrant Library Association, a lack of awareness among the authorities, a lack of expertise in practice, a lack of accessibility, and a lack of initiative on the part of the government. Consequently, the researchers have developed a study topic to determine the accessibility and availability of ICT resources in the HEIs of the state of Arunachal Pradesh.

### **Objectives of the Study**

In tune with the nature of the research problem, the following were the objectives of the study:

1. To assess the availability of ICT Resources in Higher Education Institutes (HEIs) of Arunachal Pradesh India.
2. To investigate the status of accessibility of ICT for Students in Higher Education Institutions (HEIs) of Arunachal Pradesh India.

### **Research Questions of the Study**

For the present study, the researcher set two research questions to investigate the status of availability and accessibility of ICT in HEIs of Arunachal Pradesh India.

1. What is the current status of the availability of ICT resources in higher education institutions of Arunachal Pradesh?
2. What is the current status of accessibility of ICT resources for the students in HEIs of Arunachal Pradesh?

## METHODS AND MATERIAL

In the present study, the researcher used a descriptive method of educational research and adopted purposive sample techniques to gather the status of Information and Communication Technology resources in the higher educational Institute of Arunachal Pradesh. The target population of the study consisted of undergraduate and postgraduate students studying in Higher Educational Institutes in the state of Arunachal Pradesh.

### Sample and Sampling Technique

In the present study, a sample of a total of 160 students and a purposive sampling technique were used. Brief outlines of selected universities and colleges for the study. The researcher selected the Degree colleges and universities based on the institution's highest enrolment of students among the entire total of universities and Degree Colleges of HEIs in Arunachal Pradesh. Thus, the Institutes were selected based on judgmental sampling for the study. As per Basic Information on Higher and Technical Education in Arunachal Pradesh 2021–2022, there are 10 universities, 17 Government Degree Colleges, and 8 Private Degree Colleges in Arunachal Pradesh.

**Table Number 1: Universities Level Institution of Arunachal Pradesh**

S. No	Name of Institution	Year of Establishment	Total Approx. No. Students
1.	Rajiv Gandhi University Doimukh	1984	1682
2.	Arunachal University of Studies, Namsai	2012	4259
3.	Venketshwara Open University, Naharlagun	2012	852
4.	Apex Professional University, Pasighat	2013	339
5.	Himalayan University, Itanagar	2013	1314
6.	Arunodaya University, Lekhi Naharlagun	2014	312

**Table Number 2: Selected Degree colleges of Arunachal Pradesh for the research study**

S. No	Name of Institution	Year of Establishment	Total Approx. No. Students
1.	Jawaharlal Nehru College, Pasighat (Govt)	1964	3595
2.	Dehra Natung Government College, Itanagar (Govt)	1979	2992
3.	Indira Gandhi Government College, Tezu (Govt)	1986	2171
4.	Donyi Polo Govt College, kamki (Govt)	1996	888
5.	Government College Doimukh (Govt)	2012	631
6.	Don Bosco College July, Itanagar (Private)	2002	1224
7.	Saint Claret College Ziro (Private)	2003	742
8.	Doying Guming College, Pasighat (Private)	2004	635
9.	Saint Francis De Sales College, Aalo (Private)	2007	410
10.	Venerable Uktara Bethany College, Namsai (Private)	2014	277

**Source:** (As per information retrieved from the Director of Higher and Technical Education Department of Education Government of Arunachal Pradesh Itanagar 2021-2022)

Table 1 and table 2 are the selected universities and Degree colleges for the study to investigate the status of accessibility and availability of Information and Communication Technology for Students in Higher Educational Institutions (HEIs) of Arunachal Pradesh.

## **Tools Used**

In this study, to obtain data and information about the status of ICT resources in higher educational Institutes, the primary data were collected and gathered through telephone Interviews with the respondents following the self-developed questionnaire. For the present study, lists of questions related to the availability and accessibility of ICT in Higher Educational Institutes in Arunachal Pradesh were set. Availability of ICT such as Computers, newspapers, Magazines, projectors, whiteboards, Wireless Fidelity Smart boards, E-Books, Audio-Visual Aids, Television, the internet, and accessibility of ICT in HEIs such as access to computers for students, internet access, connectivity, and wireless fidelity facilities for the students in HEIs.

## **Statistical Techniques Used**

In tune with the objectives of the study, the researcher used the descriptive statistics of percentage analysis for the analysis and interpretation of the study.

## **Data Collection Procedures**

The researcher randomly selected the students' telephone numbers studying at Degree colleges and Universities. The first step in the collection of data started with listing the telephone numbers of students. A list of questions, including both closed-ended and open-ended ones, was set by the researchers to be asked in telephonic interviews. Before asking the questions, the researcher introduced the purposes of calling the respondents, assured that the names and telephone numbers would not be revealed by the researchers and would be kept confidential, and asserted that the information gathered would be used for research and academic purposes only. The researcher gets consent from the respondents to take information and to proceed to the next question during a telephone conversation. The process of collecting information through the telephonic interview with 160 respondents took 3 months, from February to April 2023, to complete the task, and the duration of the telephonic conversation was 5 to 15 minutes. The entire telephonic interview was recorded by the researcher to draw information from respondents and to maintain transparency of documentation and evidence of voices for the study.

## **RESULTS AND DISCUSSION**

The researcher analyzed the recorded data of the respondents from the telephonic interview. Based on the respondents of the study, the researcher interpreted the recorded data. The findings and interpretation of the study are discussed below with tables, pie charts and interpretation.

Objective 1. To assess the availability of ICT Resources in Higher Education Institutes of Arunachal Pradesh.

Research Question 1. What is the current status of the availability of ICT resources in higher education institutions of Arunachal Pradesh?

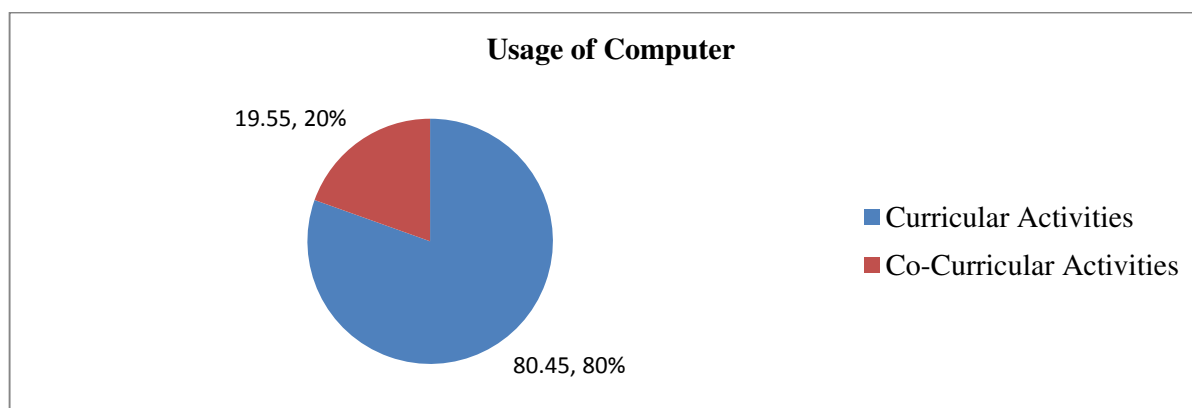
**Table Number 3: Showing the Responses for the Availability of ICT Resources for the Students.**

Sl.No	Item Characteristics of Availability of ICT Resources in HEIs	Percentage % of Availability	Percentage % of Non-Availability
1.	Computer	81.25	18.75
2.	LCD and Overhead Projector	71.87	28.13
1.	Biometric Machine	25	75
2.	Magazines and Newspapers	90.62	9.37
3.	Whiteboard and Smart Board	93.75	6.25
4.	Wireless Fidelity Wi-Fi	84.37	15.62
5.	Audio-Visual Aids	86.12	13.88
6.	Free E-Books	69.41	30.59

*Source: Authors field work*

The above table depicts the availability of ICT Resources in HEIs. By using the percentage analysis of the descriptive statistics, the researchers examine and analyze the various respondents to the study. There was a total of 160 students as respondents from the selected Colleges and Universities for the study. The ICT resources, such as computers, possessed a percentage availability of 81.25% and a non-availability of 18.75%. The availability and non-availability of LCD and Overhead projectors are 71.87% and 28.13%, respectively. In addition, the availability and non-availability of the biometric machine are 25% and 75%, respectively, and Magazines and Newspapers availability is 90.62% and non-availability is 9.37%. The availability and non-availability of whiteboards and Smart boards are 93.75% and 6.25%, respectively. 84.37% and 15.62% are the availability and non-availability of Wireless Fidelity Wi-Fi in Higher Educational institutes, respectively. The availability and non-availability of Audio-Visual Aids are 86.12% and 13.88%, respectively. The free E-Books availability and non-availability are 69.41% and 30.59%, respectively.

**Figure 1: Pie Chart Showing the Usage of Computer in Higher Educational Institutes.**

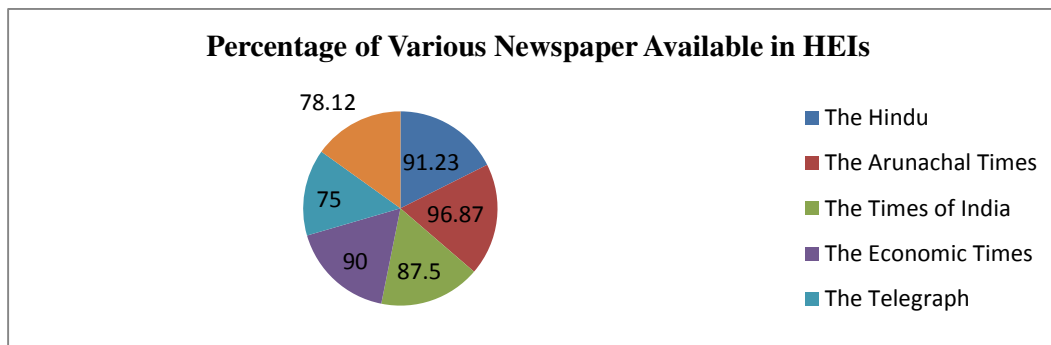


*Source: Authors field work*

## Interpretation

The pie chart you are referring to shows the percentage of computer usage in higher education institutions (HEIs) for curricular and co-curricular activities. The chart shows that 80.45% of computers in HEIs are used for curricular activities, while only 19.55% are used for co-curricular activities.

**Figure 2: Pie Chart Showing the responses of various Newspapers available in the Higher Educational Institutes.**

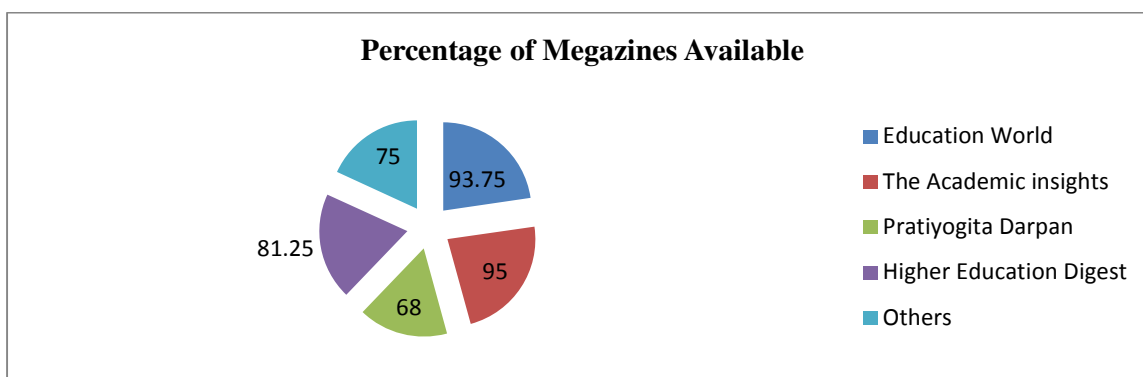


*Source: Authors field work*

## Interpretation

The above pie chart shows the percentage of various newspapers available in the HEIs. From the pie chart, it is clearly understood that the Newspaper named 'The Arunachal Times' is the highest circulated Newspaper in the Higher Educational Institutes of Arunachal Pradesh, i.e., 96.7%. Apart from this, other newspapers such as The Hindu, The Times of India, The Economic Times, The Telegraph, and The Hindustan Times are 91.23%, 87.5%, 90%, 75%, and 78.12%, respectively.

**Figure 3: Pie Chart Showing the responses of various Magazines available in the Higher Educational Institutes.**



*Source: Authors field work*

## Interpretation

The above pie chart depicts that the Magazine named The Academic Insights is the most circulated in the Higher Educational Institutes i.e. 95% of the State of Arunachal Pradesh. In addition, various magazines named Education World, Pratiyogita Darpan, Higher Education Digest, and various other magazines 93.75%, 68%, 81.25 %, and 75% respectively are accessed by the stakeholders in the Higher Educational Institutes of Arunachal Pradesh.

## **Research Findings**

Objective Number 2: To investigate the status of accessibility of ICT for Students in Higher Education Institutions (HEIs) of Arunachal Pradesh.

Research Question 2: What is the current status of accessibility of ICT resources for the students in HEIs?

Based on the findings of the study, the status of accessibility of ICT for Students in Higher Education Institutions (HEIs) of Arunachal Pradesh are discussed below:

**Table Number 4: Showing the Responses of Accessibility of ICT Resources from the Selected Sample of the Study i.e. Rajiv Gandhi University, Arunachal Pradesh**

Sl. no	Items	Percentage of Accessible	Percentage of Inaccessible
1.	Access of Computer for Students	70.56 %	29.44 %
2.	Internet Access in Institution	99 %	1 %
3.	Access Wi-Fi Facilities	98 %	2 %
4.	Access of Online libraries and e-books	92.31 %	7.69 %
5.	Magazines and Newspapers	97.32 %	2.68 %

*Source: Authors field work*

### **Interpretation**

The above table depicts the percentage of accessible and non-accessible ICT resources at Rajiv Gandhi University. From the given table and percentage of ICT resources, it is clearly understood that this university is accessible to the Internet, Wi-Fi Facilities, Online libraries, Magazines, and newspapers. On the other hand, 70.56% of the respondents state that they get an opportunity to use the computer, and 29.44% of students state that they can't access the computer. The risk factors and reasons for inaccessibility are due to non-functioning and unavailable computers for each student at Rajiv Gandhi University.

**Table Number 4.1. Showing the Responses of Accessible and Inaccessible of ICT Resources in Selected Sample of 5 Private Universities of Arunachal Pradesh.**

<b>1. Arunachal University of Studies, Namsai</b>			
Sl. No.	Items	Percentage of Accessible	Percentage of Inaccessible
1.	Access to Computers for Students	75.34%	24.66 %
2.	Internet Access in Institution	90 %	10 %
3.	Access to Wi-Fi Facilities	70 %	30 %
4.	Access to Online libraries and e-books	65.23 %	34.77%
5.	Access to Magazines and Newspaper	88.72 %	11.28 %
<b>2. Venkateshwara Open Universities, Naharlagun</b>			
Sl. No.	Items	Percentage of Accessible	Percentage of Inaccessible
1.	Access to Computers for Students	65%	35 %
2.	Internet Access in Institution	91.23%	8.77%
3.	Access Wi-Fi Facilities	69%	31%
4.	Access to Online libraries and e-books	67 %	33%
5.	Access to Magazines and Newspaper	90%	10%



<b>3. Apex Professional University, Pasighat</b>			
<b>Sl. No.</b>	<b>Items</b>	<b>Percentage of Accessible</b>	<b>Percentage of Inaccessible</b>
1.	Access to Computers for Students	85%	15 %
2.	Internet Access in Institution	90%	10%
3.	Access Wi-Fi Facilities	83.12%	16.88%
4.	Access to Online libraries and e-books	71%	29%
5.	Access to Magazines and Newspaper	91.43 %	8.57%
<b>4. Himalayan University, Itanagar</b>			
<b>Sl. No.</b>	<b>Items</b>	<b>Percentage of Accessible</b>	<b>Percentage of Inaccessible</b>
1.	Access to Computers for Students	78%	22%
2.	Internet Access in Institution	96%	4%
3.	Access Wi-Fi Facilities	79%	21%
4.	Access to Online libraries and e-books	65%	35%
5.	Access to Magazines and Newspaper	94.71%	5.29%
<b>5. Arunodaya University , Lekhi Naharlagun</b>			
<b>Sl. No.</b>	<b>Items</b>	<b>Percentage of Accessible</b>	<b>Percentage of Inaccessible</b>
1.	Access to Computers for Students	72.85 %	27.15%
2.	Internet Access in Institution	94.12%	5.88%
3.	Access Wi-Fi Facilities	72%	28%
4.	Access to Online libraries and e-books	69%	31%
5.	Access to Magazines and Newspaper	92.31%	7.69%

*Source: Authors field work*

### **Interpretation**

The percentage of ICT resources that are accessible and inaccessible at the five private universities in Arunachal Pradesh is shown in the table above. It's vital to remember that the aforementioned proportion was determined by the survey participants' responses.

**Table Number 4.2: Showing the Responses of Selected 5 Government Degree Colleges of Arunachal Pradesh**

<b>1. Jawaharlal Nehru College, Pasighat</b>			
<b>Sl. no</b>	<b>Items</b>	<b>Percentage of Accessible</b>	<b>Percentage of Inaccessible</b>
1.	Access to Computers for Students	63.21%	36.79%
2.	Internet Access in Institution	90 %	10 %
3.	Access to Wi-Fi Facilities	50 %	45 %
4.	Access to Online libraries and e-books	42 %	58%
5.	Access to Magazines and Newspaper	90.23 %	9.77 %
<b>2. Dera Natung College</b>			
<b>Sl. no</b>	<b>Items</b>	<b>Percentage of Accessible</b>	<b>Percentage of Inaccessible</b>
1.	Access to Computers for Students	56%	44 %
2.	Internet Access in Institution	93%	7%
3.	Access Wi-Fi Facilities	43%	57%
4.	Access to Online libraries and e-books	40 %	60%
5.	Access to Magazines and Newspaper	85%	15%

<b>3. Indira Gandhi Govt. College Tezu</b>			
<b>Sl. no</b>	<b>Items</b>	<b>Percentage of Accessible</b>	<b>Percentage of Inaccessible</b>
1.	Access to Computers for Students	60%	40%
2.	Internet Access in Institution	89%	11%
3.	Access Wi-Fi Facilities	42%	58%
4.	Access to Online libraries and e-books	31%	69%
5.	Access to Magazines and Newspaper	89.34 %	10.66%
<b>4. Donyi Polo Govt. College Kamki</b>			
<b>Sl. no</b>	<b>Items</b>	<b>Percentage of Accessible</b>	<b>Percentage of Inaccessible</b>
1.	Access to Computers for Students	55%	45%
2.	Internet Access in Institution	85%	15%
3.	Access Wi-Fi Facilities	39%	61%
4.	Access to Online libraries and e-books	38%	62%
5.	Access to Magazines and Newspaper	91.34%	8.66%
<b>5. Govt. College Doimukh</b>			
<b>Sl. no</b>	<b>Items</b>	<b>Percentage of Accessible</b>	<b>Percentage of Inaccessible</b>
1.	Access to Computers for Students	45 %	55%
2.	Internet Access in Institution	75%	25%
3.	Access Wi-Fi Facilities	30%	70%
4.	Access to Online libraries and e-books	25%	75%
5.	Access to Magazines and Newspaper	84.2%	15.8%

*Source: Authors field work*

### **Interpretation**

According to the survey participants' comments, the above table displays the percentage of ICT resources in the 5 government degree colleges in Arunachal Pradesh that are accessible and inaccessible.

**Table 4.3. Showing the Responses of Selected 5 Private Degree Colleges of Arunachal Pradesh**

<b>Name of the Private Degree College: 1. Don Bosco College Itanagar</b>			
<b>Sl. no</b>	<b>Items</b>	<b>Percentage of Accessible</b>	<b>Percentage of Inaccessible</b>
1.	Access to Computers for Students	85%	15%
2.	Internet Access in Institution	89%	11 %
3.	Access to Wi-Fi Facilities	56%	44%
4.	Access to Online libraries and e-books	75%	25%
5.	Access to Magazines and Newspaper	90.62 %	9.38 %
<b>2. Saint Claret College, Ziro</b>			
<b>Sl. no</b>	<b>Items</b>	<b>Percentage of Accessible</b>	<b>Percentage of Inaccessible</b>
1.	Access to Computers for Students	87%	13 %
2.	Internet Access in Institution	90%	10%
3.	Access Wi-Fi Facilities	59%	41%
4.	Access to Online libraries and e-books	76 %	24%
5.	Access to Magazines and Newspaper	92%	8%

<b>3. Doying Gumin College, Pasighat</b>			
<b>Sl. no</b>	<b>Items</b>	<b>Percentage of Accessible</b>	<b>Percentage of Inaccessible</b>
1.	Access to Computers for Students	75%	25%
2.	Internet Access in Institution	87%	13%
3.	Access Wi-Fi Facilities	60%	40%
4.	Access to Online libraries and e-books	65%	35%
5.	Access to Magazines and Newspaper	88 %	12%
<b>4. Saint Francis De Sales College</b>			
<b>Sl. no</b>	<b>Items</b>	<b>Percentage of Accessible</b>	<b>Percentage of Inaccessible</b>
1.	Access to Computers for Students	70%	30%
2.	Internet Access in Institution	91%	9%
3.	Access Wi-Fi Facilities	55%	45%
4.	Access to Online libraries and e-books	66%	34%
5.	Access to Magazines and Newspaper	86%	14%
<b>5. Venerable Uktara Bethany College, Namsai</b>			
<b>Sl. no</b>	<b>Items</b>	<b>Percentage of Accessible</b>	<b>Percentage of Inaccessible</b>
1.	Access to Computers for Students	68%	32%
2.	Internet Access in Institution	92%	8%
3.	Access Wi-Fi Facilities	58%	42%
4.	Access to Online libraries and e-books	60%	40%
5.	Access to Magazines and Newspaper	84%	16%

*Source: Authors field work*

### **Interpretation**

The above table shows the percentage of Accessible and Inaccessible ICT Resources in the five Government Degree Colleges in Arunachal Pradesh. It depicts the lists of ICT Resources questions and items asked by the researcher to 160 respondents in the telephone interview. The respondents of the study, selected from 6 universities, 5 government degree colleges, and 5 Private Degree Colleges in Arunachal Pradesh, were analyzed based on their answers to the questions. The reason for the self-developed questionnaire is to investigate the status of availability and accessibility of ICT confined to Computers, Newspaper, Magazines, Projector, Whiteboard, Wireless Fidelity Smart board, E-Books, Audio-Visual Aids, Television, and Internet in HEIs of the state Arunachal Pradesh.

### **Brief Outlines and Summary of the Findings:**

For answering the objectives and research questions of the study, the researcher interpreted the recorded data and information both qualitatively and quantitatively. In the present study, the researcher highlights the accessibility and availability of ICT resources from the recorded telephone interview:

#### **1. Poor Networking hubs and Connectivity Issues**

In this study, poor connection issues prevail in the various HEIs of the state of Arunachal Pradesh that occur due to various reasons such as dislocated routers, large populations, locations of Higher

Educational Institutes in rural areas, or interior places. Consequently, the students from various institutions experienced connectivity issues exclusively on online learning platforms during COVID-19.

## **2. Inadequate Wi-Fi Facilities**

As per the result of this study, some of the students (mentioned as a percentage in the tables and pie charts) in the HEIs did not get Wi-Fi Facilities within the campus. The Wi-Fi coverage is limited to the library or main office of the institution and does not extend to all the students on campus.

## **3. Mobile Internet**

Based on the information gathered from the respondents, it appears that the majority of the students access the Internet and use their data pack through a smartphone because some of their Institutes lack Wi-Fi facilities for students and an insufficient internet combo pack. The lack of Wi-Fi facilities in institutes can be a major inconvenience for students, as it can make it difficult to access online resources and participate in online classes.

## **4. Inadequate computer rooms for Students**

Computers are an essential part of information and technology. Nevertheless, the present study, based on the respondents' findings, exposed that HEIs do not have adequate computers for the students, and rarely there are limited computers—nearly three to five computer rooms in their respected departments and institutions. In maximum HEIs, only those students who wish to learn computer skills must pay for additional training called a Diploma in Computer Application. But there are no computers available for students who want to learn computer knowledge for free.

## **5. Provide newspapers and magazines.**

As per the information gathered from the respondent's statement, various HEIs render both Newspapers and Magazines in the library. The Arunachal Times is one of the most circulated Newspapers in the HEIs as compared to other types of newspapers such as The Hindu, The Telegraph, and The Times of India. The present study of the respondents also explained that due to the COVID-19 pandemic, delivery of Newspapers and Magazines was very unusual, and old newspapers and Magazines are found in libraries.

## **6. Insufficient Projector and Smart board in the classroom**

The sample of respondents asserts that there still exists an insufficient number of projectors and smart boards in each classroom of the Colleges and Universities of the state of Arunachal Pradesh. Each classroom does not have the necessary equipment to support modern teaching methods. Thus, a lack of projectors and smart boards can have a number of negative consequences for students and faculty. For students, it can make it difficult to follow lectures and participate in discussions. For faculty, it can make it difficult to deliver engaging and interactive lessons. The lack of projectors and smart boards is a serious problem that needs to be addressed. By taking steps to address this problem, the state government, colleges and universities, and private companies can help improve the quality of education in Arunachal Pradesh.

## **7. Biometric attendance machines**

The findings also reveal that there is an absence of biometric Attendance Machines in the HEIs. Despite having knowledge and awareness of the benefits, the majority of HEIs in Arunachal Pradesh have

not adopted Biometric Attendance Machines in their institutes so far. Educational institutes need a biometric machine to ensure better security of students' identities, convenient tracking methods, better privacy for students, and time savings. As per the research findings, only one Central university in the state of Arunachal Pradesh, namely Rajiv Gandhi University, is availing of the biometric Attendance Machines in their institution.

### **8. Online Learning Portals and Online Libraries**

The library is the most conducive environment for the students to propel knowledge from the various resources availed in the institutions. In this study, as reported by the respondents, in most of the HEIs, there are no separate classes or courses for students to teach the process of utilizing and instructions for the online learning portals.

Based on the recorded telephone interview and most respondents from the sample drawn for the present study, it was revealed that the majority of institutions have ICT facilities for students, such as Computers, newspapers, Magazines, projectors, whiteboards, E-Books, Audio-Visual Aids, and Television. Even so, there is a lacuna of ICT facilities, particularly as Smart boards, Projectors, and Biometrics machines are still not sufficient and not adopted in various departments and institutions. Although Wi-Fi facilities are available in the institution, students are not able to access the Wi-Fi due to poor networking hubs, connectivity issues, and the locations of the institutes.

### **Educational Implications of the Study:**

The findings of the present study contribute to and execute the useful educational implications of the study. To draw out the implication is crucial to understanding the worth and essence of research findings. This research looked into the availability and accessibility of information and communication technology resources in Arunachal Pradesh's higher education institutes. Therefore, based on the findings of the study, some of the educational implications are drawn from the research findings.

1. The findings of the study indicate that the computer as an important component of Information and Communication Technology Resources is not sufficient in the HEIs, and a lack of training on the use of computers is one of the hindrances faced by the students. In this connection, computer facilities should be made available in the HEIs that play a crucial role in the field of education.
2. From the findings of the study, it is found that both the Government and Private Degree Colleges lack campus wireless fidelity connectivity for the students. And on the other hand, the universities in the state of A.P. have provided wireless fidelity connectivity to the students. Thus, the institutions and Government should look into this matter and establish campus wireless fidelity connectivity in the HEIs.
3. One of the findings of the study also reveals that online libraries and e-books are not accessible in the institution due to the institute's location in the interior. Thus, network connectivity issues should be sorted out within the institution with the cooperation of all stakeholders.
4. The findings of the study also revealed that there are a few varied magazines and newspapers circulated in the HEIs. Therefore, more varieties of Newspapers and magazines can be distributed in

the HEIs. To build the competencies and proficiency of ICT in the field of education, the students widen their knowledge through the information they receive and from their environment in daily life.

5. Based on the findings, it is revealed that the biometric attendance machine is only available at one university of the Selected Sample in the study. i.e., Rajiv Gandhi University, and other Government Colleges, Private Colleges, and Private Universities do not have Biometric Attendance Machines in their institution. Though there is an advantage to utilizing it in the institution, it can maintain accuracy and increase the transparency of attendance in the institution. Thus, there must be the provision of alternative Biometric Attendance Machines in all institutions, and HEIs need to leverage the essence of Biometric Attendance Machines.

## Conclusion of the Study

The current study investigated the accessibility and availability of ICT resources in HEIs in Arunachal Pradesh (A.P.). This study reveals that HEIs in the state of A.P. progressed gradually in terms of ICT resources and in the education sector. However, most of the institutions still lack an ICT facility that has an impact on students learning processes and also hinders their readiness to face the modern era of technology. Accessibility and availability of ICT in HEIs enable each learner to learn at their own pace. ICT helps the learners acquire the content effectively based on their potential, knowledge, and experience. It widens the content knowledge at a higher speed to the citizens, helps to solve the barriers of communication and teaching-learning gaps, and becomes a knowledge superpower in a changing society. In this study, the researcher has confined herself to investigating merely the accessibility and availability of ICT resources. Therefore, the current study needs further exploration to understand the broad scope of ICT in education. The major limitations of this study are that the researcher has selected 1 Central University, only 5 Private Universities, 5 Government Degree Colleges, and 5 Private Degree Colleges in Arunachal Pradesh. Furthermore, the findings of the current study will help the facilitator's stakeholders be aware of the status of ICT in higher education and take the necessary steps to sort out the limitations of ICT in higher educational institutions.

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***Cite this Article:***

***Millo Mamung, "Examining the Information and Communication Technology (ICT) Resources: Urgent Need in Higher Education of Arunachal Pradesh", International Journal of Scientific Research in Modern Science and Technology (IJSRMST), ISSN: 2583-7605 (Online), Volume 2, Issue 9, pp. 45-59, September 2023.***

***Journal URL: <https://ijsrmst.com/>***