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DIGITAL READINESS OF SECONDARY TEACHER EDUCATION INSTITUTIONS IN WEST BENGAL: A COMPARATIVE STUDY OF AVAILABILITY AND APPLICABILITY

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RESEARCH ARTICLE

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Abstract
The integration of technology into the teaching-learning process has become strongly emphasised in NEP 2020, while the demand of contemporary society also requires teachers to possess adequate techno-pedagogical skills to effectively integrate digital technologies into educational practices. The objective of this study is to examine the availability and Application of digital infrastructure in daily experiences. The investigator used a stratified random sampling method for data collection and used the percentage analysis method. The investigator found that the secondary teacher education institutions have insufficient digital readiness. The study is very important because digital readiness in secondary teacher education institutions is essential, as it helps future teachers develop the skills needed to use technology effectively in teaching-learning, assessment, and classroom management.

Keywords: *Digital Readiness, Secondary Teacher Education Institutions, Availability, Applicability*

Introduction

Education is a key component of global efforts to achieve sustainable development. This commitment is reflected in Sustainable Development Goal 4 (SDG) of the 2030 Agenda for Sustainable Development, which India adopted in 2015. and SDG aims to ensure inclusive and equitable quality education and promote lifelong learning opportunities for all. In achieving this goal, the teacher's role is very significant as a nation builder, as they contribute to shaping the knowledge, skills, values, attitudes, and character of the new generation.

The National Education Policy (NEP 2020) places considerable importance on improving the quality of teachers and teacher education. The policy intention is to prepare skilful and knowledgeable teachers for the future generation. Keeping in view the National Council for Teacher Education (NCTE) developed the National Professional Standard for Teachers (NPST 2023). The NPST objectives of three comprehensive areas: (i) Core value Ethics, (ii) Professional Knowledge and Practices, (iii) Professional Growth and development.

At the same time, NEP 2020 recognises the growing importance of information and communication Technology in Education. The policy focused on Effective use of ICT for quality Education, improving teaching and learning, supporting teachers, providing wider access to educational resources and making education more inclusive and accessible (Ministry of Education,2020).

The rapid growth of Digitalisation has changed the way of life, way of learning, communication, and work. The present generation of teachers needs not only subject knowledge but also technological skills to deliver instruction. A teacher who is comfortable with technology can use multimedia, digital resources, digital learning platforms, and communication tools to learn more interactively, enjoyably, meaningfully, and engagingly.

Keeping in this view, the topic entitled "Digital Readiness of Secondary Teacher Education Institutions in West Bengal: A Comparative Study of Availability and Applicability" is very relevant and researchable in the present educational scenario. This study may provide useful insights into the preparedness of teacher education institutions to better implement policies at the ground level.

Rationale of the Study

The present study is highly significant because technology has become a compulsory part of Teaching-learning, administration and professional development. This study helps teacher education institutions understand the present status of availability and the applicability of digital capabilities or the digital readiness of secondary teacher education institutions. It also involves ensuring that these facilities are functional, accessible, and used meaningfully for teaching, learning, administration, and professional development. The findings may help institutions identify areas where digital facilities and skills need further improvement. This is particularly relevant to NEP 2020, which emphasises the effective use of technology in education and continues the professional development of teachers (Ministry of Education, 2020). It is also consistent National Professional Standards for Teachers (NPST), which highlights the importance of teachers' professional knowledge, skills and appropriate use of technology for effective teaching and learning (NCTE 2023). Therefore, this study may provide useful insights for strengthening digital capacity among Teachers, Teacher educators and preparing future teachers to effectively use technology in their professional practices.

Objective of the study

I. To examine the availability and functionality of the necessary resources of digital capability.
II. To compare the availability and application of Digital infrastructure on a daily basis.

Methodology

The researcher employed a descriptive research design and used a stratified random sampling technique for data collection. There are five administrative divisions in West Bengal, and from each division, two self-financed and two government secondary teacher education institutions were selected as samples. An observation schedule and semi-structured interview schedule were used for data collection.

Analysis and Interpretation

Based on data from government-funded and self-financed secondary teacher education institutions in West Bengal, the investigator carefully examined and interpreted the information to assess the availability of digital infrastructure. The analysis also focuses on comparing the availability and application of digital infrastructure in Government Funded and Self-financed Secondary Teacher Education institutions:

1. To interpretations and comparisons of the availability and application of digital infrastructure in the Government-funded Secondary Teachers' Education Institutions:

On the basis of the computers in the institutions:

Table-1

Category	Availability	Applicability	Applicability or Functionality percentage rate (%)	Availability (Overall Percentage)	Application (Overall Percentage)
Administrative use	49	35	71.40%	25.79%	18.42%
Teachers use	16	15	93.80%	8.42%	7.89%
Classroom use	14	12	85.70%	7.36%	6.31%
computer laboratory use	111	94	84.70%	58.42%	49.47%
Total	190	168	88.40%	190(100%)	168(100%)

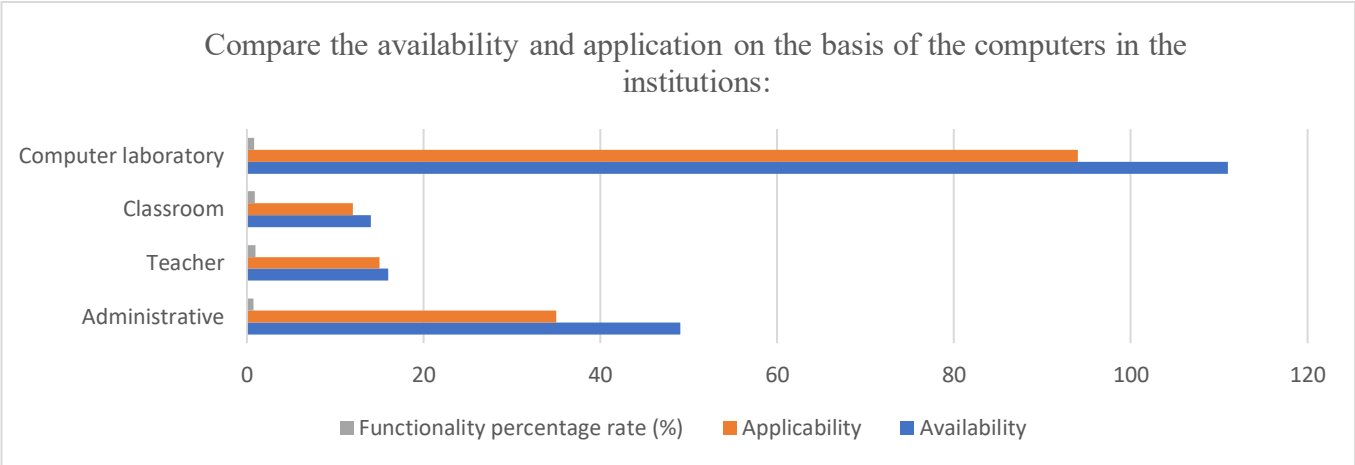

Figure 1: Available and Functional Comparison Chart

Interpretation

According to table data, the comparison between the availability and application of digital infrastructure in daily institutional practices, among the differences category computer laboratory use shows the highest availability of 111units (58.42%) and also the highest level of application with 94 units (49.47%), its applicability rate is 84.70%. Administrative purpose use availability with 25.79% and applicability 18.42%. Its applicability rate is comparatively low, 71.40%.Teachers use comparatively low use with 16 units (8.42%), but indicate the highest applicability rate of 93.80%. For classroom use, 7.36% in availability and applicability (6.31%), with an applicability percentage rate 85.70%.

A. To compare on the basis of Presentational Hardware Devices

Table 2

Category	Availability	Applicability	Applicability or Functionality percentage rate (%)	Availability (Overall Percentage)	Application (Overall Percentage)
LCD Projector	16	15	93.75%	32.65%	35.71%)
Overhead Projector	22	16	72.72%	44.89%	38.09%
Slide Projector	07	07	100%	14.28%	16.66%
Android T.	04	04	100%	8.16%	9.5%
Total Percentages	49	42	85.71%	(49)100%	42(100%)

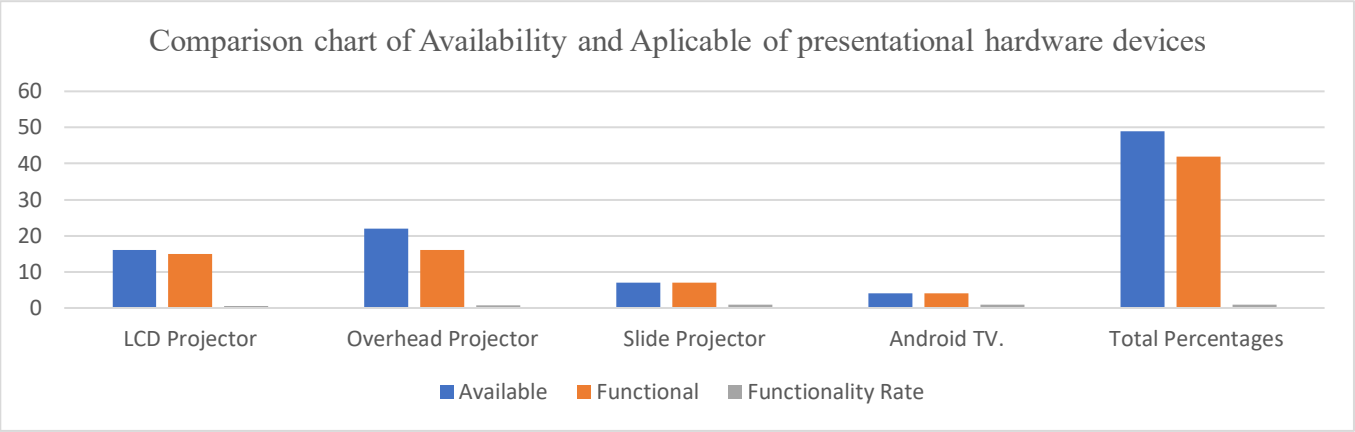

Figure 2: Comparison chart of Availability and applicability of presentational hardware

Interpretation

Based on Table 4.31, the data shows differences in both the availability and functionality of presentational hardware devices. The majority of devices are overhead projectors, which are the most available (32.65%) and the most applicability (93.75%). LCD projectors represent a substantial portion of available hardware devices (32.65%) and a high applicability percentage (72.72%).Slide share presentation devices and Android TV devices are available in a small portion; however, the applicability is high (100%).

B. To compare the institutional necessary Hardware Devices in Government-Aided & Government Teacher Education Institutions

- **Category -1**

Table-3

Institutional hardware devices	Availability	Applicability	Applicability Percentage rate (%)	Availability (Overall Percentage)	Application (Overall Percentage)
Printer	58	50	86.21%	39%	38.75%
Scanner	40	32	80.00%	27.39%	24.80%
Digital Board	05	04	80.00%	3.42%	3.10%
White Board	36	36	100%	24.65%	27.90%
Digital Camera	04	04	100%	2.05%	3.10
DVD/CD writer	01	01	100%	0.68%	0.77%
Smart Boards	02	02	100%	1.36%	1.55%
Total	146	129	88.35%	146(100%)	129(100%)

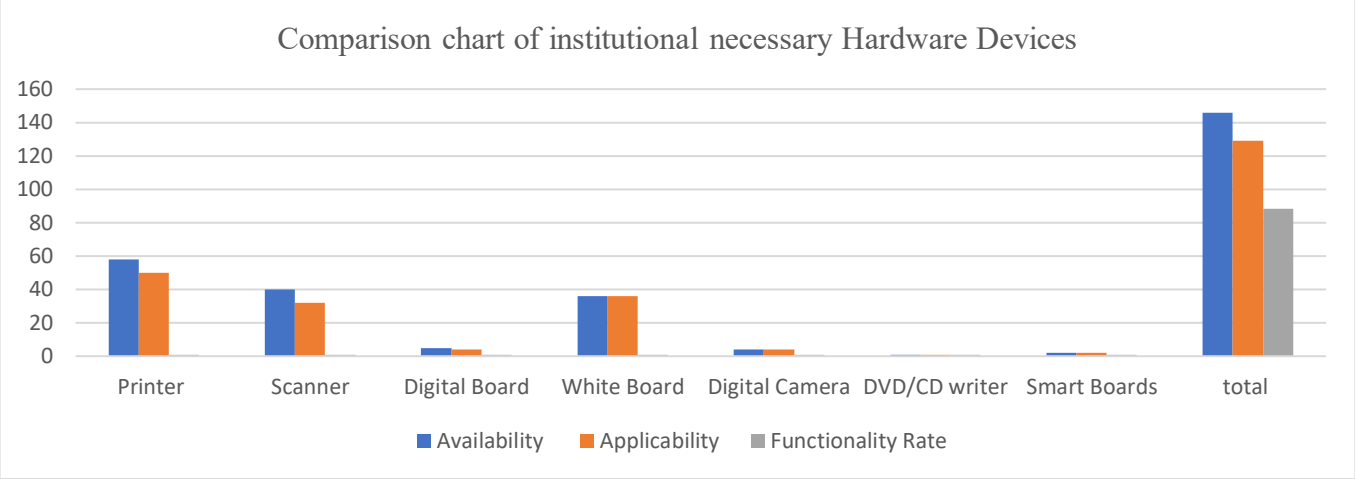

Figure-3: Comparison chart of availability and applicability

Interpretation

The table indicates that the overall applicability percentage of institutional hardware devices is 88.35%. Where whiteboards, digital cameras and smart boards have 100% applicability, form availability. Printer shows high availability and 86. 21% applicability, while scanners and digital boards have 80% functionality. However, digital boards and smart boards are not widely available in institutions. The data show that the majority of basic devices, such as printers, scanners and whiteboards, dominate both availability and applicability in government and government-aided teacher education institutions. Printers are the most widely used and functional, indicating their essential role. In contrast, modern ICT tools such as digital boards, smart boards and digital cameras are limited in number, reflecting low adoption, and DVD writers are absolutely absent

- **Category -2**

Table 4

Institutional Hardware	Availability	Applicability	Applicability or Functionality percentage rate (%)	Availability (Overall Percentage)	Application (Overall Percentage)
Portable Screens	7	06	85.71%	3.26%	2.29%
Recording Room	00	00	--	00%	00%
Sound System	19	17	89.47%	8.84%	19.77%
CCTV	141	125	88.65%	65.18%	71.84%
Biometric System	09	06	66.67%	4.19%	3.44%
Storage Hard disk	11	09	81.82%	5.12%	5.75%
Backup plan (Storage Purpose)	11	03	27.27%	5.12%	1.72%
Drive/cloud	10	01	10.00%	4.65	0.57%
Power generator	07	06	85.71%	3.26%	3.45%
Total	215	174	80.93%	215(100%)	174(100%)

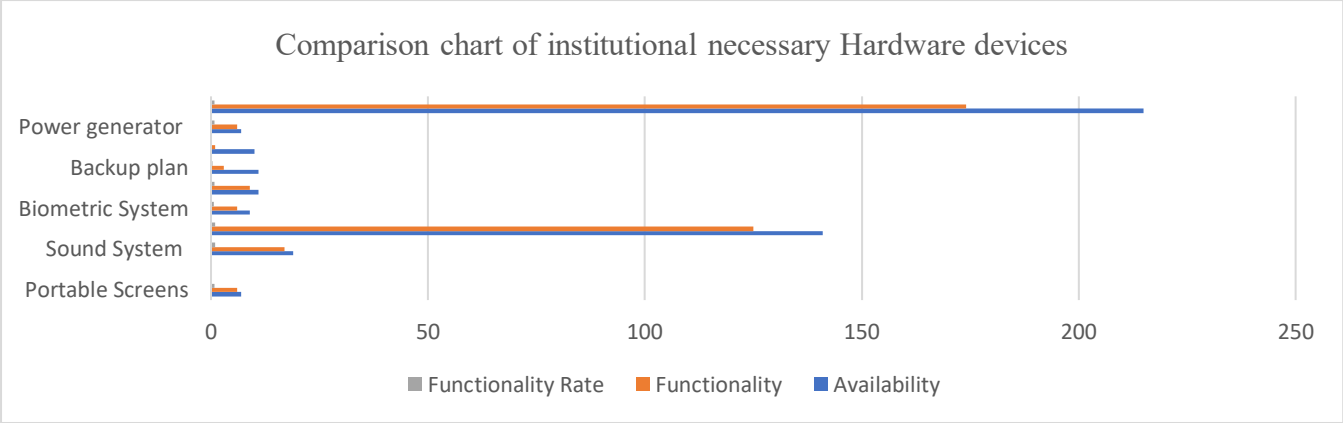

Figure 4: Availability and Applicability of Presentational Hardware

Interpretation

The table data reflected that the overall applicability percentage of institutional Hardware Devices is 80.93%, indicating that the most available devices are functional. CCTVs have the highest availability (65.18%) and the highest applicability (88.65%). Sound systems and portable screens show functionality rates of 89.4% and 85.71%, respectively. The biometric system has a moderate applicability of 66.67%, and the storage disk has a 81.82% functionality rate. However, backup plans for storage (27.27%) and drive and cloud facilities (10%) have a very low functionality rate, indicating poor cloud storage backup at the institutions. The complete absence of recording rooms that reflect lack of facilities for content creation and digital pedagogy. Overall data show that while security infrastructure is well established, there is insufficient development of essential digital support systems needed for effective ICT integration and sustainability.

2. To interpret and compare the availability and applicability of digital infrastructures in self-financed teacher education institutions:

On the basis of the computers in the institutions:

Table 5

Category	Availability	Applicability	Applicability or Functionality percentage rate (%)	Availability (Overall Percentage)	Application (Overall Percentage)
For Administrative	50	47	94%	31.64%	32.41%
For Teachers	15	15	100%	9.49%	10.34%
In classroom	01	01	100%	0.63%	0.68%
In the computer lab	92	82	89.13%	58.22%	56.55%
Total	158	145	91.77%	158(100%)	145(100%)

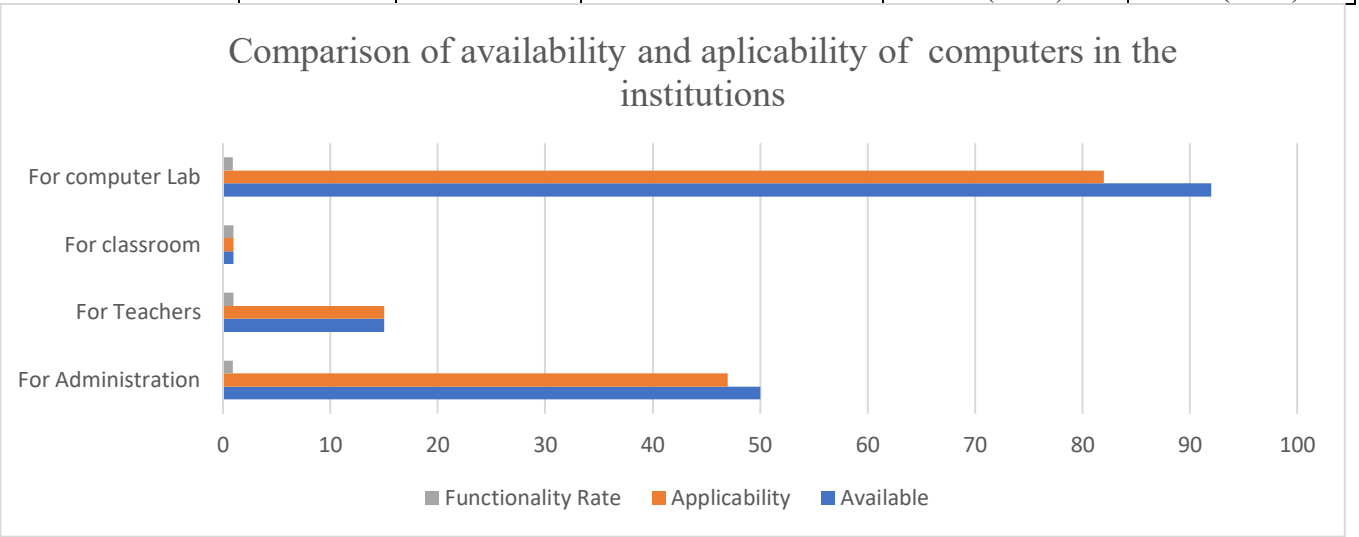

Figure 5: Comparison chart of Availability and Applicability

Interpretation

According to the table data, the overall applicability percentage of computers in the institutions is 91.77%, indicating that most available computers are functional and actively used. The computers used by teachers and in the classroom are found 100% Applicability. While the computer lab has the highest availability (58.22%) and 89.13% applicable, administrative-use computers also have a high functionality rate of 94%. However, the availability of classroom computers is low (0.63%), indicating limited integration of digital resources in regular classroom teaching.

A. To compare on the basis of Presentational Hardware Devices

Table 6

Category	Availability	Applicability	Applicability percentage rate (%)	Availability (Overall Percentage)	Application (Overall Percentage)
LCD Projector	12	10	83.33%	12 (36.36%)	10(33.33%)
Overhead Projector	12	11	91.67%	12(36.36%)	11(36.66%)
Slide Projector	5	5	100%	5(15.15%)	5(16.66%)
Android TV.	4	4	100%	4(12.12%)	4(13.33%)
Total Percentages	33	30	90%	33(100%)	30(100%)

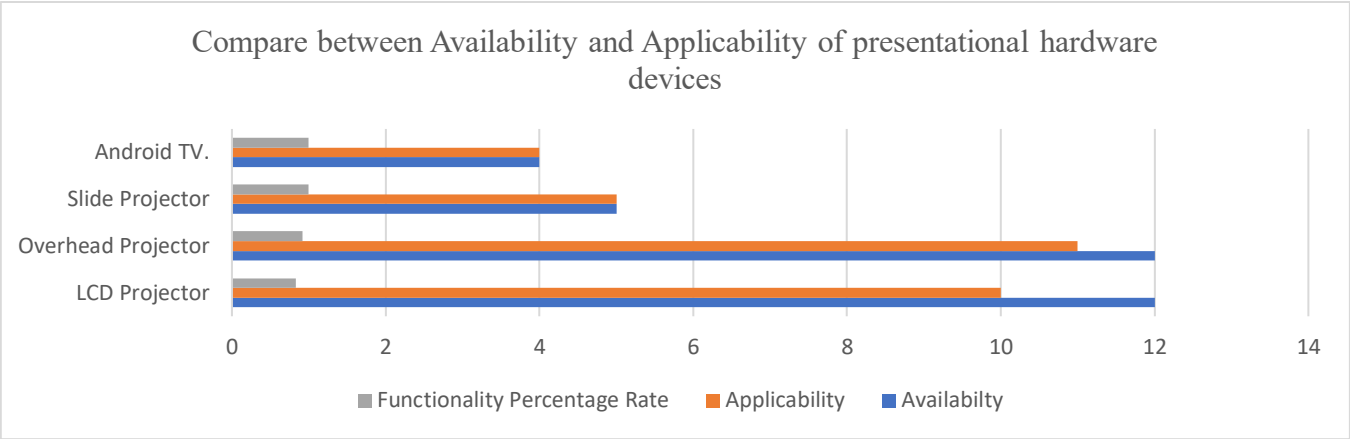

Figure 6: compare the availability and applicability of presentational hardware devices

Based on the table, differences in both the availability and applicability of presentational hardware devices are evident. The majority of devices are overhead projectors and LCD projectors, which are the most available (36.66%) and the most applicable (36.66%).

Slide share presentation devices and Android TV devices are available in a small portion; however, the applicability percentage is high (100%)

B. To compare the Institutional necessary Hardware Devices in Self- financed Teacher Education Institutions.

- Category-1 : Availability and applicability of institutional hardware devices

Table 7

Institutional Hardware	Availability	Applicability	Applicability or Functionality percentage rate (%)	Availability (Overall Percentage)	Application (Overall Percentage)
Printer	34	32	94.12%	31.19%	32.65%
Scanner	30	25	83.33%	27.52%	25.51%
Digital Board	00	00	00(00%)	00%	00%
White Board	42	40	95.24%	38.53%	40.81%
Digital Camera	01	01	100%	0.91%	1.02%
DVD/CD writer	02	00	00%	1.834%	00%
Smart Boards	00	00	00%	00%	00%
Total	109	98	89.91%	109(100%)	98(100%)

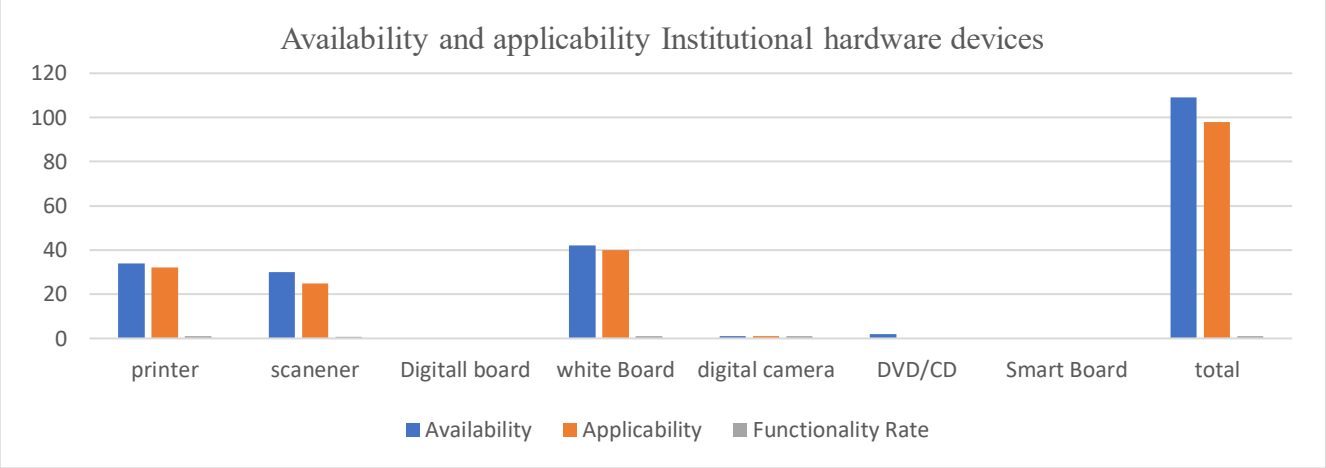

Figure 7: Availability and applicability of institutional hardware devices

Interpretation

The table compares the availability and applicability of institutional hardware devices. Whiteboards show the highest availability (38.53%) and applicability (40.81%). The printer has found high availability (31.19%), and the applicability percentage is 32.65%. Scanners are moderately available and applicable. Digital cameras are low in availability but have full applicability of the available devices. Digital Boards and Smart Boards are completely unavailable and unused in the institutions. DVD writer shows low availability but no applicability in daily practices. This indicates that limited advanced digital tools and issues in maintenance or technical support.

C. To compare the Institutional necessary Hardware Devices in Self- financed Teacher Education Institutions.

Category -2: Availability and applicability of institutional hardware devices:

Table-8

Purpose	Availability	Applicability	Applicability percentage rate (%)	Availability (Overall Percentage)	Application (Overall Percentage)
Portable Screens	02	02	100%	02(2.94)	02(3.17%)
Recording Room	00	00	00%	00(00%)	00(00%)
Sound System	10	10	100%	10((14.70%)	10(15.87%)
C.C.T.V.	54	50	92.59%	54(79.41%)	50(79.36%)
Biometric System	01	00	00%	01(1.47%)	00(00%)
Storage Hard disk	00	00	00%	00(00%)	00(00%)
Backup plan (Storage Purpose)	00	00	00%	00(00%)	00(00%)
Drive/cloud	00	00	00%	00(00%)	00(00%)
Power generator	01	01	100%	01(1.47%)	01(1.58%)
Total	68	63	92.65%	68(100%)	63(100%)

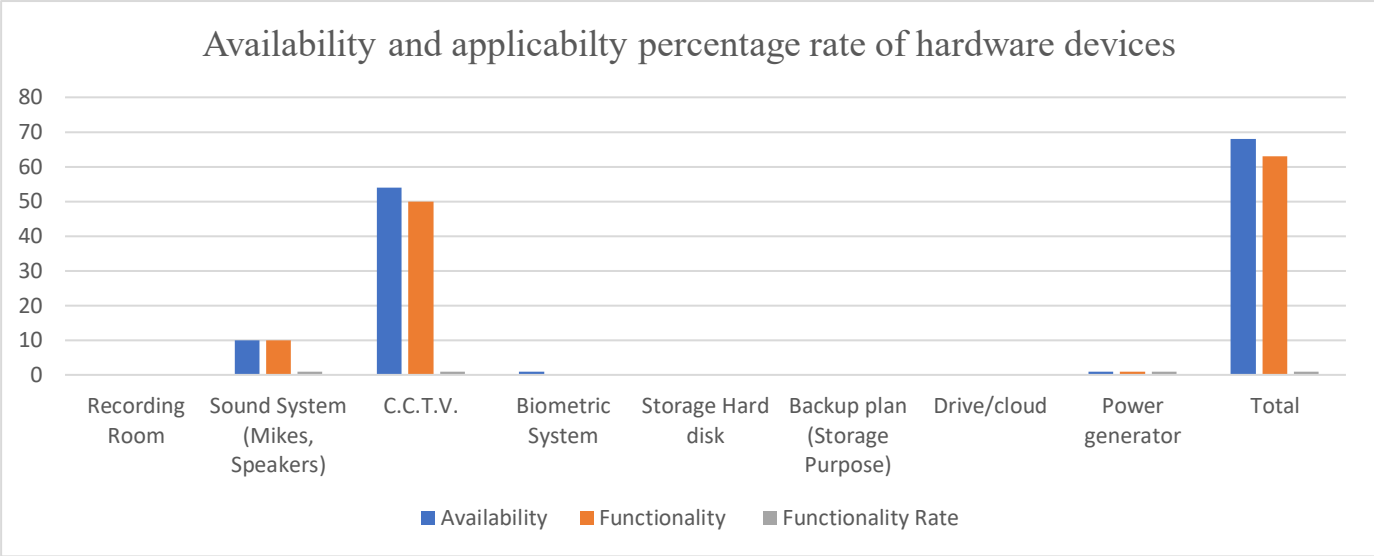

Figure 8: Availability and functionality percentage rate of hardware devices

Interpretation

The table compares the availability and application of digital infrastructure used in daily institutional activities. CCTV has the highest availability (54) and application (50), with a high applicability rate of 92.59%, indicating its regular use for security and monitoring. It found that the generator, mike and speaker/sound system, and the portable screen of the presentation device are 100% applicable. The collecting attendance digital dives biometric system has limited but no applicable properly use, while recording rooms, backup plans, hard disks and cloud for backup plans are completely unavailable and unused. Overall, the result indicates that the institutions primarily rely on basic support infrastructure, whereas advanced digital storage and backup facilities are absent from daily institutional practices.

Discussion

The investigator found that most secondary teacher education colleges have basic ICT infrastructure. However, the availability of necessary digital resources is not uniform in all institutions. The availability of digital infrastructure provides basic support to education, but effective use of ICT in teaching and learning is equally important**.** The National Education Policy (NEP) 2020 gives considerable importance to the appropriate use of technology in education and emphasises the need to strengthen digital infrastructure and digital learning opportunities in educational institutions (Ministry of Education, 2020). The institutions have different types of presentational equipment, such as LCD projectors, overhead projectors, slide projectors, and Android TVs. However, modern facilities such as digital boards and smart boards are available only to a limited extent. This indicates that many institutions still depend on basic digital equipment. The National Policy on Information and Communication Technology (ICT) in School Education also emphasises the development and effective use of ICT infrastructure for improving the quality of education (Ministry of Human Resource Development, 2012). The study also found that essential digital resources such as

backup systems, cloud or drive storage, and recording facilities are limited or insufficient. In the self-financed institutions, computers available for teachers and classroom purposes were generally functional. However, classroom-level access to digital resources remained limited. This suggests that the presence of digital devices has not yet resulted in their regular integration into classroom teaching and learning. NEP 2020 emphasises the need for teachers to be adequately trained and equipped to use technology effectively in teaching and learning. It also stresses continuous professional development and capacity building for teachers (Ministry of Education, 2020). Overall, the findings indicate that the selected institutions have made progress in developing digital infrastructure, but there is still scope for improvement.

Conclusion

The study found that most teacher training institutions have basic digital devices, such as computers and presentation devices, which are generally available and functional. However, these essential resources in the regular classroom for teaching and learning, as well as other institutional activities are limited. These study results greatly indicate that advanced digital facilities, such as smart boards, digital boards, recording rooms, storage and backup systems, are also needed. The results suggest that digital readiness is not only about having technological resources but also about making them accessible, functional, and useful in institutional activities. Therefore, Secondary Teacher Education institutions need to improve their digital facilities, properly maintain the available resources, and ensure that teachers continue professional development, especially by creating opportunities to develop their digital soft skills.

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