International Journal of Agriculture Extension and Social Development

Availability and accessibility of computer and internet in high schools: An analytical study in Samastipur, Bihar

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DOI: https://www.doi.org/10.33545/26180723.2025.v8.i4g.1814

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Abstract
The digital divide remains a critical challenge in many parts of India, particularly in rural districts like Samastipur, Bihar, where access to technology in educational institutions is still limited. This study examined the extent of digital infrastructure in selected schools and the experience and attitude of teachers and students towards information and communication technology (ICT). The study was conducted in two randomly selected blocks, Pusa and Kalyanpur, using a stratified random sampling technique. Two schools from Pusa block (60 respondents) and one from Kalyanpur block (30 respondents) were selected, making a total sample of 90 respondents, including 75 students and 15 teachers. Data was collected through a semi-structured interview schedule to understand ICT availability, accessibility, and usage patterns. Findings revealed that only 6.7% of students used smartphones, while all teachers used laptops, smartphones, Google Meet, and PowerPoint for educational purposes. A majority of students (84%) and teachers (73.3%) had prior experience with computers and the internet. Furthermore, 38.7% of students and 20% of teachers had received ICT training for more than six months. Correlation analysis showed that students' age had a significant positive relationship with their attitude towards ICT use, whereas for teachers, both age and years of service positively influenced their ICT attitudes. The study highlights the urgent need for improved digital infrastructure and teacher training programs to enhance ICT integration in schools. Policy recommendations include increasing government funding for technology, providing continuous ICT training for educators, and ensuring equitable access to digital tools for students. Strengthening digital education in high schools is crucial for bridging the digital divide and preparing students for a technology-driven future.

Keywords: ICT, availability and accessibility, computer, internet

1. Introduction
Technology is currently playing a significant role in shaping the educational landscape. Computers are widely used to create digital libraries and catalogues, enhancing academic research. However, relying solely on digital tools may not be sufficient, as the retention of information through computers is often lower than that gained through practical experience. Many libraries now provide online resources to support electronic learning and research (Heeks, 1999) [3]. Additionally, digital platforms connect learners to various sources, offering multiple perspectives on a given topic. Overall, computers have greatly benefited education by transforming how we work and learn. The Government of India introduced the ICT School Program to incorporate Information and Communication Technology (ICT) in teaching and learning, especially in government schools. Bihar was included in this initiative, with the program being implemented in over 1,300 schools across the state over a 12-year period. Data was collected from 1,551 students in 87 Bihar schools. Both boys and girls received equal access to ICT facilities. However, in practice, students often face challenges in accessing these facilities-labs are sometimes locked due to the absence of computer teachers, or the equipment is non-functional or missing. ICT labs have the potential to boost students' performance, and gender does not influence access to personal email accounts under this scheme (Jungck, 1990) [4]. In general, ICT can transform teaching approaches, expand access to quality education, and improve educational management systems. Fully integrating ICT into education is vital to prepare students for a digital future that includes tools like e-libraries (Hakkarainen *et al*., 2000) [2]. Unfortunately, the traditional methods of teaching in Indian schools have not evolved much. Middle school teachers still often follow a conventional, objectivist approach, which has faced criticism. India has seen a strong push toward e-literacy, particularly through the promotion and implementation of ICT in schools for socio-economic development. Rapid developments in ICT have reshaped communication and operations worldwide. These changes have influenced

educational and training needs, pushing policymakers to adopt new technologies. As ICT options continue to expand, decision-makers now have a wide range of tools to choose from when integrating ICT into education and training (Johnson *et al.*, 2016) [5]. The concept of e-readiness or a country's preparedness to engage in digital activities has been recognized as a key indicator of how well a nation can leverage ICT in education. This metric has been used across many Asian countries, including India (Dada, 2006) [1], and can be measured using several ICT indicators as suggested in the UIS Guide to Measuring ICT in Education. ICT facilities are essential for the global dissemination of knowledge and national development. It is crucial that secondary schools are well-equipped with ICT tools to ensure effective teaching and learning, which ultimately contributes to the holistic development of society. While India promotes its digital advancement, this study aims to explore the ground reality examining the practical knowledge of high school students regarding their subjects, and assessing the availability and accessibility of computers and internet facilities in schools

2. Materials and Methods
The study was carried out in the state of Bihar which has 38 districts and out of these 38 districts Samastipur district was selected purposively as it was located near to Dr. Rajendra Prasad Central Agricultural University. The map of Samastipur district showing the research area is presented below in Figure 1. The study was conducted in Samastipur district, which consists of 20 blocks. Out of these, two blocks Pusa and Kalyanpur were randomly chosen. A comprehensive list of government secondary schools in the selected blocks was prepared, and three high schools were selected: Senior Secondary Boys High School and Senior Secondary Girls High School from Pusa block, and one randomly chosen high school from Kalyanpur block. From each school, 25 students and 5 teachers were selected using a stratified random sampling method, resulting in a total of 90 respondents, including 75 students and 15 teachers. Data collection was carried out using a well-structured interview schedule. Prior to this, the researcher visited the selected schools with the assistance of principals and teachers, which helped in building rapport and facilitating smooth data collection. The interview Schedule was administered in English and response were recorded in Hindi language to make it convenience for the respondents. Efforts were taken to ensure that respondents fully comprehended each question, and the accuracy of their responses was verified. Secondary information was collected from credible sources including annual reports, statistical handbooks, and economic surveys. To effectively analyze and present the findings, appropriate statistical tools such as frequency, percentage, mean, and Pearson's correlation were used.

Fig 1: Map showing the study area

3. Results and Discussion
Socio-personal profile and other factors of respondents
An analysis of respondents based on socio-personal profile and other factors of students and teachers revealed that majority of the students (70.7%) and teachers (73.3%) were at the age of 17-20 and 36-50 years respectively. The details of the socio-personal profile and other factors of students and teachers are presented in Table 1. A critical look at table 1 revealed that out of 75 students, 38 were males (50.7%) and 37 were females (49.3%). Out of 15 teachers, 7 (46.7%) were males and 8 (53.3%) were females. Most of students (89.3%) had studied till senior secondary level. PG without NET, PG with NET, PhD and PhD with NET was revealed among 40%, 53.3%, 6.7% and 0% of the teachers respectively. Nuclear and joint family was reported among 82.7% and 17.3% of the student's respectively. Nuclear and joint family was reported among 80% and 20% of the teachers respectively. Smart phone was used by 6.7% of the students. This might be due to financial constraints, digital literacy, and parental restrictions and schools policies. No student was using laptop as well as power point. This might be due to high cost of laptops, lack of infrastructure, insufficient training and lack of awareness. All the teachers used laptop, smart phone, Google meet and power point respectively. The widespread use of laptops, smartphones, Google Meet, and PowerPoint by teachers can be seen as a combination of institutional support, professional necessity, enhanced teaching methods, and personal adaptability.

Table 1: Distribution of respondents based on socio-personal profile and other factors of students and teachers

Category with Range	Students (N=75)		Teachers (N=15)	
	F	**%**	**F**	**%**
Age				
12-16 years	22	29.3	-	-
17-20 years	53	70.7	-	-
Up to 35 years	-	-	3	20.0
36-50 years	-	-	11	73.3
Above 50	-	-	1	6.7
Gender				
Male	38	50.7	7	46.7
Female	37	49.3	8	53.3
Education				
Secondary	8	10.7	15	100
Senior-Secondary	67	89.3	15	100
PG without NET	-	-	6	40
PG with NET	-	-	8	53.3
PhD	-	-	1	6.7
Ph.D. with NET	-	-	0	0
Digital Nativity				
Laptop	0	0	15	100
Smart Phone	5	6.7	15	100
Google Meet	1	1.3	15	100
Power Point	0	0	15	100
Family type				
Nuclear	62	82.7	12	80
Joint	13	17.3	3	20
Family Size				
Small family(less than 5)	47	62.7	12	80
Medium family(5-7)	15	20	0	0
Large family(more than 7)	13	17.3	3	20
Family Occupation (Primary)				
Crop farming	15	20	0	0
Live-stock rearing	4	5.3	0	0
Govt-service	25	33.3	15	100
Business	16	21.3	0	0
Labour	9	12	0	0
Any other	6	8		
Family Income				
Up to 2.5 lakh	53	70.7	0	0
From 2.5 lakh to 5 lakh	21	28	8	53.3
From 5 lakh to 7.5 lakh	1	1.3	6	40
More than 7.5 lakh	0	0	1	6.7
Experience in Computer and Internet				
Yes	63	84	11	73.3
No	12	16	4	26.7
Trainings acquired on ICT				
Not a single day	11	14.7	4	26.7
One week to 14 days	14	18.7	2	13.3
One month to 3 months	21	28	3	20.0
More than 6 months	29	38.7	6	40.0
Amount of time devoted to use ICT in a day				
Half an Hour	27	36	1	6.7
One Hour	18	24	6	40
More than One Hour	30	40	8	53.3
Attitudes towards Internet				
Positive	6	8	14	93.3
Negative	64	85.3	0	0
Uncertain	5	6.7	1	6.7
Job Experience				
Up to 10 years	-	-	2	13.3
11-20 years	-	-	10	66.7
21-30 years	-	-	2	13.3
>30 years	-	-	1	6.7
Availability of computer and internet (Students and Teachers)				
	Students (N=75)		Teacher (N=15)	
Computer	74	98.7	100	100
Internet	60	80	100	100

These factors collectively create an environment where teachers are equipped and motivated to use digital tools in their daily teaching practices. A majority (84%) of the students had prior experience using computers and the internet, while 73.3% of the teachers also reported such experience. Regarding daily usage of ICT, 36% of the students used it for half an hour, 24% for one hour, and 40% for more than one hour. Among teachers, 6.7% used ICT for half an hour, 40% for one hour, and 53.3% for over an hour per day. Among available facilities, the most adequately provided was a spacious room for sitting and working (92%), followed by access to a library (78.7%), computers (70.7%), and science laboratories (70.7%). Teachers reported that the most sufficient facility was internet-connected computers, followed by computers, LCD projectors, and spacious work areas. The primary occupation of most students' families was government service (33.3%), whereas all of the teachers' families (100%) were engaged in government jobs. In terms of attitude, 93.3% of the teachers expressed a positive view toward the internet, while 6.7% were uncertain.

An access was made to identify the distribution of respondents (students and teachers) according to availability of computer and internet revealed that availability of computer and internet was 98.7% and 80% to the students

respectively. In case of teachers, availability to computer and internet was reported 100%.

Accessibility of computer and internet
An assessment was conducted to determine the distribution of respondents (students and teachers) based on their access to computer and internet facilities. Findings revealed that 92% of the students had their own email IDs. The percentage-wise distribution of respondents regarding accessibility to computers and the internet is presented in Table 2, only 28% of the students were aware of how to access the internet on a computer and connect it to the World Wide Web. Additionally, 20% and 18.7% of the students knew how to use platforms like Google Meet and Zoom, and how to connect the internet for email purposes, respectively. Similarly, Table 2 shows that all the teachers (100%) had their own email accounts. About 93.3% of them knew how to access the internet on a computer. Around 80% reported being able to use Google Meet, Zoom, and knew how to connect the internet for email and general web access. Furthermore, 93.3% of the teachers mentioned that the internet speed was adequate for computer usage, and 86.67% stated that it was easy to access school lab computers during the academic term.

Table 2: Distribution of respondents with respect to accessibility of computer and internet

| S. No	Category	Students (N=75)		Teachers (N=15)	
		F	%	F	%
1	Do you know how to access internet on computer	21	28	14	93.3
2	Do you have your own mail id	69	92	15	100
3	Do you know how to access Google meet, zoom	15	20	12	80
4	Internet via computer is more accessible	13	17.3	12	80
5	Do you connect to the internet for the mail	14	18.7	12	80
6	Do you connect to the internet for the world wide web	21	28	12	80
7	Do you use internet	33	44	12	80
8	School computer is the most common way to access the internet	5	6.7	12	80
9	Your own computer is the most common way for access the internet	13	17.3	12	80
10	Speed of internet connection is enough for computer connection	5	6.7	14	93.3
11	Is it easy to get on a school lab computer during term time	4	5.3	13	86.67
12	If a ten page handout (in pdf format) essential for a class was placed on a class website do you like to print out it	17	22.7	12	80
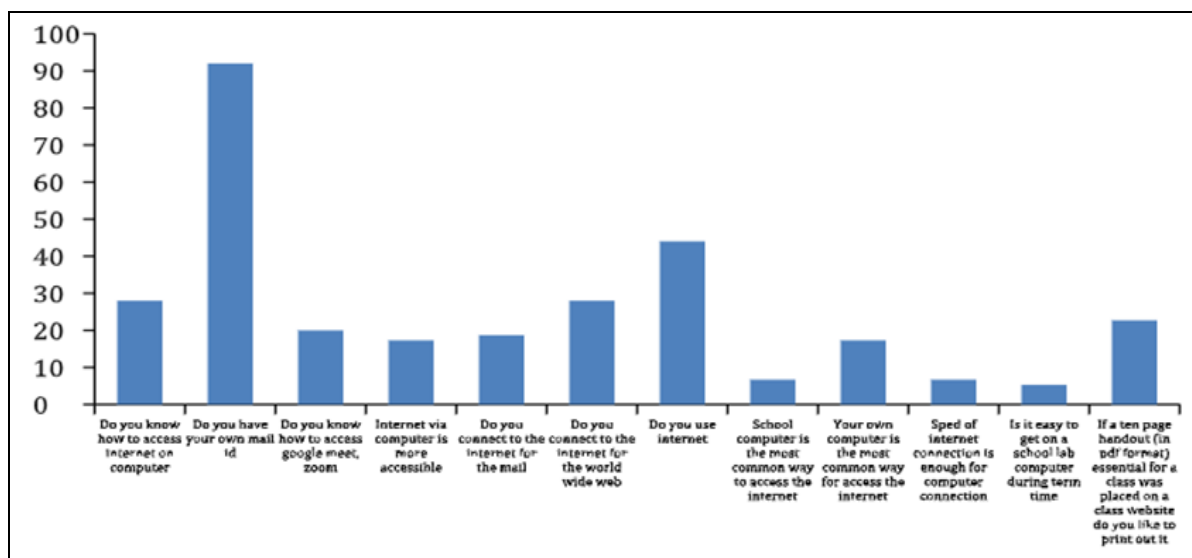
Fig 1: Distribution of respondents to accessibility of computer and internet

Relationship between a set of selected profile characteristics with attitude of teacher and students towards internet

An attempt was made to access the relationship a set of selected profile characteristics with attitude of teacher and students towards Internet revealed that students Age, was found to be positively correlated Attitude towards ICT use while in case of teachers both Age and Numbers of years in service was found to be positively correlated with Attitude towards ICT use. This might be due to the fact that older students might have had more exposure to and experience with ICT over the years, leading to greater familiarity and comfort with using technology. As the students' progress in their education, they are likely to encounter more ICT tools and resources, enhancing their skills and positive attitudes toward these technologies. Also, older students may possess greater cognitive and emotional maturity, enabling them to understand and appreciate the benefits of ICT in their studies. This might be due to the fact that older teachers might have participated in more professional development programs focusing on ICT, leading to a better understanding and more positive attitude towards its use. With age comes experience, and older teachers may feel more confident in integrating ICT into their teaching methods as they have seen the evolution and benefits of technology over time. Also, older teachers might have a broader perspective on the long-term benefits of ICT and be more willing to adapt to technological changes. Teachers with more years in service have had more opportunities to learn about and adapt to new technologies, resulting in a more positive attitude towards ICT use. Experienced teachers often have larger professional networks, enabling them to share and learn best practices for ICT use in education. Long-serving teachers might demonstrate a stronger commitment to improving their teaching methods, including the integration of ICT, to enhance student learning outcomes. Overall, the positive correlation between these variables and attitudes towards ICT use suggests that both experience and exposure play significant roles in shaping positive perceptions of technology in educational contexts.

Table 3: Relationship between a set of selected profile characteristics with attitude of teacher and students towards Internet

Independent Variables	Students attitude towards internet, R-Value	Teachers attitude towards internet, R-Value
Age	0.27*	0.36*
Gender	0.20	0.14
Education	0.04	0.06
Digital Nativity	0.05	0.01
Family type	0.09	0.09
Family size	-0.06	0.05
Family occupation	0.14	0.10
Family income	0.16	0.07
Facilities in school	0.13	0.02
Experience in computer and internet	0.15	0.09
No. of years of service	---	0.24*

4. Conclusion

Information and Communication Technology (ICT) facilities play a vital role in the global exchange of knowledge and contribute significantly to national development. To maximize the benefits of internet-based learning and research, regular and structured training programs should be implemented across all educational institutions, including schools and colleges. Future provisions should include internet connectivity in hostels, along with the installation of modern computers equipped with the latest specifications and multimedia tools. This would enable users to utilize advanced services like internet telephony, video conferencing, and online collaboration tools.

To ensure the productive use of these facilities, access to entertainment websites should be restricted to prevent misuse and allow serious users uninterrupted access. Teachers should be encouraged to be more resourceful by integrating computer and internet tools into their teaching practices, which would foster experiential learning, enhance critical thinking, and encourage innovation among students. Integrating ICT in classrooms requires focused attention to elevate the quality and competence of the education system. This shift will contribute to improving the global standing of the national education framework and help produce a skilled future workforce. For successful ICT adoption in teaching, the government must work toward changing teachers' attitudes and improving their understanding of the importance of ICT in education. As key implementers of educational policies, teachers must be well-prepared to adapt to technological advancements. Therefore, advanced communication tools and digital resources should be made accessible to students both in school and at home. Additionally, teachers must be digitally literate and possess strong ICT skills to effectively transform their teaching methods and meet the demands of 21st-century education.

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