The digital divide in India: use and non-use of ICT by rural and urban students

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Abstract

Purpose – The purpose of this paper is to know the frequency, place, and purpose of use of computer. It also aimed to know the various problems faced by the students in using the computer and to know the reasons for not using computer by rural and urban students.

Design/methodology/approach – A total of the 2,592 sample population were selected from 64 rural and urban high schools of two districts of Karnataka state. A structured questionnaire was used for the data collection and data have been analyzed using Software Package for Social Science. Statistical tests, namely, χ^2 and one-way ANOVA were applied to test the formulated hypotheses.

Findings – The results of the study showed that only 20.66 percent rural students and 69.70 percent of urban students used computer for various academic purposes. Further, most of the rural and urban students opined that "electric power failure" and "lack of computer" skills were major problem in using computer.

Originality/value – Today, the computer education in schools plays an important role in student's career development and enhances the quality of learning among students. Thus, the local government/school authorities may provide the minimum ICT infrastructure in both schools and more particularly in rural schools.

Keywords India, ICT, Digital divide, Computer literacy, Rural and urban students

Paper type Research paper

1. Introduction

During last two decades, most of the developed countries have witnessed significant changes traced by ICTs. These multi-dimensional changes have observed in almost all aspects of life, namely, economics, education, communication, and travel. In the technology-driven society, getting information quickly is important for both sender and receiver. According to Daniels (2002), ICTs have become within a very short time, one of the basic building blocks of modern society. Many countries now regard the basic skills and concepts of ICT as part of the core of education, alongside reading, writing, and numeracy.

In India, the benefits of ICTs have not reached the expected level in the rural areas and still the Indian rural population living with a minimum level of ICTs. As per the 2011 census, 72.2 percent of the population lives in rural areas and the remaining 27.8 percent lives in towns and urban agglomerations (Roy, 2012). Most of the Indian villages are lacking proper ICT infrastructure though India spends 28 percent for ICT. The rural tele-density is also very low as compared to the urban areas. A wide rural-urban disparity, which is further aggravated on the regional basis, has created an acute divide in a variety of social and economic activities including education.

In a country like India, literacy is the main foundation for social and economic growth. When the British rule ended in India in the year 1947, the literacy rate was just 12 percent. Over the years, India has changed socially, economically, and globally. After the 2011 census, the literacy rate in India was found to be 74.04 percent. Compared to the adult literacy rate, here the youth literacy rate is about 9 percent higher (Census, 2011). Latest world development indicators show that in information society indicators, i.e., computer,

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internet, radio, television, newspapers, etc., India is far behind the USA, Japan, and even some Asian countries.

However, in recent years, India has taken a very long leap in the last few years to improve its educational system. The Government of India came up with the idea of promontory use of ICTs in education in its Twelfth Five-Year Plan (2012-2017), There are plenty of ICT projects launched in India, which helps and motivate learners to learn on a computer. Mission Mode Project on School Education is now under the National e-Governance Plan. This would enable comprehensive technology enablement of the school education sector. More specifically, this would cover developing ICT skills of all heads of schools, teachers, non-teaching staff, and students; creating a repository of quality-assured digital contents in English, Hindi, and regional languages in all subjects especially in science and mathematics; training and encouraging teachers to develop and use e-content; creating provisions for ICT in classrooms or portable facilities such as a netbook/laptop/iPad and a projector with rechargeable battery, and implement ICT-integrated education and enabling provision of ICT-integrated examination and e-governance at the institutional and systemic level including setting up of education portal(s) (India Planning Commission, 2013).

Some of other the major projects are e-GyanKosh, Flexilearn, NPTEL, CEC, Institute of Lifelong Learning (ILLL) e-PG Pathshala, etc., The National Literacy Mission, EDUSAT, Sarva Shiksha Abhiyan (SSA) (Bist, 2007). With this background, this study has been conducted to know the use as well as the non-use of ICT by rural and urban students.

2. Related Literature

A plethora of literature is available in the area of ICT use by rural and urban students. Studies conducted by various authors and published in various national and international reputed journal studies are discussed in this section.

Banerjee *et al.* (2003) conducted a study on the evaluation of a computer-assisted learning and remedial education program to improve the quality of education in Vadodara. The computers were used effectively only in very few schools in 2002. The design of the program allowed children to learn as independently as possible and the interactions between instructors and children were driven by the child's experience with computer games. The results showed that the intervention led to an increase in math scores by 0.37 standard deviations. Average scores on a 50-point math test rose from 14.9 to 29.0 in the treatment group but only from 15.5 to 25.0 in the control group. At the same time, the program did not have any visible changes in the language competencies. It also suggested that the more interactive, computer-based approach to learning might not have created a greater enthusiasm for learning overall.

A study by Bhardwaj (2006) showed that there has been steady but slow progress in the availability of ICT facilities for students in India. The study attempted to assess the length of time that computers had been with schools. It was found that access to ICT tools by government school students outside the school was generally low. The access of such tools by private school students was comparably better and predominantly at home, which implied a better socioeconomic condition.

Tella *et al.* (2007) examined the use of ICT and its implications for further development of ICTs use in Nigerian secondary schools. The study found that 61 percent of the teachers have accessed computer in their schools, 11.9 percent teachers have accessed video equipment, and 10 percent teachers used digital cameras. The result of the study also found that 33.8 percent teachers have no expertise with ICT.

Barrett's (2009) review of the international experience of using ICT to improve the learning environment in schools has been demonstrative in identifying the conditions in which ICT can be effectively used to enhance the quality of learning and create social payoffs which would be conducive to sustainable growth and equitable development. It is largely agreed in the literature that infrastructure, trained teachers, e-literacy or stand-alone computer lessons though necessary are not sufficient. Integrating ICT tools into the curriculum and tailoring pedagogy according to the social environment are necessary for achieving qualitative improvements in learning (Holla and Kremer, 2009; Sreekumar and Rivera-Sánchez, 2008; Barrett, 2009; Gurumurthy and Vishwanath, 2009).

Sharma *et al.* (2009) conducted a study on "Digital divide in education." The researcher observed that all private schools are providing computer education with the use ICT tools whereas this number is less than half of government schools. The computer education was introduced almost all private schools whereas it has been introduced optionally in government schools only at the higher secondary level. The students enrolled in government schools are being deprived of the ICT education and becoming a victim of the digital divide in education.

Purushothaman (2011) conducted a study on the Role of ICT in the Educational Upliftment of Women. This study discusses the significance of ICT in the educational sector. With the emergence of ICT's, there has been a rapid change in the way information has exchanged and how people communicate. The study focus on female students reinstates the fact that just easy access does not bring the female students closer to ICT. They should have the know-how and sufficient confidence to use the accessible technology. Instead, of basic assumptions, effort should be done to understand what are the underlying problems that make female student learners of this generation stay away from ICT even though there are options for easy access and also study suggest that predominantly contributes on the sociocultural factors that should be given significance in designing technology for making the ICT widely acceptable from a gender perspective.

Similarly, Das Gupta and Haridas's (2012) study on the Role of ICT in Improving the Quality of School Education in Bihar Indian Scenario, in this, he focused on one of the state of India named as Bihar. This study pedagogy has set out certain benchmarks for integration of ICT into the learning process as a way to improve the quality of school education in specific social contexts. The study gave some inputs to the education component of ICT policy and school education policy of Government of Bihar on possible ways to create and improve the learning environment in schools in Bihar.

Monica Singh's (2013) study attempt to generate awareness among teaching and student fraternity employed/enrolled in an educational institution. This is a secondary research on various policies of ICT run by Government of India and by state governments to facilitate virtual teaching, online classes, content development and its delivery and connecting students from remote areas, rural areas along with urban regions. Some of the popular schemes are SSA, Kendriya Vidhalaya Sangathan or Central Schools, Navodaya Vidhayalaya Samiti, Rashtriya Madhyamik Shiksha Abhiyan, and EDUSAT, etc. This research highlights the spectrum of experiences of various schemes launched by the Government of India and by state government, for school education. It will also include the advantages and some practical hurdles of implementing ICT at primary, secondary, and senior secondary school education.

Sampath Kumar *et al.* (2014) conducted a study on computer literacy competencies among Indian students. The result of the study found that majority (91.33 percent) of urban students used computers while only 32.33 percent of rural students used the computer for their academic work. The most notable finding of the study was that 67.66 percent of rural students never used computer. Another study by Sampath Kumar and Basavaraja (2016) found that only 32.33 percent of students used computers for their academic work while 67.66 percent of students have not used computers. The study also found that both male and female students (100 percent) wished to use computers in their schools. This indicates that all students selected for the study had a high positive attitude toward the use of computers in schools.

Shukla *et al.*'s (2016) study focused on the education system in rural areas in India and providing access to improved learning and basic knowledge by enabling connectivity in the field of education, social awareness, health, internet knowledge, and open learning facilities. All of this is implemented and need to be implemented on the basis of ICT. Since the most common issue faced in the rural areas is the intense lack of ICT-enabled teaching methodologies, the solution approaches are provided. In addition to it, using ICT as a potential tool of teaching is much required. Therefore, massive open online courses have emerged as one of the most promising methods of catering higher education in an open and online fashion. They are not only for normal people but also for visually or physically impaired people providing them with web accessibility. This would not only improve the teaching-learning experience but would ensure and enhance the quality education for all, thus showing the pathway to ubiquitous learning in India.

The review of literature clearly shows that during the last one decade, there were many studies conducted on the use of the computer by rural students and urban students. Few of them focused on the use of computer and problems faced by students in the use of computer. However, there are very few comprehensive and in-depth studies in India focused on the digital divide. Thus, the study has been conducted to fill this research gap.

3. Objectives of the study

The present study is an attempt to examine the digital divide between the rural and urban students and thus the study has been conducted with the following objectives:

(1) to know the use of computer applications by the students of rural and urban schools;

(2) to know the place and purpose of use of computer by the rural and urban students;

(3) to know the methods of learning of computer by rural and urban students;

(4) to understand the problems faced by the rural and urban students in the use of computer; and

(5) to know the reasons for not using computer by rural and urban students.

4. Research hypotheses

H1. There is an association between the use of computer and sociological background of the students.

H2. Place of use of computer varies between rural and urban students.

H3. The methods of learning computer differ between rural and urban students.

H4. The problems faced in the use of computer vary between rural and urban students.

H5. There is no association between reasons for not using computer and sociological background of the students.

5. Methodology

The total number of high schools in Tumakuru and Chitradurga districts of Karnataka state downloaded from the website of "School Education in Karnataka," i.e., www.schooleducation.kar.nic.in, is 1,145. Out of 1,145 high schools, 853 high schools are in rural area and remaining 292 high schools are in the urban area (Table I) (School Education, 2014a) for the academic year 2014-2015.

5.1 Selection of sample population

5.1.1 Selection of students. The total population of students studying in 10th grade for the academic year 2014-2015 was 66,385. Of which 34,875 were male and 31,510 were female students for the academic year 2014-2015 (Table I) (School Education, 2014b). The target population of this study were 10th grade students from 1,145 rural and urban high schools in Tumakuru and Chitradurga of Karnataka state. The social maturity, cognitive maturity, and learning readiness of the students were considered for the selection of the students. Since, the student's maturity governs the personal responsibility, shared communication, openness to new ideas, and ability to find solutions to problems, the present study has selected only the students of age 16-17 years (10th grade). In order to calculate the sample population, the study followed the formula given by Krejcie and Morgan (1970):

$$\frac{\chi^2 NP(1-P)}{d^2(N-1)+\chi^2 P(1-P)}$$

where s is the required sample size; χ^2 the table value of χ^2 for 1 degree of freedom at the desired confidence level (6.635); N the population size (66,385); P the population proportion (assumed to be 0.50 since this would provide the maximum sample size); and d the degree of accuracy expressed as a p (i.e. margin of error = 0.025):

$$s = \frac{6.635 \times 66,385 \times 0.50(1-0.50)}{(0.025)^2(66,385-1)+(6.635)(0.50)(1-0.50)}$$

Thus, sample size is $s = 2,552$ students.

The sample size has been calculated using the above formula and the required sample size was 2,552 (degree of accuracy = 0.025 and confidence level = 99 percent). In order to get the 2,552 sample population, we randomly selected 64 high schools and from each school, we selected 40 students and thus the sample became 2,560 (64 school×40 students) which is approximately equal to the calculated sample, i.e., 2,552.

An equal percentage of male and female students were considered while distributing the questionnaire. However, in few schools, few students showed their interest to involve in the project and were very curious to fill the questionnaire. In such cases, we allowed them to fill the questionnaires and thus the total sample became 2,592 (2,552 calculated sample+40 extra students).

5.2 Survey instrument

The study is based on the survey method. After reviewing the articles published in scholarly journals, a questionnaire was designed to fulfill the above-stated objectives. The final version of the questionnaire consisted of various pre-coded questions to produce quick and easy quantitative data. Thus, the questionnaire formed the main research instrument for this study. In order to demonstrate the main purpose of the project to the students, we also created a video (15 minutes) and it was played in the classroom.

Table I. Number of high schools and demography of students

District	Total number of schools			Total students population			Number of school selected for the study			Number of population selected for the study		
	Rural	Urban	Total	Male	Female	Total	Rural	Urban	Total	Male	Female	Total
Chitradurga	301	106	407	13,103	12,034	25,137	12	12	24	456	501	957
Tumakuru	552	186	738	21,772	19,476	41,248	20	20	40	875	760	1,635
Total	853	292	1,145	34,875	31,510	66,385	32	32	64	1,331	1,261	2,592

6. Data analysis and interpretations

The data collected from the students through questionnaire has been analyzed using Software Package for Social Science. Statistical tests, namely, χ^2 and one-way ANOVA were employed to test the formulated hypotheses.

6.1 Demographic information of respondents

Table II shows the demographic information of the students. Of the 2,592 students, 51.4 percent of them were male and 48.6 percent of them were female. In total, 51 percent of students were from the rural areas and 49 percent of students were from urban areas. The majority of students were from aided schools (44.8 percent) followed by government schools (29.9 percent) and private schools (25.3 percent).

6.2 Use of computer by rural and urban students

One of the main objectives of the study was to know the use of the computer by rural and urban students. The data in Table III show that only 20.66 percent of rural students used the computer for various purposes while number of students who came from the urban area (69.70 percent) used computers. This shows that the percentage of rural students who used computer is very less as compared to urban students.

In order to know the significant association between the use of computer and the social background of the students, the χ^2 analysis was performed. It is found that there is a significant association between the use of computer and the social background of the students. ($\chi^2 = 630.236$, $c = 0.442$, $p = 0.000$). During our visit to various schools in rural and urban areas, it was also noticed that majority of schools in the rural area have no

Demographic information	Frequency ($n = 2{,}592$)	Percentage
Gender		
Male	1,331	51.4
Female	1,261	48.6
Social background		
Rural	1,321	51.0
Urban	1,271	49.0
School affiliation		
Government	775	29.9
Private	657	25.3
Aided	1,160	44.8
District		
Tumkur	1,635	63.1
Chitradurga	957	36.9

Table II. Demographic information of respondent

	Rural ($n = 1{,}321$)		Urban ($n = 1{,}271$)				
Response	Frequency	%	Frequency	%	χ^2	Contingency coefficient	Sig. p
Yes	273	20.66	886	69.70	630.236	0.442	0.000*
No	1,048	79.33	385	30.29			

Note: $^*p < 0.001$

Table III. Use of computer by rural and urban students computer facilities. However, the majority of urban schools have computer facilities. The reasons for less usage of computer because of the non-availability is the computer at rural schools, the students could not able to use computer.

6.3 Place of use of computer

The place of use of computer by rural and urban students is presented in Table IV. Data presented in the table reveal that most of the rural students (92.67 percent) used computer at schools. Comparatively less percentage of students used at home (22.34 percent) and computer coaching center (19.41 percent). This clearly indicates that most of the rural students used computer at school.

The use of the computer by urban students showed that majority of students used computer at schools (63.43 percent) followed by coaching center (60.49 percent) and home (48.42 percent). Only 8.35 percent of urban students used computer at the school library. A closer look at the data presented in Table IV clearly indicates that there is a significant difference in the use of the computer by rural and urban students, which is also supported by the χ^2 analysis ($p = 0.000$).

6.4 Methods of learning computer

Table V shows how the rural and urban students familiarized with computer and its various applications. Both rural and urban students expressed that they learnt computer with the help of school teachers which receives the highest mean score (2.96 for rural and 2.52 for urban). Also, the majority of urban students learnt computer by self-taught (2.40) followed

Table IV. Place of use of computer

Place	Rural ($n = 273$) Frequency	Percentage	Urban (886) Frequency	Percentage	χ^2	Contingency coefficient	Significance p-value
School	235	92.67	562	63.43	49.846	0.203	0.000*
School library	51	18.68	71	8.35	25.271	0.146	0.000*
Home	61	22.34	429	48.42	58.147	0.219	0.000*
Neighbor's/friend's home	38	13.91	286	32.27	34.931	0.171	0.000*
Cybercafé	52	19.04	331	37.36	31.627	0.163	0.000*
Computer coaching center	53	19.41	536	60.49	142.247	0.331	0.000*

Note: *$p < 0.001$

Table V. Methods of learning computer

Methods of learning	Rural ($n = 273$) Mean	SD	Urban ($n = 886$) Mean	SD	Both ($n = 1{,}159$) Mean	SD	F-value	Significance p-value
Self-taught	1.72	0.922	2.40	1.317	2.24	1.269	64.137	0.000**
Trial and error method	1.69	0.863	2.21	0.989	2.09	0.986	61.699	0.000**
With the help of school teacher	2.96	1.140	2.52	1.190	2.62	1.192	28.534	0.000**
With the help of parents	1.38	0.941	1.97	1.084	1.83	1.080	64.303	0.000**
Guidance by friends	1.60	0.947	2.10	0.984	1.98	0.998	55.326	0.000**
By reading computer books	1.71	1.022	2.22	1.104	2.10	1.106	45.756	0.000**
By computer training center	1.96	1.259	2.19	1.205	2.13	1.222	7.378	0.007*

Notes: *$p < 0.01$; **$p < 0.001$

by reading computer books (2.22) and trial and error method (2.21). Similarly, the majority of rural students learnt it by attending classes at computer training centers (1.96) followed by self-taught (1.72) and reading computer books (1.71). This clearly indicates that there is a significant difference in the opinion of the rural and urban students with respect to their methods of learning the computer.

To substantiate this, we employed one-way ANOVA to know the differences in their opinion among the rural and urban students with respect to their method of learning the computer. The data presented in table clearly indicate that there is a significant difference between the rural and urban students with respect to their familiarity with various applications of the computer.

6.5 Purpose of use of computer

Table VI shows the purpose of the use of the computer by the rural and urban student. It is very interesting to note that majority of rural students used computer to play computer games which is having highest mean score followed (2.98) by to see animals images (2.88) and watch games (2.72). Contrary to this, the majority of urban students used the computer for project works (3.24) followed by to play computer games (3.04) and class assignment (2.91). When we compared this data with rural students, the mean score is very less (1.88 for class assignments and 2.35 for project work). This clearly indicates that majority of rural students used the computer for non-academic works.

The result of one-way ANOVA grouped by the various purpose of use of computer clearly shows that there is a significant difference between the rural and urban students with respect to the purpose of use of computer except for two fields, namely, "to play games" and "to watch animal movies" where *p*-value is more than 0.05.

6.6 Frequency of use of computer

The present study has also made an attempt to find out the frequency of the use of computer by rural and urban students. It can be seen in Table VII that most of the rural students used computer two-three days in a week (40.66 percent) while 34.06 percent of students were occasional users. Only 4.76 percent of students used computer every day. Surprisingly, less percentage of urban students (29.11 percent) used computer two-three days per week and 25.5 percent of students used it once in a week. The differences in the frequency of use of computer clearly indicate that rural students used the computer more frequently than urban students. This shows that the rural students have more interest to use computer in spite of their inaccessibility to computer at their schools.

	Rural ($n = 273$)		Urban ($n = 886$)		Both ($n = 1,159$)			
Purpose	Mean	SD	Mean	SD	Mean	SD	*F*-value	Significance *p*-value
Class assignment	1.88	1.134	2.91	1.065	2.67	1.167	191.745	0.000**
Project work	2.35	1.251	3.24	0.962	3.03	1.105	155.928	0.000**
To use internet	2.07	1.206	2.82	1.115	2.65	1.181	91.828	0.000**
Play computer games	2.98	1.203	3.04	1.009	3.03	1.058	0.757	0.384
Watch games (cricket, football, tennis)	2.72	1.302	2.47	1.200	2.53	1.229	8.578	0.003*
Watch animation movies	2.58	1.346	2.45	1.181	2.48	1.222	2.138	0.144
See animal images	2.88	1.278	2.63	1.163	2.69	1.196	9.752	0.002*
Watch cartoons	2.66	1.263	2.30	1.229	2.39	1.245	16.807	0.000**

Notes: Insignificant comparisons are omitted. $^{*}p < 0.01$; $^{**}p < 0.001$,

Table VI. Purpose of use of computer

We employed χ^2 test to know the significant association between the frequency of use of computer and the social background of the students and it was found that there is a significant association between the frequency of use of computer and the social background of students ($\chi^2 = 37.008$, $c = 0.176$, $p = 0.000$).

6.7 Use of computer application

Table VIII shows the use of various computer applications by the rural and urban students. The majority of the rural students used "Paint" application which is having a highest mean score (3.61) followed by Notepad (3.10), WordPad (2.69) and MS-DOS (1.15). When we compared with urban students it was found that "Paint" was used more frequently (3.67) which is followed by MS-Word and Notepad (3.21). The results of the one-way ANOVA grouped by the field are presented in Table VIII. It shows that there is a significant association between rural and urban students except "Notepad ($p = 0.153$), Paint ($p = 0.299$) and DBMS ($p = 0.481$)."

6.8 Various problems faced in the use of computer

In order to examine the various problems faced by rural and urban students, a question was included in the questionnaire and the data are presented in Table IX. Not surprisingly, the majority of rural and urban students faced electric power failure (2.75 – rural students and 2.69 – urban students), lack of computer skills (2.39 rural students and 2.19 urban students) and inadequate computer (2.43 rural students and 2.12 urban students). Table IX also shows

Table VII. Frequency of use of computer

	Rural ($n = 273$)		Urban (886)				
Frequency	Frequency	Percentage	Frequency	Percentage	χ^2	Contingency coefficient	Significance p-value
Every day	13	4.76	75	8.46	37.008	0.176	0.000*
2-3 days in a week	111	40.66	258	29.11			
Once in a week	34	12.45	226	25.50			
Once in a month	22	8.06	104	11.73			
Occasionally	93	34.06	223	25.16			

Note: $*p < 0.000$

Table VIII. Use of various computer applications

	Rural ($n = 273$)		Urban ($n = 886$)		Both ($n = 1{,}159$)			
Applications	Mean	SD	Mean	SD	Mean	SD	F-value	Significance p-value
MS-DOS	1.15	0.515	1.76	1.049	1.62	0.985	87.133	0.000*
MS-Windows	2.01	1.235	2.72	1.245	2.55	1.278	67.921	0.000*
MS-Word	2.36	1.335	3.21	1.071	3.01	1.194	117.347	0.000*
MS-Excel	1.63	1.046	3.03	1.112	2.70	1.246	337.411	0.000*
MS-Power Point	1.78	1.136	2.98	1.184	2.70	1.278	217.882	0.000*
MS-Access	1.62	0.989	2.44	1.233	2.25	1.230	99.532	0.000*
Word pad	2.69	1.334	3.09	1.145	2.99	1.203	22.863	0.000*
Notepad	3.10	1.203	3.21	1.100	3.18	1.126	2.042	0.153
Paint	3.61	0.824	3.67	0.731	3.65	0.754	1.078	0.299
DBMS	1.35	0.870	1.39	0.841	1.38	0.848	0.497	0.481
Web Designing	1.18	0.595	1.50	0.937	1.42	0.879	27.794	0.000*
Programming	1.28	0.780	1.60	1.018	1.53	0.976	22.792	0.000*

Notes: Insignificant comparisons are omitted. $*p < 0.001$

that results of one-way ANOVA grouped by the sociological background of the students. The result shows that there is a significant association between faced by the students the problem and the social background only for the field "inadequate computer ($p = 0.000$) and lack of computer skills ($p = 0.009$)." Except for these two fields, most of the rural and urban students faced similar problems in the use of computer.

6.9 Reason for not using computer

The data presented in the previous table (Table III) clearly indicate that majority of rural students (79.33 percent) have not used the computer as compared to urban students (30.29 percent). To investigate further, a question was included in the survey questionnaire to elucidate the various reasons for not using computer by both rural and urban students. The data on reasons for not using the computer are presented in Table X. It shows that most of the rural students have not used computer, mainly because of non-availability of the computer at home, which is having a highest mean score of 3.52 followed by the non-availability of the computer at school (3.13). Lack of support from the teacher (2.36) and parents (2.14) was also reason for not using the computer by rural students.

The opinion of the urban students was also almost similar to the opinion of the rural students. The majority of the urban students opined that non-availability of computer at schools, which received the highest mean score of 3.62, followed by the non-availability of the computer at home (3.51) and lack of knowledge about the use of computer (2.30) main reasons for not using computer. The result of one-way ANOVA clearly shows that there is a significant difference in the opinion of rural and urban students with respect to the reasons for not using computer and social background of the students. There is no significant

	Rural ($n = 220$)		Urban ($n = 721$)		Both ($n = 941$)			
Problems	Mean	SD	Mean	SD	Mean	SD	F-value	Significance p-value
Electric power failure	2.75	1.053	2.69	1.001	2.70	1.014	0.467	0.495
Lack of computer skills	2.39	0.932	2.19	0.967	2.24	0.962	6.775	0.009*
Inadequate computers	2.43	1.126	2.12	1.119	2.19	1.128	12.729	0.000**
Lack of support from the teachers	1.94	1.265	1.95	1.180	1.95	1.199	0.005	0.945
Lack of support from the parents	1.81	1.159	1.90	1.111	1.88	1.123	1.178	0.278

Notes: Insignificant comparisons are omitted. *$p < 0.01$; **$p < 0.001$

Table IX. Various problems in the use of computer

	Rural ($n = 1,408$)		Urban ($n = 385$)		Both ($n = 1,433$)			
Reasons	Mean	SD	Mean	SD	Mean	SD	F-value	Significance
Do not know-how to use computer	2.23	1.124	2.49	1.123	2.30	1.129	15.497	0.000**
Non-availability of computer at school	3.13	1.352	3.62	0.953	3.26	1.276	42.648	0.000**
Do not have time to use computer	1.58	1.067	2.18	1.212	1.74	1.138	80.313	0.000**
Non-availability of computer at home	3.52	1.084	3.48	1.068	3.51	1.079	0.415	0.520
Available, but inconvenient to use in school	1.72	1.226	1.41	1.014	1.63	1.181	19.964	0.000**
Available at school, but must we should pay a fee	1.02	0.261	1.02	0.190	1.02	0.244	0.077	0.782
Lack of support from teachers	2.36	1.417	2.17	1.351	2.31	1.402	4.943	0.026*
Lack of support from parents	2.14	1.255	1.98	1.310	2.09	1.271	4.124	0.042*

Notes: Insignificant comparisons are omitted. *$p < 0.05$; **$p < 0.001$

Table X. Reasons for not using computer association between the reasons for not using computer and social background of the students only for the two fields, namely, "non-availability of the computer at home ($p = 0.52$) and "available at school, but must we pay a fee" ($p = 0.782$) where the p-value is more than 0.05. The data presented in the table show that reasons vary among the rural and urban students with respect their reasons for not using computer.

6.10 Testing of hypotheses

The formulated hypotheses were tested using various statistical techniques, namely, χ^2 and one-way ANOVA (Table XI). Table XI shows that all five hypotheses were accepted since the p-value less than 0.05.

7. Discussion and conclusion

The study found that most of the rural students used computer at schools, while comparatively less percentage of students used at home and at computer coaching center. This clearly indicates that most of the rural students were mainly depended on the computer available at schools since they do not have computer facilities at home. The use of the computer by urban students shows that majority of students used computer at school followed by coaching center and home. Only few of them used computer at the school library. The notable finding of the study was that majority of the rural and urban school students preferred to use computer at schools. It is also found that only few rural schools have computer facilities while majority 72.12 percent of urban schools have provided computer facilities at their schools. Thus, the government/management should provide more opportunities to use computers in rural schools.

Both rural and urban students learnt computer with the help of teachers followed by self-taught and by reading computer books. It is obvious that the students are highly depended on the teachers to learn computer. Contradictory to this, it was observed that majority of rural schools have no permanent teacher to teach computers at their schools. Therefore, the government should appoint computer teachers in rural and urban schools. It was also recommended that the government should conduct massive computer training program for teachers.

The majority of rural and urban students used MS-Office applications, that is, MS-Word, MS-Excel, MS-Power Point, etc. These applications should be taught in the rural and urban schools.

Another notable observation is both rural and urban school students faced electric power failure while using computer at schools. During our personal visit to various rural and urban schools, it is also observed that majority of rural, as well as urban schools, have no uninterrupted power supply (UPS) in the computer laboratories. The government/management

Sl. no	Hypotheses	Test applied	p-value and result
H1	There is an association between the use of computer and sociological background of the students	χ^2	$p < 0.000$ supported
H2	Place of use of computer differs among rural and urban students	One-way ANOVA	$p < 0.000$ supported
H3	The methods of learning computer differ among rural and urban students	One-way ANOVA	$p < 0.000$ supported
H4	The problems faced in the use of computer vary among rural and urban students	One-way ANOVA	$p < 0.000$ supported
H5	There is no association between reasons for not using computer and sociological background of the students	One-way ANOVA	$p < 0.000$ supported

Table XI.
Testing of hypotheses

should provide the UPS facility in the rural and urban schools for the use of computers by the students.

In few rural and urban schools, the computer laboratories are not properly maintained even though the government has given UPS facility. The school management and teachers are equally responsible for providing the computer education to students.

The majority of rural and urban students have not used computers because of non-availability computer at home and non-availability computer at school. They also opined that lack of support from teachers and parents are also reasons for not using computer. So school management, teachers, and parents should support to students to learn the computer.

The interesting result of the present study is that all students wished to use computer in their school and home, which shows that students had a high positive attitude toward computer use. The study also suggests that the parents should understand the expectations of their children and help them to learn computer applications.

Computers are very much needed by the rural and urban students not only for their studies, also to get information and updating the knowledge. In this context, the local government/school authorities should understand the needs and demands of the students and try their level best to provide the minimum ICT infrastructure. This will not only helps the students to learn computer but also helps to cope up with advancement in the field of ICT and also bridge the digital divide among the rural and urban students.

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