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Functional Status of ICT Tools and its Usage in Government Schools: A Rural-Urban Comparison in Telangana State, India

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ABSTRACT

The application of Information and Communication Technology (ICT) has been rapidly increasing in all the sectors including the education system. There is deliberate need of technology integration in school education for new emerging societies to facilitate significant learning needs for holistic development. The main objective of this paper is assessing the availability and functional Information and Communication Technology (ICT) tools in government schools in rural and urban areas. This study has collected primary data from 72 government secondary schools in Warangal Rural and Urban districts of Telangana State. The data reveals that of the total sample schools 43 percent schools are not using computers and chi-square test results ($p>0.05$) shows that there is no significant difference between rural and urban schools. Also, regarding other functional ICT devices like projectors, K-YANs, printers, television, UPS it is found that there is no significant difference between the schools of rural and urban area. Overall, it is very disheartening to found that more than four-fifth (80 percent) schools had very poor performance in using ICT tools for teaching and learning.

Keywords: Education, facilities, government schools, rural, technology, urban

New trends in societal growth and economic creation are increasingly influenced by knowledge and information. For future educational growth it is essential to use computers and the

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internet. The adoption of ICTs in education is crucial to the creation of a new society (UNESCO IITE, 2004). The new generations should equip with the 21st century skills and knowledge to compete with global society and sustain them in attaining job.

ICT can empower teachers and learners which brings substantial contributions to learning out comes and achievement. ICT transforms education from being institution-centric to learner-centric, from being primarily classroom-based to being always linked via wifi and e-learning. ICT will make everyone to utilise the time, content and space in flexible mode (S Shamsu, 2012). The use of ICT will soon become dynamic force for purposeful, constructivism and inclusive student management (Madden D C, 2014). Having access to the web-based educational tools and use of computer had brought changes among the student community in three essential areas like research, assessment and collaboration. Further, changes were seen in the student learning environment holistically contributes more classroom engagement, behaviour and interactions (Light, D., & Pierson, E., 2014). Australian schools found that with the usage of ICT in schools through an organization and design-based pedagogy there was high student engagement and learning in the classroom (Gorris H.A., Sellings, P. & Echter, A., 2021).

In India, Educational Technology (ET) Scheme was started during IV Five Year Plan in 1972. Under this scheme, six State Institutes of Educational Technology (SIET) were given 100% assistance and the States/Union Territories were assisted for procurement of ICT devices like colour televisions (TVs), radios and cassette players. Later, knowing the importance of ICT in education system the central government has initiated a pilot project 'Computer Literacy and Studies in Schools' (CLASS) in 1984-85. Further this project was approved as a Centrally Sponsored Scheme in 1993-98 during VIII Five Year Plan. An IT task force – National Task Force on Information Technology and Software Development in 1998 had made precise recommendations to impart IT in the education system including schools and specified that about 1 to 3 percent of the total budget has to be spent on the procurement of computers in all the secondary and higher secondary educational institutions for the next five years (Government of India, 2011). After many reviews and pilot projects, the central government has launched the ICT@Schools in December, 2004 and it was revised in 2010 with the aim of provision of ICT infrasturucture in all the secondary schools, facilitate the computer aided learning process and to enhance the ICT skills among students (CLix, 2017).

Under this scheme the all the States were encouraged for setting up the programme through a BOOT model where the ICT infrastructure was made available by the supplier for the duration of five years contract period initially. The scheme made provision to State/UT governments to partner with other private organisations or integrate it with other similar schemes for execution of the ICT@Schools scheme which includes maintenance (Government of India, 2011). Now the scheme was not in active mode but central and state governments are implementing various schemes/strategies on ICT usage in school education system.

Concepts and Definitions

Information and Communication Technology (ICT): The word ICT is used in different contexts and has various connotations. For educational purpose Information and Communication Technologies is defined as the information that can be store, create and transmit though a set of various technological devices and resources. These devices and resources include hard wares, computers, radio, television, internet (e-mails, websites) any other live and recorded broadcasting technologies (UNESCO, 2009).

Government Schools: These are the schools that are run by the central or state governments, or any other accredited body which was recognised as per the constitution of India like municipality, gram panchayat, etc., which are completely financed by the government are considered as Government Schools.

Private-unaided Schools: Private-unaided schools are those which are managed by any person or a private organisation and will not receive any grant from the Government.

Secondary Schools: Secondary schools refer to students who are studying in the classes from I to X.

K-Yan: K-Yan is a multipurpose digital teaching-learning device, which integrates the capability of a high-end computer, an ultra-large screen television & a projector preloaded with curriculum-based multimedia teaching aids.

Research Methodology

In this study, the researcher used both secondary and primary data to analyse the ICT infrastructure facilities in the government schools. The study selected 72 government secondary schools randomly from each block of Warangal Rural (39 schools) and Warangal Urban (33 schools) districts of Telangana State in India. The primary data has been collected in 72 government secondary schools using a self-report structured questionnaire. The questionnaire has been administered to the sample secondary schools where Head Masters / Miss of the schools are reported. Questionnaire was prepared in Telugu (local) language for easy understandable to respondents. The school ICT infrastructure information like available and functional monitors, CPUs, digital class room, projectors, K-YANs, printers, televisions, teaching staff, ICT trainings attended, etc. were collected.

For analysing the rural-urban difference in having computers at various school managements, secondary data from Unified District Information System for Education (UDISE+) 2020-21 data have been used. For effective school education management information system the Department of School Education and Literacy has initiated the UDISE during 2012-13 by integrating the earlier DISE and MIS. Every year the school level data were sent manually by the respective school head masters where it covers all the information of school education

system related to school infrastructure, teachers and students enrolment details. Later in 2018-19, the Department of School Education Literacy (DoSEL) has launched UDISE+ system which is an upgraded version of UDISE with several unique features.

RESULTS

1. Rural-Urban Disparity of Computer Availability in Indian and Telangana Schools:

Table 1: Area-wise number and percentage of schools with computer facility in India

Area	School Management	Total No. of Schools	No. of schools with computer facility	% of schools with computer facility
Rural	Government schools	1022732	330302	**32.3**
	Private Unaided (Recognized) schools	211407	118977	**56.3**
	Total -Rural	**1234139**	**449279**	**36.4**
Urban	Government schools	113225	61221	**54.1**
	Private Unaided (Recognized) schools	129346	99235	**76.7**
	Total -Urban	**242571**	**160456**	**66.1**
Total	Government schools	1135957	391523	**34.5**
	Private Unaided (Recognized) schools	340753	218212	**64.0**
	Grand Total	**1476710**	**609735**	**41.3**

Source: *UDISE + (2020-21); Note: unorganised schools data is not included.*

The table 1 shows that, of the total 14,76,710 schools less than half of the schools (41.3 percent) are only having computer availability. Of which only little more than one-third (34.5 percent) of the government schools are having the computer facility compared to 64 percent of private recognised schools. In comparison to rural-urban, there is wide gap of 21.8 percent where in rural area only 32.3 percent government schools are having computer availability compared to 54.1 percent in urban area. It is similar for private school managements with 56.3 percent in rural private schools compared to 76.7 percent in urban private schools. Overall, it is found that there is a huge gap of 30 percent between rural and urban schools with respect to computer availability.

Table 2: Area-wise number and percentage of schools with computer facility in Telangana

Area	School Management	Total No. of Schools	No. of schools with computer facility	% of schools with computer facility
Rural	Government schools	25265	5736	22.7
	Private Unaided (Recognized) schools	3268	2000	61.2
	Total -Rural	**28533**	**7736**	**27.1**
Urban	Government schools	5450	1979	36.3
	Private Unaided (Recognized) schools	8755	6696	76.5
	Total -Urban	**14205**	**8675**	**61.1**
Total	Government schools	30715	7715	25.1
	Private Unaided (Recognized) schools	12023	8696	72.3
	Grand Total	**42738**	**16411**	**38.4**

Source: *UDISE + (2020-21); Note: unorganised schools data is not included.*

The table 2 represents the school management and rural-urban wise schools having computer availability in Telangana State. It is found that Telangana State is having very low with 38.4 percent compared to the national percentage (41.3 percent) regarding schools having computer facility. While comparing rural and urban schools there is 34 percent of huge rural-urban divide in Telangana. Regarding government schools, it is found that only 22.7 percent schools in rural areas are equipped with computers compared to 36.3 percent schools in urban area. It indicates that not even one-fourth of the government schools in rural areas are having computers. For private schools also there is 15 percent rural-urban divide, where 61.2 percent schools in rural areas are having computer availability compared to 76.5 percent schools of urban areas. Overall, the data shows that in majority of the government schools the computer facilities are not available in both rural and urban areas compared to private schools.

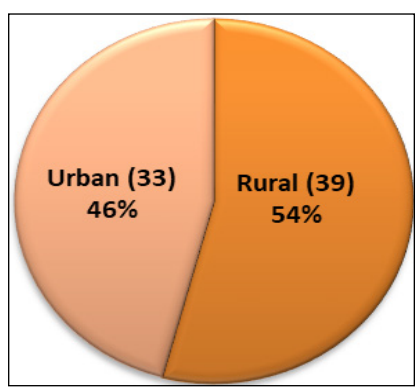

Fig. 1: Rural and urban wise percentage of sample schools selected for the study

2. Rural-Urban Disparity in Functional ICT Tools in Sample Secondary Schools

The Fig. 1 represents the data pertaining to the area-wise schools selected and studied. A total of 72 government secondary schools have been studied in Warangal Rural and Warangal Urban districts. Of these 39 schools belongs to rural area i.e. Warangal Rural district constituting 54

percent of total schools. About 46 percent i.e. 33 schools are from urban area which are located in Warangal Urban district.

(a) Status of ICT Facilities in Sample Government Secondary Schools:

An attempt has been made to know status of ICT infrastructure facilities in the government secondary schools. For this, information regarding availability and functioning of monitors, desktops, projectors, K-YANs, printers and other major ICT infrastructure details were collected from the sample 72 secondary government schools. It is observed that in all (100 percent) the sample secondary government schools the ICT infrastructure facilities were provided by the Government initially from 2004 onwards gradually.

Table 3: Sample schools having computers & CPU's initially

Sl. No.	Item	Availability (no's)	No. of sample schools	Percent (%)
1	Monitors	11	72	100.00
2	CPUs	2	72	100.00
3	Computer Tables	11	72	100.00

The provision of ICT facilities in government secondary schools were started during 2004 in the united Andhra Pradesh under ICT@Scheme of Central Government on pilot basis. Initially the schools were provided 10 monitors with 2 CPU's along with 10 computer tables in boot-model. Later, this provision of ICT facilities was extended to all the secondary government schools in Telangana State.

Monitors in Schools

Table 4: Sample schools with functional monitors

Sl. No.	Area	No. of functional monitors				Total Schools
		0	1 to 5	6 to 10	11	
1	Rural Schools	17 (43.6)	16 (41.0)	4 (10.4)	2 (5.1)	39 (100.0)
2	Urban Schools	14 (42.4)	13 (39.5)	3 (9.1)	3 (9.1)	33 (100.0)
Total Schools		**31 (43.1)**	**29 (40.3)**	7 (9.8)	5 (6.9)	72 (100.0)

From table 4, the data shows that out of total 72 schools in majority of the schools (43 percent) not even one monitor was in working condition. Among these, it is seen similar in both sample rural and urban schools with 43.6 percent and 42.4 percent. Similarly not much variation is found between rural (41 percent) and urban (40 percent) sample schools having 1 to 5 functional monitors Of the total sample schools, only 40 percent (29 schools) schools are having 1 to 5 functional monitors. Only 5 percent schools reported that all the monitors that

are provided initially are in working condition. In these, there is small rural-urban variation can be seen where 5 percent and 9 percent of sample rural and urban schools are having all functional monitors respectively.

Table 5: Anova test for rural and urban school difference in functional monitors

Particular	N	Mean	Std. Deviation	95% Confidence Interval for Mean		F	Sig. (two-tailed)
				Lower Bound	Upper Bound		
Rural	39	1.871795	3.278153	0.809	2.934	0.573	0.452
Urban	33	2.484848	3.589231	1.212	3.758		
Total	**72**	**2.152778**	**3.413559**	**1.351**	**2.955**		

Significance level at 0.05.

One-way anova test has been conducted to analyse whether there is any difference between rural and urban sample schools having functional monitors. The table 5 shows that the mean value of sample schools having functional monitors in rural and urban areas is 1.87 and 2.48 respectively. The significant p value is 0.452 which is greater than the significance level 0.05 at 95% confidence interval. This indicates that there is no statistical significant difference between the rural and urban schools in having functional monitors.

CPUs in Schools

Table 6: Percentage of sample schools with functional CPUs

Sl. No.	Area	No. of functional CPUs			Total
		0	1	2	
1	Rural Schools	17 (43.6)	14 (35.9)	8 (20.5)	39 (100.0)
2	Urban Schools	14 (42.4)	10 (30.3)	9 (27.3)	33 (100.0)
Total Schools		**31 (43.1)**	**24 (33.3)**	**17 (23.6)**	**72 (100.0)**

Regarding functional Control Processing Units (CPUs) in the sample schools, similar findings can be seen from the table 6 where in majority of the schools (43 percent) not even one CPU is working. Also, in rural and urban sample schools it is 43.6 and 43.4 percent schools respectively with small variation. Two-third schools (33.3 percent) reported that one CPU was in working condition. There is 6 percent variation in rural-urban schools having one functional CPU. Of the total schools, low percentage (23.6 percent) schools are having all the functional CPUs. There is six percent variation between rural (21 percent) and urban (27 percent) sample schools which are having all functional CPUs.

Table 7: Anova test for rural and urban school difference in functional CPUs

Particular	N	Mean	Std. Deviation	95% Confidence Interval for Mean		F	Sig. (two-tailed)
				Lower Bound	Upper Bound		
Rural	39	0.77	0.777	0.52	1.02	0.174	0.678
Urban	33	0.85	0.834	0.55	1.14		
Total	**72**	**0.81**	**0.799**	**0.62**	**0.99**		

Significance level at 0.05.

The table 7 shows that the mean value of sample schools having functional CPUs in rural and urban areas is 0.77 and 0.85 respectively. The significant p value is 0.678 which is greater than the significance level 0.05 at 95% confidence interval. This indicates that there is no statistical significant difference between the rural and urban schools in having functional CPUs.

Other ICT facilities in Schools

Table 8: Percentage distribution of schools with various functional ICT devices in sample schools

Sl. No.	ICT devices (functional)	Rural schools	Urban schools	Total schools
1	Projectors	19 (48.7)	12 (36.4)	31 (43.1)
2	K-YANs	22 (56.4)	25 (75.8)	47 (65.3)
3	Television	13 (33.4)	14 (42.5)	27 (37.7)
4	Printers	29 (74.5)	23 (69.7)	52 (72.6)
5	UPS	12 (30.8)	9 (27.3)	21 (29.4)
6	Access to electricity	39 (100.0)	33 (100.0)	72 (100.0)

The above table 8 represents the various functional ICT facilities in the sample secondary government schools. It is found that of the total sample schools, the functional projectors are there in 43 percent schools. These functional projectors are high (49 percent) in schools of rural area compared to schools of urban area with 36 percent. Regarding K-YANs, it is found that in majority (65.3 percent) of the schools K-YANs are working. Further, rural-urban variation can be seen where 56 percent and 76 percent schools in rural and urban area respectively have functional K-YANs. Televisions were provided to the all schools decades' back, when it was enquired in sample schools only 38 percent of the schools have functional televisions. The functional televisions are more in schools of urban area with 42.5 percent compared to schools of rural area with 33.4 percent. UPS – Uninterrupted Power Supply devices are working only in 30 percent of the sample secondary government schools and it is 31 percent in rural

area schools compared to 27 percent of urban area schools. It is very interesting to found that electricity facility is there in all (100.0 percent) the schools of both rural and urban areas

3. Rural-Urban differences in Usage of Computers in Schools

Table 9: Percentage of sample schools using computers at present

Sl. No.	Area	Schools using computer at present		Total	Chi-square value	df	Asymp. Sig. (2-tailed)
		Yes	No				
1	Rural Schools	22 (56.4)	17 (43.6)	39 (100.0)	0.010	1	0.921
2	Urban Schools	19 (57.6)	14 (42.4)	33 (100.0)			
Total Schools		**41 (56.9)**	**31 (43.1)**	**72 (100.0)**			

Significance level at 0.05.

Sample government school head masters were asked to mention their status of using computer in their school. The table 9 shows that majority of the schools (56.9 percent) are using computers and there is very small variation in rural (56.4 percent) and urban (57.6) schools that are using computers. On applying chi square test, it is found that p value is 0.921 which is greater than the significance value 0.05 at 95% confidence interval. It indicates that there is no statistical significant difference between rural and urban schools in using computers.

Purpose of using computers

Table 10: Responses of sample schools on the purpose of using computers

Sl. No.	Purpose of using computers	Rural Schools	Urban Schools	Total
1	Administration	15 (68.2)	8 (42.1)	23 (56.1)
2	Teaching	2 (9.1)	1 (5.26)	3 (7.3)
3	Teaching & Administration	5 (22.7)	5 (26.3)	10 (24.4)
4	Teaching & Learning for students	0 (0.0)	5 (26.3)	5 (12.2)
	Total	**22 (100.0)**	**19 (100.0)**	**41 (100.0)**

In continuance to the above, the schools which are using computers were asked to mention their purpose of using computers. The table 10 shows that out of total 41 schools more than half of the schools (56 percent) reported that they are using the computer for administration purpose. It is seen high in rural area schools (68 percent) compared to urban area schools (42 percent). Nearly one-fifth (24.4 percent) schools are using computers for teaching and administration purpose. In this, the urban area schools (26 percent) are little high in number compared to rural area schools (23 percent). It is very disheartening to found that for the

purpose of teaching and students to learn computer skills, none of the schools in rural area are using while it is 26 percent schools in urban area. Exclusively for the purpose of teaching, it is found that there are 9 percent schools in rural area and 5 percent schools in urban area.

Reasons for not working Computers

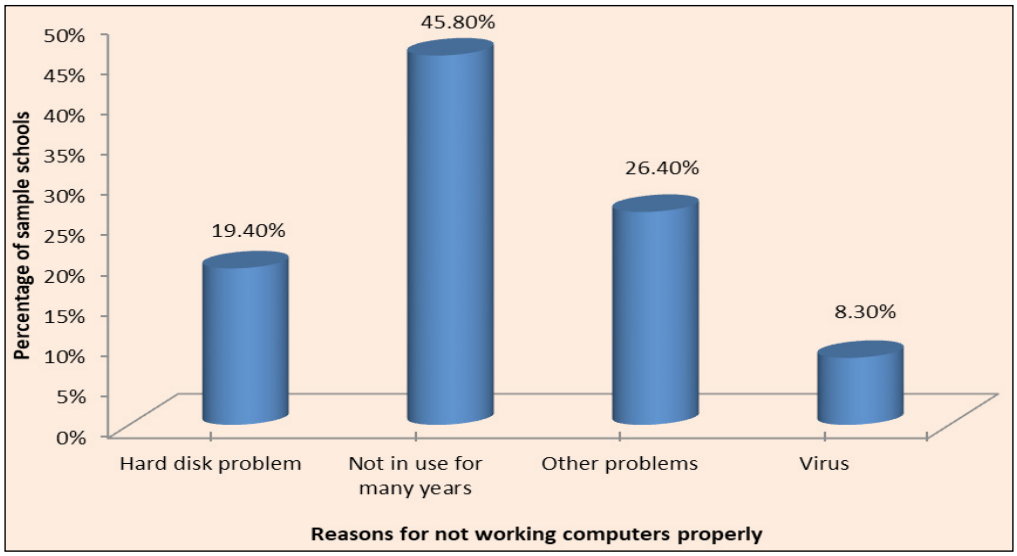

Fig. 2: Responses of sample schools on the reasons for not working computers properly

Responses have been collected from the sample schools to know about the reasons for not working computers. The Fig. 2 depicts that 46 percent of the schools reported that the computers are not in use for many years was the main reason for not working properly. More than one-fifth (26 percent) schools reported that there are other problems like poor maintenance, no computer instructor, theft of the CPUs/monitors, etc. Nearly 20 percent schools said that due to hard disk problem the computers are not working properly. Lastly, 8 percent schools reported that virus is one of the reasons.

4. Schools with Digital Class and its preference in School Time Table

The Fig. 3 represents the area wise percentage of sample secondary government schools having digital class room facility. Here, the digital class room facility meant that separate class room with digital devices for teaching and learning was generally available to students, regardless of whether it was actually used. From the graph it is found that there is only three percent variation between rural and urban areas. In urban area the digital class room facility is there in little more than two-third (67 percent) of government secondary schools. In rural areas,

little less than two-third (64 percent) of the schools are having digital class facility. Overall about 65 percent of the schools are having digital class room facility.

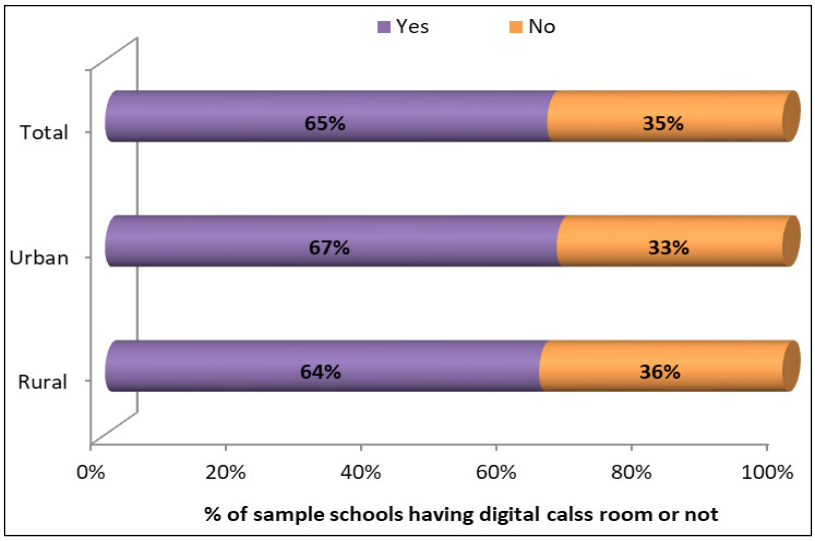

Fig. 3: Rural-Urban wise percentage distribution of schools with digital class room

Table 11: Rural-Urban wise percentage distribution of schools with digital class in their school time table

Sl. No.	Area	Schools with digital class in time table		Total	Chi-square value	df	Asymp. Sig. (2-tailed)
		Yes	No				
1	Rural Schools	10 (25.6)	29 (74.4)	39 (100.0)	0.512	1	0.474
2	Urban Schools	11 (33.3)	22 (66.7)	33 (100.0)			
Total Schools		**21 (29.2)**	**51 (70.8)**	**72 (100.0)**			

Significance level at 0.05.

Though the availability of digital classes are there in 65 percent of sample schools the inclusion of digital class in their school time table in prime most important. An enquiry has been made on this, the table 11 visualise the data of sample government secondary schools whether time period was mentioned for digital class in their school time table or not. It is to found that majority of the schools in rural (74 percent) and urban (67 percent) reported that they had not included the digital class in their school time table. Of the total sample schools, less than one-third (29 percent) of the schools reported that they mentioned particular time for digital classes in their school time table.

5. Teachers received ICT training and having Basic Computer Skills

Head of the sample schools were asked about the details pertaining to the number of teachers who received training in ICT and the number of teachers know using computer with basic skills.

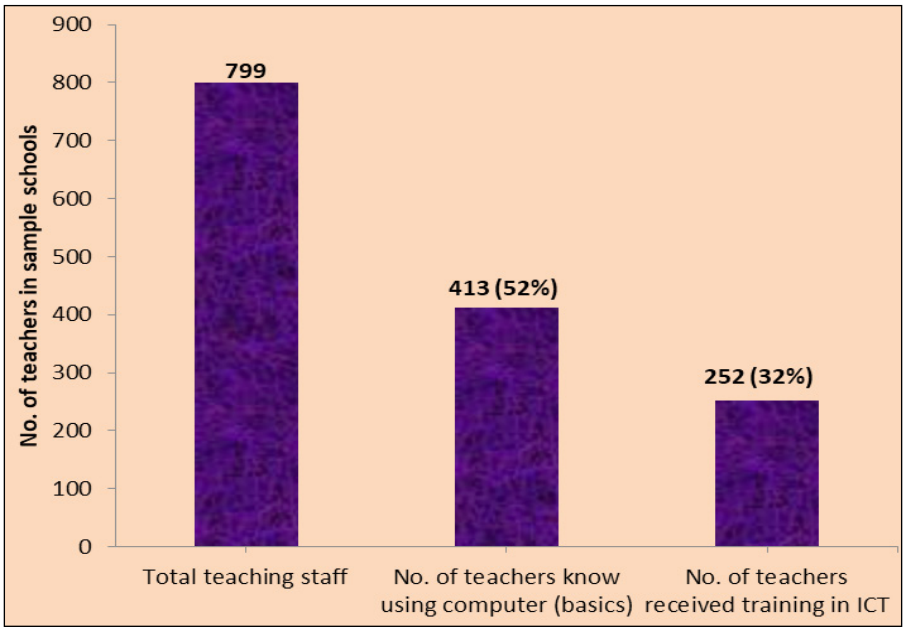

Fig. 4: Percentage of teachers with computer skills and received training in ICT

From the Fig. 4, it is found that there are total 799 teaching staffs in the sample schools. Of which, little more than half of the teachers (52 percent) know using computer with basic skills and only 32 percent teachers had received training in ICT.

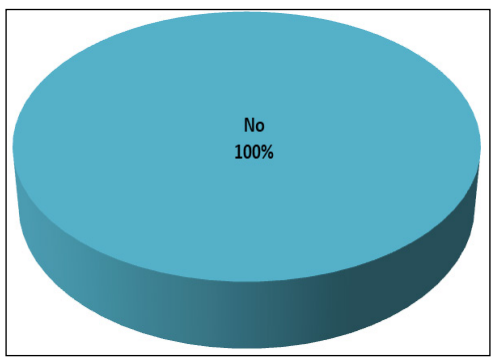

Fig. 5: Percentage of sample schools having computer instructor

The above Fig. 5 represents the availability of computer instructor in the selected government secondary schools. It is very disheartening to found that none of the schools are having computer instructor in both rural and urban district schools. Most of the schools opined that absence of computer instructor in the school was the major reason for poor maintenance of ICT infrastructure and has weakened the usage of ICT tools for teaching and learning in the schools.

6. Performance of the Sample Schools in Using ICT Tools

A self-assessment on the usage of ICT tools for teaching and learning in the schools has been made where the Head Masters were asked to give rating (1 – excellent to 6 – not at all using) to their school. The details of the ratings given to the sample schools were mentioned below:

Table 12: Responses of sample schools rating on usage of ICT tools for teaching and learning

Sl. No.	Rating	Rural schools	Urban schools	Total schools	Chi-square value	df	Asymp. Sig. (2-tailed)
1	Excellent	1 (2.6)	1 (3.0)	2 (2.8)	1.588	5	0.903
2	Very good	2 (5.1)	3 (9.1)	5 (6.9)			
3	Better	3 (7.7)	2 (6.1)	5 (6.9)			
4	Poor	13 (33.3)	8 (24.2)	21 (30.6)			
5	Very poor	12 (30.8)	12 (36.4)	24 (33.3)			
6	Not at all using	7 (17.9)	8 (24.2)	15 (20.8)			
Total		**39 (100.0)**	**33 (100.0)**	**72 (100.0)**			

Significance level at 0.05.

From the table 12, data reveals that out of total sample schools one-third (33.3 percent) schools were given 5 rating and in which 31 present schools are in rural area and 36.4 percent schools are in urban area. It indicates that very poor usage of ICT tools was there in majority of the schools for teaching and learning. This was followed by little less than one –third (31 percent) schools which got 4 rating indicate their usage of ICT tools for teaching and learning is poor. In this poor rating category, rural area schools are 33.3 percent and 24.2 percent are urban area schools. Nearly one-fifth (20.8 percent) schools were given 6 rating indicates not at all using ICT devices for teaching and learning. In this, 18 percent and 24 percent schools are in rural and urban area respectively. Very few schools with less than one-tenth (6.9 percent) have got two rating (very good) and three rating (better) on usage of ICT tools. Only two schools (3 percent) are using ICT tools excellently for teaching and learning. Overall, it is very disheartening to see that more than four-fifth (80 percent) schools had very poor performance in using ICT tools for teaching and learning. On performing the Chi-square test, the result

shows that there is no statistical significant difference between the rural and urban area schools on their usage of ICT tools for teaching and learning.

CONCLUSION

In India, about 16.2 crore (64 percent) students of class I-X are studying in 11,35,957 government schools. But only one-third (34.1 percent) government schools are having computer facility. Whereas, in Telangana State it is very low, as not even one-fourth of government schools (22 percent) are having computer availability. In India, only one-third (33.6 percent) persons of age group 15-59 years are able to operate a computer and it was 12.6 percent in rural and 38 percent in urban areas of India (NSSO 2018). Though India has highest ever adolescent and youth population in the world, majority of them are not having basic computer skills. There was no data available regarding the availability and functional status of ICT infrastructure facilities in the government schools. This study has made an attempt to assess the status of ICT tools in 72 government secondary schools. It was found that in vast majority (75 percent) of the schools where ICT infrastructure facilities are provided are now not using computers for teaching and learning. Nearly in 43 percent sample schools the computers are not in working condition, when it was enquired the heads of the schools reported that computers are not in use for many years as there was no computer operator/in-charge in the schools. Also, the schools reported that nearly half of the teachers (48 percent) don't know how to operate computer and so far, only less than one-third (32 percent) teachers had received training in ICT which was held by the government. There are various policy guidelines and frameworks at international and national level on the importance of ICT usage in school education. But, the governments are deliberately neglecting in allocation of budget for ICT infrastructure, its usage and maintenance in government schools. With a pragmatic approach the central and state governments should effectively use the ICTs in schools education by providing abundant budget for ICT infrastructure, man power, training to teachers, content and maintenance to enhance the school students' abilities in ICT and improving the teaching and learning process.

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