CLI CONNECTED LEARNING INITIATIVE

Report on

- Status of Secondary Education in Rajasthan
- Technology Readiness for CLIx Intervention in Rajasthan
- CLIx in Rajasthan

An Initiative seeded by

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Massachusetts Institute of Technology

CLIx (2017)

TISS/CEI&AR/CLIx/RP1(RJ)/10 March '17

The Connected Learning Initiative (CLIx) is a technology enabled initiative at scale for high school students. The initiative was seeded by Tata Trusts, Mumbai with Tata Institute of Social Sciences, Mumbai and Massachusetts Institute of Technology, Cambridge, as founding partners.

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ABBREVIATIONS

CLIx	Connected Learning Initiative
DISE	District Information System for Education
GAR	Gross Access Ratio
GER	Gross Enrolment Ratio
HDI	Human Development Index
ICT	Information and Communication Technology
MHRD	Ministry of Human Resources Development
MRP	Maximum Retail Price
RBI	Reserve Bank of India
RMSA	Rashtriya Madhyamik Shiksha Abhiyan
SCERT	State Council of Educational Research and Training
SSA	Sarva Shiksha Abhiyan

PREFACE

The Connected Learning Initiative (CLIx) is the outcome of a collaboration between Tata Trusts (India), Tata Institute of Social Sciences (TISS, Mumbai, India) and Massachusetts Institute of Technology (MIT, Cambridge, Mass., USA). CLIx aims to provide high school students from under-served regions opportunities for participation in quality education through meaningful integration of technology. CLIx is geared to provide engaging, hands-on learning experiences in Mathematics, Science, Communicative English and Digital Literacy, integrated with value education and skills relevant to the 21st century.

As a platform for innovation in education, CLIx also supports the professional development of teachers, making substantial contributions to teacher education in Indian languages. Research activities and collaborations aim to nurture a pool of professionals from the fields of education, technology and science. Supported by an interconnected network of partners, institutions, public education systems, teachers and learning resources, CLIx is developing a scalable and sustainable model of education, providing students with technology enabled opportunities of deep and authentic learning. In the first phase, these resources are being offered to students and teachers of government secondary schools in the four Indian states of Chhattisgarh, Mizoram, Rajasthan and Telangana, in Hindi, English and Telugu.

Challenges facing students from rural areas who manage to reach high school tend to include weak foundation laid in primary years, unavailability of resources in their own languages, isolation, poor access to learning opportunities and lack of qualified teachers, particularly in Maths, Science, and English. In this context, CLIx addresses both curriculum content and pedagogical approaches to work with students and teachers to deliver quality solutions at scale. CLIx aims to reach approximately 1,000 schools and 150,000 students in four states during 2015-2017. With an eye on capacity building, Teacher Professional Development (TPD) courses for approximately 2,700 teachers are to be conducted during the same period.

Successful implementation of the project could pave the way for expansion, not only in terms of schools, but also in terms of states covered, subjects and age-groups. The future would lie in the replication of the model throughout the country. The two main aspects that are at the core of the CLIx implementation approach are integration of technology and an ecosystem approach for sustainability. Through this, we envision processes whereby communities build and share knowledge with each other. Capacity building of high school students, student-teachers, teachers and teacher educators are an integral part of the sustainability plan. CLIx has partnered with locally invested institutions and groups to utilize their experience and existing resources in optimal ways.

Technology is an integral part of CLIx and it is being thoughtfully used to design the curricular offerings (modules/courses). For most components of the CLIx offerings, Information and Communications Technology (ICT) infrastructure is essential. Most government high schools and higher secondary schools have received such infrastructure through the ICT@Schools scheme, now merged with Rashtriya Madhyamik Shiksha Abhiyan (RMSA) of the Government of India. CLIx is

using the existing infrastructure, wherever feasible, and trying to build on it, as needed, through support from state governments and other agencies. CLIx platform and offerings are designed to take advantage of technological advancements opening up in future.

This document is divided into three parts. The first part provides a brief account of the status of secondary education in the state of Rajasthan and presents the recent trends in enrolments, equity, quality, efficiency and financing of secondary education in the state. It is based on data collected from various secondary sources and can serve as a useful reference to understanding the context in which CLIx is being implemented. The second part of this document presents how CLIx has helped build technology readiness in the intervention schools so that the schools are prepared to implement the programmes. The third part of this document presents the status of implementation of CLIx in Rajasthan, particularly the roll out of student modules and teacher professional development. It also summarises the main challenges in implementation and makes recommendations for future action.

Status of Secondary Education in Rajasthan

I. Status of Secondary Education in Rajasthan

1. Introduction

Education is the strongest tool for attaining sustainable development in any country. While primary education acts as the basic enabling factor for participation, freedom and overcoming of basic deprivation, secondary education facilitates economic development and establishment of social justice. Over the years, liberalisation and globalisation have led to rapid changes in the scientific and technological world and have prompted the general needs of an improved quality of life and reduced poverty. This undoubtedly necessitates those completing high schools to acquire higher levels of knowledge and skills than what they are imparted with throughout the school years. Secondary education empowers children by preparing them for higher education and also for the world of work. Secondary education, as part of the virtuous circle of growth and development, not only serves as an important transition from primary to higher education but provides key generic competencies to individuals, which prove important across all domains of knowledge. It provides skills for early employment and the foundation for further education. Thus, secondary education is a vital part of a virtuous circle of economic growth within the context of a globalised knowledge economy. According to UNESCO, expanding secondary schooling is "a minimum entitlement for equipping youth with the knowledge and skills they need to secure decent livelihoods in today's globalised world". Secondary education also helps build social capital by raising the likelihood that citizens will participate in democratic institutions and will join community organizations and engage in politics.

About Rajasthan

Rajasthan, a north-western Indian state, is the largest state in the country by area, with the city of Jaipur as its capital. Rajasthan has 33 districts which are grouped into seven divisions for administrative purposes. Rajasthan's economy is primarily agricultural and pastoral.

Total population of Rajasthan as per 2011 census is 6,85,48,437 with rural areas comprising 75% and urban areas comprising 25% of the population. The total sex ratio (no of females per 1000 males] is 928 (933 in urban and 914 in rural areas). Rajasthan has a literacy rate of 67% as per the 2011 Census data, which is below the national average. The female literacy rate in the state which is 52.12%, is the lowest in the country while the male literacy rate is 79.19 %.

Table 1 : Percentage of Population below Poverty Line

Year	Rajasthan	India
2004-05(Based on MRP Consumption)	34.40	37.20
2009-10(Based on MRP Consumption)	24.80	29.80
2011-12(Based on MRP Consumption)	14.71	21.92

Source: Reserve Bank of India, 2016. Table 1 shows that the percentage of population below the poverty line has decreased from 2004 to 2012 in India. In Rajasthan, there is an approximately 10% decrease in the percentage of population below the poverty line every five years from 2004 to 2012.

2. Secondary Education in Rajasthan

This section provides an overview of secondary education in the state of Rajasthan in terms of number of secondary schools, distribution of schools in rural and urban areas, district-wise availability of secondary schools, enrolment by gender and social group, teacher parameters and so on. The data of last four years i.e., from 2012-13 to 2015-16 is used to study the trend, but in some cases the latest data was not available.

2.1. Access to secondary education

Table 2 : Number of Secondary Schools

Year	Number of secondary schools
2012-13	24354
2013-14	27291 (12.05%)
2014-15	27681 (1.42%)
2015-16	28195 (1.85%)

Source: Compiled from U-DISE Flash statistics for respective years.

As shown in Table 2, the number of secondary schools in the state has increased from 24354 in 2012-13 to 28195 in 2015-2016. There was a significant increase of 12.05% in the number of secondary schools between 2012-13 and 2013-14.

Table 3: Percentage of Schools Established since 2012

2012-13	2013-14	2014-15	2015-16
7.03	8.39	8.93	9.75

Source: Compiled from U-DISE Flash statistics for respective years

The Table 3 shows the percentage of schools established since 2012. The construction work of all the 114 new schools approved in 2015-16 is in progress and it is likely to be completed by February, 2017.

Table 4 : Number of Secondary Schools in Rural and Urban Areas

Year	Number of Secondary Schools in Rural Areas	Number of Secondary Schools in Urban Areas	Total
2012-13	17909	6445	24354
2013-14	20237	7054	27291
2014-15	20491	7190	27681
2015-16	20853	7342	28195

Source: Compiled from U-DISE Flash statistics for respective years and author's calculation based on unpublished U-DISE raw data.

The Table 4 shows the number of secondary schools by their location (rural or urban). There are more number of secondary schools in rural areas than in urban areas. The increase in number of secondary schools every year from 2012 to 2016 is found to be more in rural compared to urban areas.

The Table 5 shows the district-wise availability of secondary schools in Rajasthan.

Table 5 : District-Wise Availability of Secondary Schools

District	2011-12	2012-13	2013-14	2014-15
Ajmer	436	451	823	862
Alwar	1015	866	1743	1759
Banswara	317	245	510	514
Baran	333	259	524	523
Barmer	427	457	719	731
Bharatpur	672	533	1119	1151
Bhilwara	407	378	666	685
Bikaner	440	423	719	732
Bundi	262	258	441	453
Chittorgarh	305	260	505	519
Chruru	535	511	982	986
Dausa	440	393	795	805
Dhaulpur	293	218	477	478
Dungrapur	220	163	379	393
Ganganagar	513	413	930	926
Hanumagarh	523	395	883	884
Jaipur	1561	1407	3327	3391
Jaisalmer	141	134	208	217
Jalor	318	297	525	534
Jhalawar	309	272	460	459
Jhunjhunun	658	444	1295	1296
Jodhpur	637	478	1143	1188
Karauli	413	384	607	634
Kota	464	397	845	840
Nagaur	757	784	1421	1426
Pali	417	397	673	678
Pratapgarh(Raj)	154	159	231	241
Rajsamand	221	175	369	383
Sawai Madhopur	367	244	638	662
Sikar	858	660	1577	1579
Sirohi	156	169	275	281
Tonk	361	350	596	597
Udaipur	529	425	856	865
Total	15459	13399	27261	27672

Source: Compiled from SEMIS disaggregated statistics for respective years

In most of the districts, the number of schools almost doubled from 2012-13 to 2013-14. The Gross Access Ratio (GAR) of the state is 76.26%. Out of the total 143675 habitations in the state, 109577 habitations are served by secondary schools within a distance of 5 km. The districts of Pratapgarh (27.84%), Bhilwara (26%), Bharatpur (16%), Ajmer (44%), Alwar (61%) and Karauli (55%) have a very low GAR compared to the state average GAR of 76.26%.

2.2. Equity

Equity has always been the policy focus in the field of education. It is often used interchangeably with equality in terms of opportunity, resources, inputs processes, immediate and long term outcomes, but it is important to recognise the subtle difference that exists between the two. While equality implies equal access for all, equity ensures intervention to bring the marginalised at par with the rest of the society in terms of education. Before looking at equity in enrolment, it would be important to study the overall enrolment at the secondary level which has not shown much improvement in the state in the last two years. The enrolment at the secondary level was 23.2 lakh and 23.31 in 2014-15 and 2015-16 respectively.

Table 6 : Total Enrolment in Secondary Schools

Year	Total enrolment
2012-13	2245437
2013-14	2363831 (5.27%)
2014-15	2320172 (-1.84%)
2015-16	2331239 (0.47%)

Source: Compiled from U-DISE Flash statistics for respective years and authors calculation based on unpublished U-DISE raw data.

From the above Table 6, we observe that there is an increase of 5.27% in enrolment in 2013-14 from 2012-13. There was a decline in the enrolment of students in 2014-15 and slight increase in 2015-16. The total enrolment in secondary schools increased by a mere 11,067 or 0.47% in 2015-16. The enrolment is almost static in the last two years at 23.2 lakh and 23.31 lakh respectively.

Gross enrolment ratio (GER) is the total enrolment in a specific level of education, regardless of age, expressed as a percentage of the eligible official school-age population corresponding to the same level of education in a given school-year. School-age population is the population of the age group which officially corresponds to the relevant level of education.

Table 7 : Gross Enrolment in Secondary Schools

Year	Gross Enrolment Ratio (GER)
2011-12	86.17
2012-13	69.75
2013-14	78.68
2014-15	76.16
2015-16	76.06

Source: Compiled from U-DISE Flash statistics for respective years and authors calculation based on unpublished U-DISE raw data.

The above Table 7 shows the gross enrolment ratio (GER) in secondary schools in Rajasthan. The GER in 2015-16 has decreased to 76.06 compared to the 76.16 in 2014-15. The GER in 2011-12 was 86.17 and it has declined significantly to 69.75 in 2012-13.

The Net Enrolment Ratio (NER) is defined as enrolment of the official age-group for a given level of education expressed as a percentage of the corresponding population. The Table 7 shows NER in secondary schools in Rajasthan.

Table 8 : Net Enrolment Ratio

2012-13	**Boys**	40.74
	Girls	31.71
2013-14	**Boys**	44.66
	Girls	36.86
2014-15	**Boys**	43.52
	Girls	35.46
2015-16	**Boys**	57.4
	Girls	42.6

Source: Compiled from U-DISE Flash statistics for respective years

Table 8 shows the NER in secondary schools in Rajasthan. The NER for boys was significantly more than that of girls in all the years from 2012-13 to 2015-16. In 2015 the NER of boys is 57.4 and for girls it is 42.6. The NER is increasing gradually year after year.

Table 9: Enrolment by Caste

Year	General	Scheduled Caste	Scheduled Tribes	Other Backward Class (OBC)
2012-13	19.51	17.94	13.55	49.00
2013-14	19.06	18.52	13.63	48.80
2014-15	18.63	18.49	13.62	49.26

Source: Compiled from U-DISE Flash statistics for respective years

The table 9 shows that, with regard to enrolment by castes, there has been a greater share of Other Backward Classes, followed by General, Scheduled Caste and Scheduled Tribes. The enrolment has been static for all social groups with less than 1% variation for all the three years studied.

The gender parity index (GPI) for the state of Rajasthan is 0.87 against the national GPI of 1. GPI is further lower for the districts of Jaisalmer (0.49), Jalore (0.59), Sirohi (0.65), Barmer (0.69) and Jodhpur (0.71). Proactive measures required to address this issue are imperative especially from the point of view that child marriage is quite prevalent in the state and education of girls at secondary level could be a potent strategy to address this social malaise.

2.3. Teachers

This section presents data related to teachers teaching at secondary level in Rajasthan in terms of gender parity, qualification and so on.

Table 10 : Number of Teachers by Gender

Year	Total Number of Teachers	Male (percent)	Female (percent)
2012-13	72,935	74	26
2013-14	96,179	73	27
2014-15	1,01,422	72	28
2015-16	1,07,508	70.62	29.38

Source: Compiled from U-DISE Flash statistics for respective years and authors calculation based on unpublished U-DISE raw data.

From the Table 10, it is evident that there are more number of male teachers than female teachers but there is small rate of decline in percentage of male teachers and a small increase in percentage of female teachers from 2012 to 2016.

Table 11 : Percentage of Secondary Teachers by Academic Qualification

	Below Graduation	Graduate	Post-Graduate	M.Phil	PhD / Post-Doctoral
2012-13	10.79	45.53	42.97	0.51	0.20
2013-14	10.24	44.66	44.23	0.57	0.25
2014-15	10	44.42	44.39	0.53	0.27
2015-16	4.45	48.67	46.20	0.44	0.24

Source: Compiled from U-DISE Flash statistics for respective years and authors calculation based on unpublished U-DISE raw data.

The table 11 shows the distribution of teachers by their academic qualification. Teachers with either graduation or post-graduation constitute around 90% of the total secondary teachers. The percentage of teachers who are not graduates has decreased by half in 2015-16 while it has increased from 44.42% in 2014-15 to 48.67% in 2015-16, in case of teachers with graduation. The point to be noted is that 4.45% of secondary school teachers are not graduates when the minimum qualification prescribed for secondary school teachers is graduation. As of June 2016, the state has vacancies of 10,954 teachers including headmasters.

Table 12 : Percentage of Professionally Qualified Teachers

2012-13	2013-14	2014-15	2015-16
92.58	93.77	93.18	95.74

Source: Compiled from U-DISE Flash statistics for respective years

The Table 12 shows that the percentage of professionally qualified teachers has increased to 95.74% in 2015-16 from 92.58% in 2012-13. Overall the percentage of professionally qualified teachers in secondary education has gradually increased from 2012 to 2016.

2.4. Management

This section deals with the classification of secondary schools, teachers and students by the management of the schools. In Rajasthan, the Department of Education issues appointment and school placement order for schools that are either at the secondary or higher level, while the Panchayati Raj Ministry undertakes all appointments at the elementary level. This is because in Rajasthan, primary/elementary education comes under the purview of the Panchayati Raj Department. However, with the exception of issuing the appointment letter, all other matters related to teachers are handled by the education department. Rajasthan also has a non-trivial number of schools run by the Sanskrit Department; appointments to these schools are done by that department (Ramachandran, 2016).

Table 13 : Management-wise Percentage of Secondary Schools

Management	2012-13	2013-14	2014-15	2015-16
Department of Education	48.15	50.06	49.34	49.10
Tribal/Social Welfare Department	0.11	0.11	0.12	0.14
Local Body	0	0	0	0
Private Aided	0.11	0	0	0
Private Unaided	50.72	49.44	49.70	50.26
Other Government Managements	0.18	0	0	0
Central Government	0.42	0.38	0.36	0.37
Unrecognised	0.14	0	0	0
Recognised Madrasa	0.14	0	0.10	0.13
Unrecognised Madrasa	0	0	0.37	0
Other Managements* or No response**	0	0	0	0

Source: Compiled from U-DISE Flash statistics for respective years

As shown in the Table 13, nearly 50% of the total secondary schools in the state belong to private unaided management followed by Department of Education across all the years studied. The share for private unaided schools is increasing which is a common trend in all states. The point to be highlighted here is unlike other states, there are no private aided secondary schools in Rajasthan.

Table 14 : Percentage of Enrolment by Management at Secondary School Level

Management	2012-13	2013-14	2014-15	2015-16
Department of Education	47.36	48.45	46.15	48.79
Tribal/Social Welfare Department	0.11	0.12	0.12	0.14
Local Body	0	0	0	0
Private Aided	0.10	0	0	0
Private Unaided	51.22	50.74	52.40	50.32
Other Government Managements	0.20	0	0	0
Central Government	0.70	0.68	0.66	0.66
Unrecognised	0.12	0	0	0
Recognised Madrasa	0.11	0	0.07	0.10
Unrecognised Madrasa	0	0	0.59	0
Other Managements	0.08	0	0	0

Source: Compiled from U-DISE Flash statistics for respective years

As evident from the Table 14, more than 50% of total enrolment in secondary schools is by private unaided schools in Rajasthan. The increasing demand for private unaided schools is reflected from the ever increasing student enrolment in these schools, followed by share of schools run by the Department of Education. Apart from private unaided and state government run schools, the schools run by the central government constitutes 0.70% of enrolment followed by schools run by tribal welfare and social welfare department.

3. Quality of Secondary Education

This section discusses the quality of secondary education in relation to infrastructure, repetition, drop-outs, achievement and percentage of teachers involved in non-teaching activities.

3.1. Infrastructure

Status of basic infrastructure, as reflected in the Table 15, shows an improved performance by the secondary schools with respect to availability of building, playground, library and separate toilets for boys and girls. 99.99% of the secondary schools have a building, 70.97% of schools have playground, 98.83% of schools have drinking water facility and 89.98% of the schools have library in 2015-16. 98.19% of the schools have a separate boys toilet and 99.79% of schools have a separate girls toilet. The student – classroom ratio has improved from 45 in 2012-13 to 35 in 2015-16.

Table 15 : Status of Basic Infrastructure in Secondary Schools

Year	Building	Play Ground	Drinking water facility	Library	Boy's toilet	Girl's toilet	Student classroom ratio (SCR)
2012-13	99.98	71.18	99	83.03	88.14	99	45
2013-14	99.97	69.29	99.51	82.53	97.45	99.08	38
2014-15	99.98	70.14	98.88	89.10	97.90	99.50	35
2015-16	99.99	70.97	98.83	89.98	98.19	99.79	35

Source: Compiled from U-DISE Flash statistics for respective years

Table 16 : Status of ICT Infrastructure in Secondary Schools

Year	Integrated science laboratory	Electricity and Computer	Computer	Computer and Internet
2012-13	17.38	NA	51.88	21.68
2013-14	17.74	NA	53.56	25.84
2014-15	18.15	57.47	59.90	31.36
2015-16	31.95	60.54	62.76	36.00

Source: Compiled from U-DISE Flash statistics for respective years

As far as modern infrastructure like integrated science laboratory, computer and internet connectivity is concerned there has been a gradual improvement as seen in the Table 16. More than 60 percent of the secondary schools in the state have a computer facility but only 36 percent have internet connectivity. 31.95 percent of schools have an integrated science laboratory in 2015-16 compared to 17.38% in 2012-13. However, 1308 schools were without this ICT infrastructure as of June 2016.

3.2. Repetition and Drop-outs

Repeaters are students from a cohort enrolled in a given grade at given school years who study in the same grade in the following school year. Table 17 shows the percentage of repeaters in secondary schools by social group.

Table 17 : Percentage of Repeaters by Caste

	General	SC	ST	OBC	Muslim
2012-13	13.31	21.04	26.23	39.42	3.52
2013-14	13.20	22.40	24.76	39.64	3.25
2014-15	11.85	23.21	25.60	39.34	2.58
2015-16	12.14	23.25	23.66	40.48	2.86

Source: Compiled from U-DISE Flash statistics for respective years.

As evident in the Table 17, the percentage of repeaters in the secondary level is highest among Other Backward Castes (OBC). For Scheduled Caste (SC) it has increased over the years. On the contrary, it has almost remained the same for the OBCs. In 2015-16, there was an increase in the percentage of repeaters in all social groups except ST. However, the share of repeaters by gender is not available.

Table 18 : Average annual Drop-out Rates by Gender

2012-13	**Boys**	13.06
	Girls	14.49
	Total	13.65
2013-14	**Boys**	17.85
	Girls	20.06
	Total	18.77
2014-15	**Boys**	13.54
	Girls	13.40
	Total	13.48

Source: Compiled from U-DISE Flash statistics for respective years and authors calculation based on unpublished U-DISE raw data.

The Table 18 shows that the over-all drop-out rates for the secondary education in Rajasthan has decreased from 2012-13 to 2014-15. When compared to 2012-13, the drop-out rate has decreased for girls from 14.49 in 2012-13 to 13.40 in 2014-15 whereas for boys, the drop-out rate has increased from 13.06 in 2012-13 to 13.54 in 2014-15.

Table 19 : Average annual Drop-out Rate by Caste and Gender

	SC			ST			OBC			Muslim		
	Boys	Girls	Total	Boys	Girls	Total	Boys	Girls	Total	Boys	Girls	Total
2013-14	23.32	25.95	24.42	21.39	22.48	21.87	16.72	18.84	17.59	31.39	29.62	30.71
2014-15	17.56	18.49	17.95	16.47	15.47	16.03	13.32	13.23	13.28	20.12	18.12	19.32

Source: Compiled from U-DISE Flash statistics for respective years

The Table 19 shows drop out rate by caste. It can be seen that the drop-out rate in 2014-15 has decreased across all social groups when compared to 2013-14. The drop-out rate in Muslims which was highest among all social groups in 2013-14 has decreased by more than 10 percent in 2014-15. One interesting observation is that the drop-out rate is higher in boys in all social groups, except SC.

3.3. Learning Achievement

The Board of Secondary Education, Rajasthan evaluates students progress by conducting two board examinations, one at the end of class 10 and the other at the end of class 12. The Table 20 shows the pass percentage of boys and girls in the board examinations.

Table 20 : Pass percentage at secondary levels

Year	Boys	Girls	Total
2012-13	70.55	69.23	70.01
2013-14	72.12	71.21	71.74
2014-15	79.49	78.98	79.28

Source: Compiled from U-DISE Flash statistics for respective years

The overall pass percentage has increased from 70.01% in 2012-13 to 79.28% in 2014-15. The pass percentage in girls has increased from 71.21% in 2013-14 to 78.98% in 2014-15 and for boys it has increased from 72.12% in 2013-14 to 79.49% in 2014-15.

Achieving good quality educational outcomes has been a key education target. It is important for all students to attain certain specified and valued learning standards after a period of 10 years of schooling, irrespective of their diverse social, cultural and economic backgrounds. In light of this, the Ministry of Human Resource Development (MHRD) had entrusted the Educational Survey Division of the National Council of Educational Research and Training (NCERT) to conduct a nationwide achievement survey of students at the end of Class X, on a sample basis. The survey investigates the student achievement in five subjects: English, Mathematics, Social Science, Science and Modern Indian Language.

Table 21 shows the performance of secondary school students in Rajasthan for different subjects as per the National Achievement Survey (NAS) conducted in 2015.

Table 21: Subject-wise Mean Achievement Score

	English	Mathematics	Science	Modern Indian Language	Social Science
Rajasthan	229	240	240	244	248
India	250	250	250	250	250

Source: NAS (class X), 2015

The Table 21, shows the achievement level of the students at secondary level in Rajasthan in English, Mathematics and Science. In Rajasthan, the mean score in English, Mathematics and Science score in the grade X assessment conducted by NCERT, is significantly below the national average. For Social Sciences, the state's overall achievement score is not significantly different from the overall average score for India.

As per the National Achievement Survey, gender-wise there was no significant difference observed in the performance of students in English, Mathematics, Science, Social Science and Modern Indian Language (MIL). However in terms of area-wise comparison, urban students performed better than their rural counterparts only in MIL. In terms of number of questions correctly answered they are 33%, 34%, 37%, 42% and 48% in English, Mathematics, Science, Social Sciences and MIL respectively which is much below the national average.

3.4. Teachers involved in non-teaching assignments

There are several non-teaching functions within the school including administrative support, organising events, managing mid-day meals, managing construction, collecting and maintaining data about school students, organising events, facilitating visits of officials, distribution of uniforms, books, etc. These are, typically, functions of the administration, but given the fact that in most states, support staff has not been appointed in government schools.

Studies have shown us that science and mathematics teachers are more likely to be deputed to these non-teaching positions, because of their ability to manage numbers and data. When teachers are unable to get a transfer of their choice or when they have missed their chance they arrange for a deputation to their preferred location through personal networking. Those teachers get deputed to work in the SSA / RMSA Directorate, or sent to SCERT (Ramachandran, 2015).

Table 22 : Percentage of Teachers involved in Non-teaching Assignments

2012-13	**Teachers**	2.79
	Days	43
2013-14	**Teachers**	0.63
	Days	24.69
2014-15	**Teachers**	0.28
	Days	17

Source: Compiled from U-DISE Flash statistics for respective years

As seen from the above Table 22, the percentage of secondary school teachers involved in non-teaching activities and number of days devoted to non-teaching activities, have continuously declined from 2012-13 to 2014-15.

3.5. Financing

The Table 23 shows that the total plan budgeted expenditure on education by all departments is increasing year on year. The point to be noticed is that the share of plan expenditure is increasing while that of non-plan expenditure is decreasing. However, that data for 2014-15 and 2015-16 is not available.

Table 23 : Total Plan Budgeted Expenditure on Education by all Departments (Rupees in Thousands)

Year	Percentage of Plan expenditure	Percentage of Non-Plan expenditure	Total expenditure on education
2010-11 (Actual)	15.55	84.45	10,63,77,692
2011-12 (Actual)	20.03	79.97	12,06,41,171
2012-13 (R.E)	17.70	82.3	14,41,81,748
2013-14(B.E)	23.40	76.6	16,91,15,577

Source: Compiled from Analysis of budgeted Expenditure on Education 2010-11 to 2013-14

Table 24 : Heads of Public Spending on Secondary Education

Year	Spending on Elementary Education	Spending on Secondary Education
2011-12 (Actual)	68070633.00 (59.93)	36674196.00 (32.29)
2012-13 (R.E)	74148001.00 (54.57)	49722757.00 (36.59)
2013-14 (B.E)	85967978.00 (54.36)	60077114.00 (37.99)

Source: Compiled from Analysis of budgeted Expenditure on Education 2011-12 to 2013-14, MHRD

The Table 24 shows that the spending on elementary education is more than the spending on secondary education in all the years between 2011-12 to 2013-14. However the share of spending on elementary education is decreasing while that of secondary education is increasing.

4. Rashtriya Madhyamik Shiksha Abhiyan (RMSA)

Rashtriya Madhyamik Shiksha Abhiyan (RMSA) is a centrally sponsored scheme of the Ministry of Human Resource Development, Government of India, for the development of secondary education in public schools throughout India. It was launched in March 2009. The implementation of the scheme started from the academic year 2009-2010 to provide conditions for an efficient growth, development and equity for all. The scheme includes a multi-dimensional research, technical consulting, various implementations and funding support Rajasthan had been sanctioned 114 new schools, strengthening in 4,183 existing secondary schools, and 1752 major repair works under RMSA. The overall completion of sanctioned civil works in the state is 83.83%, with 7.76% works in progress and 9.4% of the works yet to be taken up by the state as of June 2016.

In Rajasthan, as many as 7125 schools have been approved to be covered under the ICT component of converged RMSA scheme (previously ICT@Schools). Of these, 7125 sanctioned schools, 4600 schools have completed 5 years of implementation cycle. The implementation started in 200 schools in 2014 and in the remaining 525 schools in 2015-16.

Technology Readiness for CLIx intervention in Rajasthan

II. Technology Readiness for CLIx intervention in Rajasthan

5. Overview of CLIx

Rajasthan is emerging as one of the fast progressing states. The state has shown an interest and positive response to various initiatives for improving quality of education. Hence, Rajasthan was selected for implementation under the Connected Learning Initiative (CLIx).

In July 2015, the Rajasthan Council of Secondary Education (RCSE) entered into a Memorandum of Understanding (MoU) with Tata Institute of Social Sciences for implementation of CLIx in Rajasthan state. Prior to and following the agreement, various activities have been conducted in collaboration with the RCSE and Centre for Education and Research and Practice (CERP) which is the local implementation partner for CLIx in the state. In the current three-year phase-1 (2015-18) of the CLIx programme, Jaipur and Sirohi have been selected for implementation. There is a proposal to cover 300 government schools across four districts viz. Baran and Jhalawar in addition to Jaipur and Sirohi.

The selection of districts was done keeping in mind the need to work in districts that are representative of the state.

This part of the report seeks to

- Give a brief overview of ICT@School scheme in Rajasthan.
- Provide a snapshot of the process followed till now to select the schools for intervention.
- Estimate the type of infrastructural requirements that are needed in addition to the infrastructure already present in the selected secondary schools of Rajasthan to effectively run the CLIx intervention.

6. ICT@Schools Scheme in Rajasthan

Recognising the critical role of ICT in achieving the country's developmental and educational objectives, the National IT Task Force recommended the introduction of ICT infrastructure in schools. In 1998, it recommended that 1 to 3% of the budget be spent on providing computers in secondary and senior secondary schools over the subsequent five years (NCERT, 2014). Following this, the Government of India launched its flagship ICT scheme for schools in 2004 called the 'ICT@Schools' to promote ICT literacy and ICT-enabled learning in Government and Government aided secondary and senior secondary schools. Based on the implementation experience of the first six years, the Government of India revised the ICT@Schools scheme in 2010. After the revision the MHRD released a 'model bid document' for the revised scheme which mentioned that States' experience with BOOT models has been varied and at times, mixed. The document, therefore, suggested that States with adequate capacity to procure and manage the ICT infrastructure may opt for the outright purchase instead of the BOOT model.

Within a federal Government structure, the central Government lays down the broad guidelines for the scheme, while individual States are responsible for its implementation. The cost of the scheme is split in a ratio of 75:25 between the central Government and the state Governments.

In the secondary and senior secondary schools of Government of Rajasthan, the first exposure related to ICT to teachers and student was through the MHRD scheme of ICT@School. The scheme was initiated in 2008 and 2,500 schools were covered across the state. In this phase, mostly senior secondary schools (with secondary classes) were covered in the state. The second phase for covering 2000 more schools (both secondary and sr. secondary) was supposed to be started in 2010 and it was delayed due to delay in the release of funds from the central government. The second phase was started in April 2013. In the third phase which took off in February 2014, 2000 more schools have been covered in the scheme.

In the process of implementation the state hired the services of private service providers. Through tender process the contract was awarded to the lowest bidder. In the state, for 80% of the schools, contracts have been awarded to CompuCom computers Private Limited. Other organizations such as Educom, Pearson, IL&FS are providing services for the rest of the 20% of the schools. When the scheme was initiated the budget allotted per school was Rs. 6.7 lakhs and it has now increased to Rs. 9.10 lakhs per school. Seventy percent of the total budget is shared by the central government and the rest 25 percent budget is contributed by the state.

The service providers have provided the following infrastructure for every school; 10 computers (1 main server + 9 nodes),1 Printer, 1 Scanner, 1 Projector, 2 UPS, 1 Webcam, 1 Wireless router, 1 Wireless adapter, LAN, 10 Computer tables, 20 Chairs and 1 Generator 3KV. Two teachers from every school have been trained on basic use of computers. As per the agreement, the service providers had to provide one instructor per school but because of unavailability of such trained instructors at Rs 1800/month pay, now they are providing one instructor for a cluster of every 5 schools and these instructors are supposed to visit 5 schools in a week.

7. ICT Infrastructure

Technology is the backbone for the implementation of CLIx. It is based on the premise that use of appropriate technology in curriculum development, pedagogy and teacher professional development can transform learning experience and improve quality of education.

Table 25 : Infrastructure provisions under revised ICT @school scheme and requirements for CLIx

Requirement	Revised ICT@School scheme	CLIx requirements	Remarks
Hardware 	10 PCs or 10 nodes connected through a server per school, printers, projector, etc Keyboards customised for use in the regional languages.	- 3 CPUs working in case of NComputing or at least 7 computers - Keyboard, - Projector, - Printer/Scanner, - Audio system, - Camera(If Provided) - Headsets, Spilitters.	Multimedia devices like camera, audio system, headsets are additional requirements for CLIx.
Connectivity 	Broadband internet connection of at least 2 Mbps band width or connection of lower bandwidth with plan to upgrade in future. Wireless links would also be explored.	Functional Internet connection with a speed of at least 2Mbps or 3G. Schools must have LAN interface or at least a possibility of having such a setup.	Internet connection of 3G or above quality is required with LAN interface for CLIx.
Power Supply 	Wherever the power supply is unreliable, it is proposed to provide assistance for purchase of a generator, as a backup only and also its recurring cost, subject to a maximum of Rs.1000 per month, in addition to Rs.1000/- per month for the electricity charges. In areas where there is no power supply, solar generated power should be made use of.	UPS present with all PCs.	Uninterrupted power supply is necessary for CLIx intervention.
Computer Room/Lab 	The computers would be installed in one of the safe rooms in the school. If such rooms are not available, the need can be met from the scheme (RMSA) in case of Government schools.	The school has a computer lab/room. If not, there should be a provision or possibility of creating a space that can be used as a computer lab/room.	Most of the schools have computer lab.
Science Lab 	No provision under ICT@School scheme	The school has functional science lab(s) with required equipments and supplies. Preferably three different labs for Physics, Chemistry and Biology.	All the schools selected for CLIx have combined science lab.

Table 25 shows the difference between infrastructure provisions under ICT@School scheme and technological requirements for the CLIx intervention. Multimedia devices like speakers, camera and headsets, LAN interface, uninterrupted power supply and separate labs physics, chemistry and biology are additional requirements for the CLIx intervention.

The central government initially recommended that States with limited capacity adopt the BOO/BOOT (Build Own Operate and Transfer). Under this model, a BOOT operator is responsible for procuring, deploying and maintaining the hardware. After a period of five years,the BOOT operator transfers this infrastructure to the States. Additionally, the BOOT operator is also responsible for supplying the content, establishing smart schools as well as hiring and training teachers.

Studies have reported that Principals have low levels of awareness towards the implementation of the ICT@Schools scheme. This contributes to the lack of infrastructure maintenance and the low levels of technology integration in teacher practice and administrative tasks. In order to create greater school level ownership, the States must empower Principals to interact with and hold the BOOT operator accountable for the quality of service provision. This tripartite arrangement between the State, the BOOT operator and the school Principal will create an environment conducive to school level ownership, planning and accountability. It will enable the State to strengthen their evaluation processes by articulating a clear set of demands from the school. It will also enable Principals to encourage teachers and students to be active participants in integrating technology in curriculum transaction and school processes (NCERT, 2014).

Table 26 : Financial Assistance under ICT@School for Rajasthan (Rs. in Lakh)

Year	Released	Utilized	Expenditure
2009-10	2300.00	2300.00	-
2010-11	4500.00	4500.00	-
2011-12	0.00	0.00	-
2012-13	6000.00	0.00	4516.60
2013-14	0.00	-	5287.95
2014-15	5507.75	-	2183.31
2015-16 (As on 24/7/15)	2123.67	-	-
Total	20431.42	6800.00	

Source: Lok Sabha Unstarred Question No. 2737, dated on 13.03.2013, Lok Sabha Starred Question No. 231, dated on 23.07.2014 & Lok Sabha Starred Question No. 1471, dated on 29.07.2015, www.indiastat.com

As evident in Table 26, Rs. 2300 lakh and Rs.4500 lakh were released in 2009-10 and 2010-11 respectively and the funds were completely utilized. In 2011-12 and 2013-14 there was no allocation of budget for ICT@School scheme. In 2012-13 Rs. 6000 lakh was released but the entire amount remained unutilized. In 2014-15, Rs.5507 lakh was released but it was unspent. Overall, till July 2015, a total of Rs. 20431 lakh was released under ICT@School to Rajasthan and Rs.6800 lakh was spent. The Expenditure includes the unspent of previous year, state share and central share and is based on expenditure reported by states for appraisal.

Table 27 :Year-wise Detail of Schools covered under ICT in Rajasthan

Year	Phase	Number of Schools
2005-06	1	100
2006-07	-	0
2007-08	1	2500
2008-09	2	2000
2009-10	-	0
2010-11	3	2000
2011-12	-	0
2012-13	-	0
2013-14	-	0
2014-15	-	0
Total		6600

Source: www.indiastat.com

Schools covered under ICT Phase 1 and Phase 2 were mostly senior secondary schools. Initially when the ICT Phase 3 was started most of the schools covered were secondary schools but in the last two years the state has upgraded large number of secondary schools to senior secondary schools. For the CLIx programme, schools covered under Phase 3 have been selected as the availability of infrastructure in Phase 3 schools is comparatively better.

Table 27 gives a snapshot of year-wise number of schools covered under ICT@School scheme in Rajasthan. So far as many as 6600 schools are covered under ICT@School scheme in Rajasthan over the three Phases. However, no new school in Rajasthan has been covered under ICT@Schools scheme, integrated with RMSA since 2011-12.

Table 28: Student to Computer Ratio in CLIx Intervention Schools 2016-17

SL. No.	School Name	Total no. of students in Grade 9	No. of section in Grade 9	No. of functional PCs in the school	Student to computer ratio (SCR)
1	Govt. Sr. Sec. School, Vasa	94	2	10	9.4
2	Govt. Sr. Sec. School, Bhimana	61	1	10	6.1
3	Govt. Sr. Sec. School, Vatera	81	2	10	8.1
4	Govt. Girls Sr. Sec. School, Mount Abu	77	2	9	8.5
5	Govt. Sr. Sec. School, Deldr	58	1	9	6.4
6	Govt. Sr. Sec. School, Maval	86	2	9	9.5
7	Govt. Sec. School, Tartoli	39	1	9	4.3
8	Govt. Sec. School, Akhrabhtta	127	2	10	12.7
9	Govt. Sr. Sec. School, Morthala	30	1	9	3.3
10	Govt. Sr. Sec. School, Manora	73	1	10	7.3
11	Govt. Sr. Sec. School, Bhootgaon	71	1	10	7.1
12	Govt. Sr. Sec. School, Naradra	60	1	10	6
13	Govt. Sr. Sec. School, Andor	64	1	9	7.1
14	Govt. Sr. Sec. School, Sindrath	67	1	10	6.7
15	Govt. Sr. Sec. School, Undra	68	1	10	6.8
16	Govt. Sr. Sec. School, Peshua	63	2	9	7
17	Govt. Sr. Sec. School, Sanwara R	36	1	10	3.6
18	Govt. Girls Sr. Sec. School, Jawal	88	2	9	9.7
19	Shri Shantinath Sr. Sec. School, Udd	74	1	10	7.4
20	Govt. Sr. Sec. School, Sorda	56	1	9	6.2
21	Govt. Sr. Sec. School, Magriwada	53	1	5	10.6
22	Govt. Sr. Sec. School, Jeerawal	78	1	9	8.6
23	Govt. Sr. Sec. School, Makawal	68	1	7	9.7
24	Govt. Sr. Sec. School, Marol	77	1	7	11
25	Govt. Sr. Sec. School, Lunol	49	1	6	8.1
26	Govt. Sr. Sec. School, Gulabganj	65	1	7	9.2
27	Govt. Sr. Sec. School, Pamera	83	2	8	10.3
28	Govt. Girls Sr. Sec. School, Mandar	94	2	9	10.4
29	Govt. Girls Sr. Sec. School, Datrai	45	1	0	-
30	Govt. Adarsh Sr. Sec. School, Khambal	65	1	10	6.5
31	Govt. Sec. School, Deldar, Mand	33	1	9	3.6
32	Govt. Adarsh Sr. Sec. School, Mandwariya	39	1	10	3.9
33	Govt. Adarsh Sr. Sec. School, Dodua	86	2	9	9.5
34	Govt. Sec. School, Sirohi	68	2	10	6.8
35	Govt. Adarsh Sr. Sec. School, Aamalari	66	1	9	7.3

SL. No	School Name	Total no. of students in Grade 9	No. of section in Grade 9	No. of functional PCs in the school	Student to computer ratio (SCR)
36	Govt. Adarsh Sr. Sec. School, Haliwada	41	1	10	4.1
37	Govt. Adarsh Sr. Sec. School, Fugani	60	1	9	6.6
38	Govt. Adarsh Sr. Sec. School, Sanpur	65	1	10	6.5
39	Govt. Adarsh Sr. Sec. School, Madiya	81	1	10	8.1
40	Govt. Sec. School, Kesharpura	52	1	10	5.2
41	Govt. Sec. School, Khejriya	37	1	4	9.2
42	Govt. Adrash Sr. Sec. School, Vaghsin	61	1	10	6.1
43	Govt. Sec. School, Shivganj	101	2	10	10.1
44	Govt. Sr. Sec. School, Chhibagaon	39	1	10	3.9
45	Govt. Sr. Sec. School, Rukhada	40	1	10	4
46	Govt. Sr. Sec. School, Aalpa	47	1	10	4.7
47	Govt. Sr. Sec. School, Jhadoli Veer	37	1	8	4.6
48	Govt. Sec. School, Chota Lakhmawa	31	1	10	3.1
49	Govt. Sr. Sec. School, Joga Pura Purana	64	1	6	10.6
50	Govt. Adrash Sr. Sec. School, Uthman	64	1	10	6.4
51	Govt. Sr. Sec. School, Chaapradi	27	1	8	3.3
52	Govt. Sec. School, Rajpur Vaas Tala	31	1	6	5.1
53	Govt. Adarsh Sr. Sec. School, Nevar, Dhula via Banshka	69	1	7	9.8
54	Govt. Sec. School, Dhaupura	20	1	10	2
55	Govt. Sr. Sec. School, Tholai	136	2	10	13.6
56	Govt. Sr. Sec. School, Bhagawas Chourasi	35	1	6	5.8
57	Govt. Sr. Sec. School, Bhonawas	52	1	8	6.5
58	Govt. Adarsh Sr. Sec. School, Taskola	33	1	7	4.7
59	Govt. Adarsh Sr. Sec. School, Viratnagar	52	1	6	8.6
60	Govt. Sec. School, Hanutpura (Ajitgarh)	43	1	10	4.3
61	Govt. Adarsh Sr. Sec. School, Padampura	79	1	10	7.9
62	Govt. Adarsh Sr. Sec. School, Sambharia	65	1	10	6.5
63	Govt. Adarsh Sr. Sec. School, Vidhani	26	1	10	2.6
64	Govt. Sr. Sec. School, Garudwasi	59	1	10	5.9
65	Govt. Sr. Sec. School Radoli	23	1	10	2.3
66	Govt. Girls' Sr. Sec. School, Goner	43	1	10	4.3
67	Govt. Girls' Sec. School, Sheetla Mata	15	1	10	1.5
68	Govt. Sr. Sec. School, Ramnagar	83	1	10	8.3
69	Govt. Sec. School, Mahadevpura	66	1	0	-
70	Govt. Adarsh Sr. Sec. School, Morija	79	2	10	7.2

SL. No	School Name	Total no. of students in Grade 9	No. of section in Grade 9	No. of functional PCs in the school	Student to computer ratio (SCR)
71	Govt. Adarsh Sr. Sec. School, Neender	52	1	10	5.2
72	Govt. Adarsh Sr. Sec. School, Rampura Dabdi	97	1	7	13.8
73	Govt. Adarsh Sr. Sec. School, Khorashyamdas	183	3	8	22.8
74	Govt. Sr. Sec. School, Radhasoami Ka Baag	25	1	10	2.5
75	Govt. Maheshwari Sec. School, Chomu	51	1	10	5.1
76	Govt. Adarsh Sr. Sec. School, Hadota	54	1	10	5.4
77	Govt. Sr. Sec. School, Nivaru Road jaipur	73	1	10	7.3
78	Govt. Sr. Sec. School, Goukulpura	31	1	10	3.
79	Govt. Sec. School, Chakbasdhi	37	1	7	5.2
80	Govt. Sr. Sec. School, Jawahar nagar	55	1	10	5.5
81	Govt. Girls. Sr. Sec. School, Raval Ji Ka Bag	48	1	6	8
82	Govt. Sec. School, Mandi Khatikan	64	1	10	6.4
83	Govt. Sr. Sec. School, Labour Colony, Bani park	22	1	9	2.4
84	Govt. Girls Sr. Sec. School, Nari Ka Naka, Sashtri Nagar	90	2	0	-
85	Govt. Sr. Sec. School, Charan Nadi, Dadi Ka Fatak	55	1	9	6.1
86	Govt. Sr. Sec. School, Goliyawas	15	1	9	1.6
87	Govt. Adarsh Sr. Sec. School, Heera Path	23	1	10	2.3
88	Govt. Girl Sr. Sec. School, Durgapura	46	1	10	4.6
89	Govt. Adarsh Sr. Sec. School, Jhar	46	1	10	4.6
90	Govt. Sr. Sec. School, Paldi Meena	106	2	9	12.1
91	Govt. Sec. School, Kuthada Kalan	22	1	10	2.2
92	Govt. Adarsh Sr. Sec. School, Hatupura	48	1	6	8
93	Govt. Adarsh Sr. Sec. School, Rojadi	70	1	10	7
94	Govt. Adarsh Sr. Sec. School, Kachroda	41	1	7	5.8
95	Govt. Adarsh Sr. Sec. School, Harsolia	16	1	6	2.6
96	Govt. Adarsh Sr. Sec. School, Gohandi	30	1	7	4.2
97	Govt. Sec. School, Dabla Bujurag	21	1	5	4.2
98	Govt. Sec. School, Chhaparwada, Dudu	33	1	9	3.6
99	Govt. Girls Sec. School, Shubash Chok Narayana	57	1	9	6.3
100	Govt. Adarsh Sr. Sec. School, Mohabbatpura	44	1	7	6.2
	Average	57.53	1.17	8.61	6.361

Source: CLIx internal documents

Table 28 indicates availability of computers and student strength in Grade 9.

The ICT@School scheme stipulates that each school be provided with requisite infrastructure in the form of hardware and software (10 PCs, accessories like printers, projection systems, etc.), internet connectivity, power supply and computer labs. Table 28 indicates that number of computers available is not enough to ensure that all students get access to the machine as most of the schools have a high student to computer ratio. However, if the section-wise allotment of computer teaching hours is managed efficiently computer access could be provided to all students. Overall internet connectivity in rural schools is very poor. Broadband service is available in the selected few schools which are located on highways or around cities/towns.

Table 29 : Gaps in ICT infrastructure in Jaipur schools before CLIx intervention

Sl. No.	Jaipur	Computers	N-Computing Device	Functional LAN Setup	Internet	Display	Server	key board & Mouse	Web cam	Headphone (10/20)	Speaker	Printer	Splitters	Scanner	LED(TV)	Power backup
1	Govt. Adarsh Sr. Sec. School, Jalsu, Khorashymdas	√	√	√	×	√	×	√	√	×	√	√	×	√	√	√
2	Govt. Adarsh Sr. Sec. School, Rampuradabdi	√	√	√	√	√	×	√	√	×	√	√	×	√	√	√
3	Govt. Maheshwari Sec. School, Govindghar, Chomu	√	√	√	√	√	×	√	√	×	√	√	×	√	√	√
4	Govt. Sr. Sec. School, Rojdi Via Phulera, Dudu	√	√	√	×	√	×	√	√	×	√	√	×	√	√	√
5	Govt. Sr. Sec. School, Sakuhooa, Hatupura, Dudu	√	√	√	×	√	×	√	√	×	√	√	×	√	√	√
6	Govt. Sr. Sec. School, Kachroda, Dudu	√	√	√	×	√	×	√	√	×	√	√	×	√	√	√
7	Govt. Sr. Sec. School, Nidadh, Jhotwara	√	√	√	×	√	×	√	√	×	√	√	×	√	√	√
8	Govt. Adarsh Sr. Sec. School, Hadota	×	√	√	√	√	×	√	√	×	√	√	×	√	√	√
9	Govt. Sr. Sec. School, Morija, Govindgadh	√	√	√	×	√	×	√	√	×	√	√	×	√	√	√
10	Govt. Adarsh Sr. Sec. School, Radhaswamibagh, Jhotwada	√	√	√	×	√	×	√	√	×	√	√	×	√	√	√
11	Govt. Sr. Sec. School, Jawaharnagar	√	√	√	√	√	×	×	√	×	√	√	×	√	√	√
12	Govt. Sec. School, Mandikhatikan	√	√	√	√	√	×	√	√	×	√	√	×	√	√	√
13	Govt. Sr. Sec. School, Labour Colony, Bani Park	√	√	√	√	√	×	√	√	×	√	√	×	√	√	√
14	Govt. Girls Sr. Sec. School, Narikanaka, Sastrinagar	√	√	√	√	√	×	√	√	×	√	√	×	√	√	√
15	Govt. Sr. Sec. School, Charan-2 Nadi, Dadikafatak	√	√	√	√	√	×	√	√	×	√	√	×	√	√	√
16	Govt. Sr. Sec. School, Nivaru Road Jaipur	√	√	√	×	√	×	√	√	×	√	√	×	√	√	√
17	Govt. Girls Sr. Sec. School, Durgapura	√	√	√	×	√	×	√	√	×	√	√	×	√	√	√
18	Govt. Sr. Sec. School, Goukulpura	√	√	√	×	√	×	√	√	×	√	√	×	√	√	√
19	Govt. Sr. Sec. School, Goliyawas	√	√	√	×	√	×	√	√	×	√	√	×	√	√	√
20	Govt. Adarsh Sr. Sec. School, Mansarovar	√	√	√	√	√	×	√	√	×	√	√	×	√	√	√
21	Govt. Sec School,Chakbasdi	×	√	×	×	×	×	×	×	×	×	×	×	×	×	×
22	Govt. Girls Sr. Sec. School, Ravaljikabagh	√	√	√	×	√	×	√	√	×	√	√	×	√	√	√
23	Govt. Sr. Sec. School Near Tample, Padampura	√	√	√	×	√	×	√	√	×	√	√	×	√	√	√
24	Govt. Girl Sec. School Sheetaladungri	√	√	√	×	√	×	√	√	×	√	√	×	√	√	√
25	Govt. Sr. Sec. School Radoli	√	√	√	×	√	×	√	√	×	√	√	×	√	√	√
26	Govt. Sec. School Mahadevpura	√	√	√	×	√	×	√	√	×	√	√	×	√	√	√
27	Govt. Sr. Sec. School, Agra Road Paldimeena	√	√	√	×	√	×	√	√	×	√	√	×	√	√	√
28	Govt. Adarsh Sr. Sec. School, Agra Road Jhar	√	√	√	×	√	×	√	√	×	√	√	×	√	√	√
29	Govt. Adarsh Sr. Sec. School, Sambharia	√	√	√	×	√	×	√	√	×	√	√	×	√	√	√
30	Govt. Girl Sr. Sec. School, Goner, Near Jagdish Temple	√	√	√	×	√	×	√	√	×	√	√	×	√	√	√

Sl. No.	Jaipur	Computers	N-Computing Device	Functional LAN Setup	Internet	Display	Server	key board & Mouse	Web cam	Headphone (10/20)	Speaker	Printer	Splitters	Scanner	LED(TV)	Power backup
31	Govt. Sr. Sec. School, Vidhani	√	√	√	×	√	×	√	√	×	√	√	×	√	√	√
32	Govt. Sr. Sec. School, Garudwasl	√	√	√	×	√	×	√	√	×	√	√	×	√	√	√
33	Govt. Sr. Sec. School, Ramnagar	√	√	√	×	√	×	√	√	×	√	√	×	√	√	√
34	Govt. Sec. School, Kunthadakalan, Bassi	√	√	√	×	√	×	√	√	×	√	√	×	√	√	√
35	Govt. Sr. Secondary School, Garudwasi, Chaksu	√	√	√	×	√	×	√	√	×	√	√	×	√	√	√
36	Govt. Sr. Sec. School, Chaapradi	√	√	√	×	√	×	√	√	×	√	√	×	√	√	√
37	Govt. Sr. Sec. School, Bhagawaschorsi	√	√	√	√	√	×	√	√	×	√	√	×	√	√	√
38	Govt. Sr. Sec. School, Bhonawas	√	√	√	×	√	×	√	√	×	√	√	×	√	√	√
39	Govt. Adarsh Sr. Sec. School, Taskola	√	√	√	×	√	×	√	√	×	√	√	×	√	√	√
40	Govt. Adarsh Sr. Sec. School, Nevar, Dhula Via Banshka	√	√	√	×	√	×	√	√	×	√	√	×	√	√	√
41	Govt. Sec. School, Dhaupura	√	√	√	×	√	×	√	√	×	√	√	×	√	√	√
42	Govt. Sr. Sec. School, Tholai	√	√	√	×	√	×	√	√	×	√	√	×	√	√	√
43	Govt. Sec. School, Hanutpura	√	√	√	×	√	×	√	×	×	√	√	×	√	√	√
44	Govt. Sec. School, Rajpurvasstala	√	√	√	×	√	×	√	√	×	√	√	×	√	√	√
45	Govt. Adarsh Sr. Sec. School, Barodiya, Viratnagar	√	√	√	×	√	×	√	√	×	√	√	×	√	√	√
46	Govt. Adarsh Sr. Sec. School, Mohabbalpura	√	√	√	×	√	×	√	√	×	√	√	×	√	√	√
47	Govt. Adarsh Sr. Sec. School, Harsolia	√	√	√	×	√	×	√	√	×	√	√	×	√	√	√
48	Govt. Adarsh Sr. Sec. School, Gohandi	√	√	√	×	√	×	√	√	×	√	√	×	√	√	√
49	Govt. Sec. School, Chhaparwada, Dudu	√	√	√	×	√	×	√	√	×	√	√	×	√	√	√
50	Govt. Girls Sec. School, Shubashchoknarayana	√	√	√	×	√	×	√	√	×	√	√	×	√	√	√
51	Govt. Sec. School, Dablabujurag,Phagi	×	√	×	×	√	×	×	√	×	√	√	×	√	√	√

Source: CLIx internal survey, July-Nov, 2016

Table 29 indicates the gaps in ICT infrastructure in the schools selected for CLIx intervention in Jaipur district. The gaps are mapped for 15 key computer hardware specifications necessary for CLIx intervention. The marked × indicate the gap of specific hardware in corresponding school and the ones marked √ indicates presence of computer hardware in the school.

Table 30 : Gaps in ICT Infrastructure in Sirohi schools before CLIx Intervention

Sl. No.	Sirohi	Computers	N-Computing Device	Functional LAN Setup	Internet	Display	Server	Keyboard & Mouse	Web cam	Headphone (10/20)	Speaker	Printer	Splitters	Scanner	LED(TV)	Power backup
1	Govt. Sr.Sec. School, Undra	√	√	√	×	√	×	√	√	×	√	√	×	√	√	√
2	Govt. Girls Sec. School, Jawal	√	√	√	×	√	×	√	√	×	√	√	×	√	√	√
3	Govt. Sec. Sr. School, Manora	√	√	√	√	√	×	√	√	×	√	√	×	√	√	√
4	Govt. Adarsh. Asec. School, Uud, Sirohi	√	√	√	×	√	×	√	√	×	√	√	×	√	√	√
5	Govt. Sr. Sec. School, Sindrath	√	√	√	√	√	×	√	√	×	√	√	×	√	√	√
6	Govt. Sr. Sec. School, Peshua	√	√	×	×	√	×	√	√	×	√	√	×	√	√	√

Sl. No.	Sirohi	Computers	N-Computing Device	Functional LAN Setup	Internet	Display	Server	key board & Mouse	Web cam	Headphone (10/20)	Speaker	Printer	Splitters	Scanner	LED(TV)	Power backup
7	Govt. Sr. Sec. School, Sanwara R	√	√	√	√	√	×	√	√	×	√	√	×	√	√	√
8	Govt. Sr. Sec. School, Naradara	√	√	√	×	√	×	√	√	×	√	√	×	√	√	√
9	Govt. Sr. Sec. School, Andore	√	√	×	×	√	×	√	√	×	√	√	×	√	√	√
10	Govt. Sr. Sec. School, Bhootgaon	√	√	√	×	√	×	√	√	×	√	√	×	√	√	√
11	Govt. Sr. Sec. School, Vatera	√	√	×	×	√	×	√	√	×	√	√	×	√	√	√
12	Govt. Sr. Sec. School, Bhimana	√	√	√	×	√	×	√	√	×	√	√	×	√	√	√
13	Govt. Sr. Sec. School, Vasa	√	√	√	√	√	×	√	√	×	√	√	×	√	√	√
14	Govt. Adarsh Sr. Sec. School, Morthala	√	√	√	×	√	×	√	√	×	√	√	×	√	√	√
15	Govt. Adarsh Sr. Sec. School, Deldar	√	√	√	×	√	×	√	√	×	√	√	×	√	√	√
16	Govt. Sec. School, Akrabhata	√	√	√	×	√	×	√	√	×	√	√	×	√	√	√
17	Govt. Adarsh Sr. Sec. School, Maval	√	√	√	×	√	×	√	√	×	√	√	×	√	√	√
18	Govt. Girls Sr. Sec. School, Mount Abu	√	√	√	√	√	×	√	√	×	√	√	×	√	√	√
19	Govt. Adarsh Sr. Sec. School,Tartoli	√	√	√	√	√	×	√	√	×	√	√	×	√	√	√
20	Govt.Girls Sr. School, Mandar	√	√	√	×	√	×	√	√	×	√	√	×	√	√	√
21	Govt. Sr. Sec. School, Mandwariya	√	√	√	×	√	×	√	√	×	√	√	×	√	√	√
22	Govt. Sr. Sec. School, Jeerawal	√	√	√	√	√	×	√	√	×	√	√	×	√	√	√
23	Govt. Sr.Sec School, Datrai	√	√	√	√	√	×	√	√	×	√	√	×	√	√	√
24	Govt. Sr. Sec. School, Pamera	√	√	√	×	√	×	√	√	×	√	√	×	√	√	√
25	Govt. Sr. Sec. School, Makawal	√	√	√	×	√	×	√	√	×	√	√	×	√	√	√
26	Govt. Adarsh Sr. Sec. School, Gulabganj	√	√	√	√	√	×	√	√	×	√	√	×	√	√	√
27	Govt. Sr. Sec. School, Marol	√	√	√	×	√	×	√	√	×	√	√	×	√	√	√
28	Govt. Sr. Sec. School, Lunol	√	√	√	×	√	×	√	√	×	√	√	×	√	√	√
29	Govt. Sr. Sec. School, Rukhada, Shivganj	√	√	√	×	√	×	√	√	×	√	√	×	√	√	√
30	Govt. Adarsh Sr. Sec. School, Vaghsin	√	√	√	√	√	×	√	√	×	√	√	×	√	√	√
31	Govt. Sec. School, Khejariya	√	√	√	√	√	×	√	√	×	√	√	×	√	√	√
32	Govt. Sr. Sec. School, Uthman	√	√	√	×	√	×	√	√	×	√	√	×	√	√	√
33	Govt. Sr.Sec School, Chiwagoan	√	√	√	√	√	×	√	√	×	√	√	×	√	√	√
34	Govt. Sr. Sec. School, Jogapura(Purana)	√	√	√	×	√	×	√	√	×	√	√	×	√	√	√
35	Govt. Sr.Sec School, Aalpa	√	√	×	×	√	×	√	√	×	√	√	×	√	√	√
36	Govt. Sec. School, Chotalakmawa, Shivganj, Sirohi	√	√	√	×	√	×	√	√	×	√	√	×	√	√	√
37	Govt.Ser.School, Keasrpura	√	√	√	×	√	×	√	√	×	√	√	×	√	√	√
38	Govt. Sec. School, Shivganj	√	√	√	√	√	×	√	√	×	√	√	×	√	√	√
39	Govt. Sr. Sec. School, Fugni	√	√	√	√	√	×	√	√	×	√	√	×	√	√	√
40	Govt. Adarsh Sr. Sec. School, Madiya	√	√	√	√	√	×	√	√	×	√	√	×	√	√	√
41	Govt. Sr. Sec. School, Sanpur	√	√	√	×	√	×	√	√	×	√	√	×	√	√	√
42	Govt. Sec. School, Deldar, Mandh	√	√	√	×	√	×	√	√	×	√	√	×	√	√	√
43	Govt. Sr. Sec. School, Mandwariya	√	√	√	√	√	×	√	√	×	√	√	×	√	√	√
44	Govt. Sec. School,Sirohi	√	√	√	×	√	×	√	√	×	√	√	×	√	√	√
45	Govt. Sr. Sec. School, Khambal	√	√	√	×	√	×	√	√	×	√	√	×	√	√	√
46	Govt. Sr. Sec. School, Dodua	√	√	√	×	√	×	√	√	×	√	√	×	√	√	√
47	Govt. Adarsh Sr. Sec. School, Haliwada	√	√	√	×	√	×	√	√	×	√	√	×	√	√	√
48	Govt. Sr. Sec. School,Aamlari	√	√	√	×	√	×	√	√	×	√	√	×	√	√	√

Source: CLIx internal survey. July-Nov, 2016

Table 30 indicates the gaps in ICT infrastructure in the schools selected for CLIx intervention in Sirohi district. The gaps are mapped for 15 key computer hardware specifications necessary for CLIx intervention. The marked × indicate the gap of specific hardware in corresponding school and the ones marked √ indicates presence of computer hardware in the school.

Table 31 : Budget Summary for Procurement of ICT infrastructure

SL. No.	Particulars	Number of units	Amount in Rs
1	Dell Server	101	34,59,881
2	Server Distribution Transportation Cost	--	27,036
3	Keyboard	55	23,380
4	Mouse	120	30,000
5	Speaker	13	7,145
6	Splitter	243	30,777
7	Patch Cable* 10 meter	15	6,270
8	Patch Cable* 3 meter	100	16,985
9	HDMI to VGA Convertor	7	2,452
10	Pen Drive	6	8,550
11	Headphones	1000	5,50,000
	Total Amount		Rs.41,62,476

Source: CLIx internal documents, August, 2016

Table 31 shows the number of units of each device required for CLIx intervention and its cost. CLIx has now procured the entire necessary infrastructure at a cost of Rs .41,62,476.

Table 32 : Current Status of ICT Infrastructure in Jaipur after Upgradation for CLIx Intervention

Sl. No.	Jaipur	Computers	N-Computing Device	Functional LAN Setup	Internet	Display	Server	key board & Mouse	Web cam	Headphone (20/20)	Speaker	Printer	Splitters	Scanner	LED(TV)	Power backup
1	Govt.AdarshSr.Sec.School,Jalsu,Khorashymdas	√	√	√	×	√	√	√	√	√	√	√	√	√	√	√
2	Govt.AdarshSr.Sec.School,Rampuradabdi	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
3	Govt.MaheshwariSec.School,Govindghar,Chomu	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
4	Govt.Sr.Sec.School,RojdiViaPhulera,Dudu	√	√	√	×	√	√	√	√	√	√	√	√	√	√	√
5	Govt.Sr.Sec.School,Sakuhooa,Hatupura,Dudu	√	√	√	×	√	√	√	√	√	√	√	√	√	√	√
6	Govt.Sr.Sec.School,Kachroda,Dudu	√	√	√	×	√	√	√	√	√	√	√	√	√	√	√
7	Govt.Sr.Sec.School,Nidadh,Jhotwara	√	√	√	×	√	√	√	√	√	√	√	√	√	√	√
8	Govt.AdarshSr.Sec.School,Hadota	×	√	√	√	√	√	√	√	√	√	√	√	√	√	√
9	Govt.Sr.Sec.School,Morija,Govindgadh	√	√	√	×	√	√	√	√	√	√	√	√	√	√	√
10	Govt.AdarshSr.Sec.School,Radhaswamibagh,Jhotwada	√	√	√	×	√	√	√	√	√	√	√	√	√	√	√

Sl. No.	Jaipur	Computers	N-Computing Device	Functional LAN Setup	Internet	Display	Server	key board & Mouse	Web cam	Headphone (20/20)	Speaker	Printer	Splitters	Scanner	LED(TV)	Power backup
11	Govt. Sr. Sec. School, Jawaharnagar	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
12	Govt. Sec. School, Mandikhatikan	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
13	Govt. Sr. Sec. School, Labour Colony, Bani Park	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
14	Govt. Girls Sr. Sec. School, Narikanaka, Sastrinagar	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
15	Govt. Sr. Sec. School, Charan-2 Nadi, Dadikafatak	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
16	Govt. Sr. Sec. School, Nivaru Road Jaipur	√	√	√	×	√	√	√	√	√	√	√	√	√	√	√
17	Govt. Girls Sr. Sec. School, Durgapura	√	√	√	×	√	√	√	√	√	√	√	√	√	√	√
18	Govt. Sr. Sec. School, Goukulpura	√	√	√	×	√	√	√	√	√	√	√	√	√	√	√
19	Govt. Sr. Sec. School, Goliyawas	√	√	√	×	√	√	√	√	√	√	√	√	√	√	√
20	Govt. Adarsh Sr. Sec. School, Mansarovar	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
21	Govt. Sec School,Chakbasdi	√	√	×	√	√	√	√	√	√	√	√	√	√	√	√
22	Govt. Girls Sr. Sec. School, Ravaljikabagh	√	√	√	×	√	√	√	√	√	√	√	√	√	√	√
23	Govt. Sr. Sec. School Near Tample, Padampura	√	√	√	×	√	√	√	√	√	√	√	√	√	√	√
24	Govt. Girl Sec. School Sheetaladungri	√	√	√	×	√	√	√	√	√	√	√	√	√	√	√
25	Govt. Sr. Sec. School Radoli	√	√	√	×	√	√	√	√	√	√	√	√	√	√	√
26	Govt. Sec. School Mahadevpura	√	√	√	×	√	√	√	√	√	√	√	√	√	√	√
27	Govt. Sr. Sec. School, Agra Road Paldimeena	√	√	√	×	√	√	√	√	√	√	√	√	√	√	√
28	Govt. Adarsh Sr. Sec. School, Agra Road Jhar	√	√	√	×	√	√	√	√	√	√	√	√	√	√	√
29	Govt. Adarsh Sr. Sec. School, Sambharia	√	√	√	×	√	√	√	√	√	√	√	√	√	√	√
30	Govt. Girl Sr. Sec. School, Goner, Near Jagdish Temple	√	√	√	×	√	√	√	√	√	√	√	√	√	√	√
31	Govt. Sr. Sec. School, Vidhani	√	√	√	×	√	√	√	√	√	√	√	√	√	√	√
32	Govt. Sr. Sec. School, Garudwasl	√	√	√	×	√	√	√	√	√	√	√	√	√	√	√
33	Govt. Sr. Sec. School, Ramnagar	√	√	√	×	√	√	√	√	√	√	√	√	√	√	√
34	Govt. Sec. School, Kunthadakalan, Bassi	√	√	√	×	√	√	√	√	√	√	√	√	√	√	√
35	Govt. Sr. Secondary School, Garudwasi, Chaksu	√	√	√	×	√	√	√	√	√	√	√	√	√	√	√
36	Govt. Sr. Sec. School, Chaapradi	√	√	√	×	√	√	√	√	√	√	√	√	√	√	√
37	Govt. Sr. Sec. School, Bhagawaschorsi	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
38	Govt. Sr. Sec. School, Bhonawas	√	√	√	×	√	√	√	√	√	√	√	√	√	√	√
39	Govt. Adarsh Sr. Sec. School, Taskola	√	√	√	×	√	√	√	√	√	√	√	√	√	√	√
40	Govt. Adarsh Sr. Sec. School, Nevar, Dhula Via Banshka	√	√	√	×	√	√	√	√	√	√	√	√	√	√	√
41	Govt. Sec. School, Dhaupura	√	√	√	×	√	√	√	√	√	√	√	√	√	√	√
42	Govt. Sr. Sec. School, Tholai	√	√	√	×	√	√	√	√	√	√	√	√	√	√	√
43	Govt. Sec. School, Hanutpura	√	√	√	×	√	√	√	×	√	√	√	√	√	√	√
44	Govt. Sec. School, Rajpurvasstala	√	√	√	×	√	√	√	√	√	√	√	√	√	√	√
45	Govt. Adarsh Sr. Sec. School, Barodiya, Viratnagar	√	√	√	×	√	√	√	√	√	√	√	√	√	√	√
46	Govt. Adarsh Sr. Sec. School, Mohabbalpura	√	√	√	×	√	√	√	√	√	√	√	√	√	√	√
47	Govt. Adarsh Sr. Sec. School, Harsolia	√	√	√	×	√	√	√	√	√	√	√	√	√	√	√
48	Govt. Adarsh Sr. Sec. School, Gohandi	√	√	√	×	√	√	√	√	√	√	√	√	√	√	√
49	Govt. Sec. School, Chhaparwada, Dudu	√	√	√	×	√	√	√	√	√	√	√	√	√	√	√
50	Govt. Girls Sec. School, Shubashchoknarayana	√	√	√	×	√	√	√	√	√	√	√	√	√	√	√
51	Govt. Sec. School, Dablabujurag,Phagi	×	√	×	×	√	√	√	√	√	√	√	√	√	√	√

Source: CLIx internal documents, 2016

Table 33 : Current Status of ICT Infrastructure in Sirohi after Upgradation for CLIx intervention

Sl. No.	Sirohi	Computers	N-Computing Device	Functional LAN Setup	Internet	Display	key board	Mouse	Web cam	Headphone	Speaker	Printer	Cartridge Filling	Scanner	LED(TV)	Power backup
1	Govt. Sr. Sec. School, Undra	√	√	√	×	√	√	√	√	√	√	√	√	√	√	√
2	Govt. Girls Sec. School, Jawal	√	√	√	×	√	√	√	√	√	√	√	√	√	√	√
3	Govt. Sec. Sr. School, Manora	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
4	Govt. Adarsh. Asec. School, Uud, Sirohi	√	√	√	×	√	√	√	√	√	√	√	√	√	√	√
5	Govt. Sr. Sec. School, Sindrath	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
6	Govt. Sr. Sec. School, Peshua	√	√	×	×	√	√	√	√	√	√	√	√	√	√	√
7	Govt. Sr. Sec. School, Sanwara R	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
8	Govt. Sr. Sec. School, Naradara	√	√	√	×	√	√	√	√	√	√	√	√	√	√	√
9	Govt. Sr. Sec. School, Andore	√	√	×	×	√	√	√	√	√	√	√	√	√	√	√
10	Govt. Sr. Sec. School, Bhootgaon	√	√	√	×	√	√	√	√	√	√	√	√	√	√	√
11	Govt. Sr. Sec. School, Vatera	√	√	×	×	√	√	√	√	√	√	√	√	√	√	√
12	Govt. Sr. Sec. School, Bhimana	√	√	√	×	√	√	√	√	√	√	√	√	√	√	√
13	Govt. Sr. Sec. School, Vasa	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
14	Govt. Adarsh Sr. Sec. School, Morthala	√	√	√	×	√	√	√	√	√	√	√	√	√	√	√
15	Govt. Adarsh Sr. Sec. School, Deldar	√	√	√	×	√	√	√	√	√	√	√	√	√	√	√
16	Govt. Sec. School, Akrabhata	√	√	√	×	√	√	√	√	√	√	√	√	√	√	√
17	Govt. Adarsh Sr. Sec. School, Maval	√	√	√	×	√	√	√	√	√	√	√	√	√	√	√
18	Govt. Girls Sr. Sec. School, Mount Abu	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
19	Govt. Adarsh Sr. Sec. School,Tartoli	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
20	Govt.Girls Sr. School, Mandar	√	√	√	×	√	√	√	√	√	√	√	√	√	√	√
21	Govt. Sr. Sec. School, Mandwariya	√	√	√	×	√	√	√	√	√	√	√	√	√	√	√
22	Govt. Sr. Sec. School, Jeerawal	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
23	Govt. Sr.Sec School, Datrai	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
24	Govt. Sr. Sec. School, Pamera	√	√	√	×	√	√	√	√	√	√	√	√	√	√	√
25	Govt. Sr. Sec. School, Makawal	√	√	√	×	√	√	√	√	√	√	√	√	√	√	√
26	Govt. Adarsh Sr. Sec. School, Gulabganj	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
27	Govt. Sr. Sec. School, Marol	√	√	√	×	√	√	√	√	√	√	√	√	√	√	√
28	Govt. Sr. Sec. School, Lunol	√	√	√	×	√	√	√	√	√	√	√	√	√	√	√
29	Govt. Sr. Sec. School, Rukhada, Shivganj	√	√	√	×	√	√	√	√	√	√	√	√	√	√	√
30	Govt. Adarsh Sr. Sec. School, Vaghsin	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
31	Govt. Sec. School, Khejariya	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
32	Govt. Sr. Sec. School, Uthman	√	√	√	×	√	√	√	√	√	√	√	√	√	√	√
33	Govt. Sr.Sec School, Chiwagoan	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
34	Govt. Sr. Sec. School, Jogapura(Purana)	√	√	√	×	√	√	√	√	√	√	√	√	√	√	√
35	Govt. Sr.Sec School, Aalpa	√	√	×	×	√	√	√	√	√	√	√	√	√	√	√
36	Govt. Sec. School, Chotalakmawa, Shivganj, Sirohi	√	√	√	×	√	√	√	√	√	√	√	√	√	√	√
37	Govt.Ser.School, Keasrpura	√	√	√	×	√	√	√	√	√	√	√	√	√	√	√
38	Govt. Sec. School, Shivganj	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
39	Govt. Sr. Sec. School, Fugni	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
40	Govt. Adarsh Sr. Sec. School, Madiya	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√

Source: CLIx internal documents, 2016

Sl. No.	Sirohi	Computers	N-Computing Device	Functional LAN Setup	Internet	Display	key board	Mouse	Web cam	Headphone	Speaker	Printer	Cartridge Filling	Scanner	LED(TV)	Power backup
41	Govt. Sr. Sec. School, Sanpur	√	√	√	×	√	√	√	√	√	√	√	√	√	√	√
42	Govt. Sec. School, Deldar, Mandh	√	√	√	×	√	√	√	√	√	√	√	√	√	√	√
43	Govt. Sr. Sec. School, Mandwariya	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
44	Govt. Sec. School,Sirohi	√	√	√	×	√	√	√	√	√	√	√	√	√	√	√
45	Govt. Sr. Sec. School, Khambal	√	√	√	×	√	√	√	√	√	√	√	√	√	√	√
46	Govt. Sr. Sec. School, Dodua	√	√	√	×	√	√	√	√	√	√	√	√	√	√	√
47	Govt. Adarsh Sr. Sec. School, Haliwada	√	√	√	×	√	√	√	√	√	√	√	√	√	√	√
48	Govt. Sr. Sec. School,Aamlari	√	√	√	×	√	√	√	√	√	√	√	√	√	√	√

Source: CLIx internal documents, 2016

CLIx in Rajasthan

III. CLIx in Rajasthan

The first phase of the initiative attempts to build a model at scale that will help establish a local ecosystem connecting youth and teachers from local communities, education institutions, domain experts and creating an environment that supports active learning and seamless technological use in schools and the teaching-learning process. The initiative aspires to nurture an ecosystem of partnerships to effectively implement in the field, the modules and courses developed for Mathematics, Science, English and Teacher Professional Development (TPD). During this phase, through action research, we will demonstrate the proof of concept in the following areas:

i. The efficacy and value of such learning to youth, particularly from underserved regions and communities.

ii. The efficacy of a platform based approach to curriculum strengthening and teacher professional development at scale.

iii. The sustainability of a networked and ecosystem approach involving partners: individuals, institutions, the education system, teachers, and resources.

Progress and Milestones Achieved in CLIx

S.No	Activity	Time
	Ground Preparations and Research	
1	Situational Analysis of ICT in School Education In Rajasthan	November 2014
2	Implementation partner –CERP : MoU between Tata Institute of Social Sciences and CERP	June 2015
3	MoU between RCSE and Tata Institute of Social Sciences, Mumbai	July 2015
4	Survey in 119 schools for selection (Jaipur, Sirohi, Baran & Jhalawar) 101 schools selected in Jaipur and Sirohi districts in consultation with the department **refer to Technology Readiness Report for details	August 2015
5	Two rounds of Pilot testing of baseline tools	October-December 2015
6	Baseline research in 40 intervention and 20 Control schools	April 2016- November 2016
7	Study on Status of Secondary Education – Rajasthan	June 2016 - January 2017
	Lab Readiness	
8	Detailed Infrastructure mapping of computer labs of selected	September-2015
	101 schools (Jaipur & Sirohi) Round 1: for status of ICT labs Detailed Infrastructure mapping of computer labs of selected 101 schools (Jaipur & Sirohi) Round 2: for status of ICT labs	February 2016
9	Procurement of peripherals and server machines	July 2016
10	Installation of servers, peripherals etc	July - November 2016
	**refer to Technology Readiness Report for details	
	Module Development	
11	Curricular Mapping	May 2015
12	Field Study – Math Group (Curriculum development)	October 2015
13	Field Study – English group (Curriculum development)	May 2016

S.No	Activity	Time
	Systemic Preparation	
14	State Steering Committee formation and its first meeting	January 2016
15	Orientation of Principals of Schools participating in CLIx	February 2016
16	Meeting with School Principals for discussing integration of CLIx in school timetables	October - November 2016
17	Implementation design camp for developing micro plan for the TPD and roll out of various modules in the next session in Rajasthan state	January 2017
18	Continuous professional development of teachers	August - October 2016
19	Subject module implementation in schools	October 2016 - March 2017

8. Implementation of CLIx

The implementation of CLIx programme consists of two main components.

8.1. Teacher Professional Development (TPD)

To implement CLIx in schools, teachers are first trained and oriented on the CLIx modules. Teacher Professional Development/Training includes a face to face component and online engagement through discussions on platform like CLIx Community (Discourse) and Telegram. Online platforms are for continuous engagement and deeper academic and professional discussion with teachers and to support teachers in implementing the modules with the students. A group of Teacher Educators (ICT) in Rajasthan has been formed to support TPD of school teachers. Similar groups for Maths, Science and English will be formed in due course.

TPD activities in Rajasthan for 2016-17

S.No	Teacher Professional Development (TPD)/Trainings	Time
1	TPP workshop in Mumbai for Subject advisors & Teacher educators (Teacher educators and advisors participated from Rajasthan state)	14-15 August & 13-14 September, 2016
2	i2C - Digital Literacy (113 teachers of subject Math, Science & English from 101 schools)	Feb 2016, June 2016 & August 2016
3	Mathematics - Geometry (53 teachers)	October 2016
4	English (46 teachers)	September 2016
5	Teacher groups on Telegram and CLIx community on Discourse platform	Feb 2016 onwards
6	TPD Design Camp at TISS, Mumbai - 2 Teacher Educators participated from Rajasthan	December 2016

8.2. Student Module Rollout

Subject modules for students are implemented by teachers. Until February 2017, the digital literacy module has been rolled out in about 81 schools, English module in 20 schools and Math module in about 5 schools. The school level implementation is expected to happen till mid-March 2017. For the onsite support and handholding of teachers, a team of Field Support Persons have been placed in the field (1 FSP for 10 schools). 1 Field Technologist (FT) provides technical support to the FSPs and schools. FSPs and FTs are oriented by the expert teams of the CLIx programme.

Modules offered: (as on 24 Feb 2017)

S.No	Student Rollout	No. of schools	Time
1	**i2C - 4 Modules** i. Introduction / Indic Typing ii. Drawing and Designing – Inkscape iii. Measuring and Observing – Spreadsheet iv. Dynamic Mathematics – Geogebra	81 schools	Oct 2016 - Feb 2017
2	**Mathematics - 1 Module** i. Geometric Reasoning	2 schools	Jan 2017 onwards
3	**English - 2 Courses** i. English Beginner - 10 lessons ii. English Elementary - 5 lessons	17 schools	Dec 2016 onwards

9. CLIx Offerings for Year 2017-18

For teachers, CLIx will be offering a certificate coursefor in-service teacher professional development. The CLIx programme will leverage ICT to provide sustained and long-term professional development of teachers by:

a. Developing professional learning communities to reach rural schools and its teachers.

b. Imbibing the transformative pedagogies with contextual, authentic content for teachers to re-engage with subject matter. (For further details refer to of Annexure II).

For students, CLIx comprises of an introductory digital literacy course titled Invitation to CLIx (i2C), modules in Communicative English, Mathematics and Science for grade 8 and 9 students. In year 2, the existing modules shall be revised and offered based on feedback from teachers and our observations in schools. (For further details refer to Annexure II).

10. Challenges faced in implementing CLIx

There has been an overall appreciation for the initiative among the principals, teachers and students. However, there have been several challenges along the way in implementing the CLIx intervention.

i) ICT infrastructure in schools –

The trainings for TPD and i2C for teachers were done at the computer laboratories in the chosen institute or college, hence there were no infrastructural issues faced in conducting the trainings successfully. However, for the roll out of i2C to students, the implementation team faced several constraints owing to the inadequate infrastructure available at the school. Some of the issues are -

a. Challenges in transacting the modules and limited access to computers by students because of high computer student ratio (1:3 - 1:5) in some schools.

b. Not enough physical space in the computer lab of some schools to accommodate one entire section of students (average class size of 40).

c. Low maintenance of computer labs by schools and service providers (ICT labs are managed by private service providers). Principals are not sure of provisions for maintenance.

d. Non-functional computer labs largely due to budget constraints in upgrading and making them functional.

e. Constant technical issues arising in relation to the functioning of computer labs especially for N Computing arrangement in labs.

f. Lack of continuous internet connectivity. Modules have to be uploaded on all the machines or servers. Uploading, updating and data retrieval is a manual process.

ii) Teacher Educators and Teachers

During training and especially post training, teachers are quite confident of transacting the module with the students, however there are a few challenges that are being observed during the student roll out.

a. Teacher's anxiety of technology or technology based teaching.

b. Low turn out of teachers during the training workshops.

c. Teacher's perception that the ICT class is separate/different from the subject classes and lack of motivation to integrate ICT within their subject teaching.

d. Teacher's inability to relate i2C (digital literacy) to their subject areas and thus their disinterest in rolling out i2C in their schools.

e. Expectations from teachers for the presence of a local team member during module roll out in schools.

f. Declining confidence in teachers for rolling out modules in school because of gap between TPD/Trainings and module delivery.

g. Delay in module delivery and pressure on teachers to complete the syllabus making them unable to accommodate CLIx modules.

h. For principals and teachers, Class 10 is always on priority due to the board exam.

i. Gap between teachers' understanding of CLIx and their expectations and CLIx approach on integration of technology in curriculum and pedagogy.

iii) Administrative

a. Grouping a section of students in two or more groups to access computer lab is challenging.

b. Timetabling - incorporating CLIx modules (block periods) in the existing timetable has been very limited. In the time scheduling there is hardly time for teachers to take up hands-on activities. Within the existing timeframe there is a possibility to restructure the time table to support the activity based teaching process. Two periods of Science in class IX can be clubbed together to facilitate this process.

11. Recommendations

The experience of implementing CLIx in Rajasthan highlighted many issues that need to be addressed in order to effectively implement any ICT programme in the state, including CLIx intervention. Some of these issues are strengthening of the overall ICT infrastructure in schools, streamlining policies regarding teacher trainings and use of ICT resources for their professional development, use of open and free software, and adequate allocation and use of budgets.

In this regard, some key recommendations for ICT in Rajasthan are:

1. **Enhancing access and quality of computer based learning experiences for students (curriculum integration of ICT in Maths, Science, English)**

The state government should enhance existing ICT infrastructure in schools. Specifically, it should:

i. Provide adequate number of computers to schools based on student enrollment to improve the computer-student ratio at to 1:2 or 1:3 (at present it is 1:5 or even worse).
ii. Replace five and above years' old non-functional machines with new machines of the latest configuration.
iii. Ensure the computer lab is of an appropriate size to comfortably accommodate at least 2-3 students per machine
iv. Ensure internet connectivity for the computing lab with 4Mbps connection with unlimited upload/download for connected learning experience, access to open educational resources and information, easy syncing and retrieval of data.
v. Peripherals including headphones with microphones and splitters for listening and speaking.
vi. Power backup to the computer lab to avoid any data loss, to provide an uninterrupted learning experience and ensure safety of machines.
vii. Provide on-going maintenance of the computer lab and upgrade existing machines and repair/replace old ones.
viii. ICT@Schools phase IV to move in the direction of wireless solutions including wireless keyboards, laptops/tablets (as opposed to desktops), and availability of peripherals such as headphones with microphones, USB microscopes etc.
ix. Flexibility of device choice (e.g. purchase of laptops/notebooks instead of desktops) so that the computer lab is made more accessible to larger batches.

2. Teacher Professional Development for and with ICT

I. To promote higher quality of in-service teacher professional development recognize the value of certified courses In Service Teacher Training (INSET)
ii. Move towards cafeteria approach to INSET with a menu of courses that could be recognised and recommended to teachers.
iii. Allocate resources for TPD to enable teachers to become ICT users, for teachers' digital literacy and use of NROER and other such open, interactive resources.
iv. Forming a cadre of subject Teacher Educators who can lead blended INSET
v. Support teachers for the purchase of personal computing devices.
vi. Data plans for teachers who are enrolled for courses or reimbursement of course fee with a contingency for computing device and data plan on successful completion with a minimum grade.
vii. Placement of Maths, Science and English teachers for the secondary section.
viii. In Science, emphasis on hands-on activities and projects for real life experiences.

3. Schools

i. Allocation in the school timetable for science labs and ICT labs (approximately 30% of school time to be earmarked for lab and library time).
ii. Flexibility in time tabling including batching and block period for use of science and ICT labs.
iii. Curricular resources to teachers and students in the form of supplementary handbooks, workbooks etc.
iv. Maintenance and refurbishment of science labs replenishment of consumable items.
v. Maintenance and refurbishment of libraries
vi. School leadership training to manage and facilitate innovation and change.

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Annexure

Annexure 1: Details of CLIx offering 2017-18

(1) Digital Literacy course

Digital Literacy provides learners with operational skills for the new media. In i2C we invite learners to an exemplary connected learning experience on a specially designed course platform. i2C prepares learners for conceptual and investigative engagements in Science, Mathematics and Communicative English to be offered through CLIx. The skills thus acquired will last a lifetime.

Modules to be offered:

i. Introduction / Indic Typing
ii. Drawing and Designing – Inkscape
iii. Measuring and Observing – Spreadsheet
iv. Dynamic Mathematics – Geogebra
v. Programming activities – Turtle
vi. Simulations – Turtle
vii. Mapping your world – Open Street Mapping

(2) English

The English course aims to improve learners' communicative abilities, especially oral communication skills, through an immersive experience using computer technology, by adopting a task-based, communicative language teaching approach for L2 or second language learners.

Modules to be offered:

i. English Elementary (30 lessons)
ii. English Beginners (10 lessons)
iii. English Pre-Beginner (20 lessons)

(3) Mathematics

CLIx Math aims to change the approach to math learning and teaching at high school level. It focuses on three core aspects to bring about desired changes, with technology as an enabler:

i. Re-interpreting the Curriculum: Strengthening the intended curriculum by building modules that use parts of the textbook content as the basis for building foundational concepts, strengthening reasoning ability, and understanding core ideas of mathematics
ii. Transforming the Pedagogy: Learning through meaningful explorations and games, discussion of mathematical ideas
iii. Continuous professional development of Math teachers.

Modules to be offered:

i. Geometric reasoning
ii. Proportional reasoning
iii. Linear Equations

(4) Science

CLIx science focuses on strengthening the fundamentals of scientific learning.

Modules to be offered:

I. Physics:

a) Fundamental idea of motion
b) Force and Motion

ii. Astronomy

iii. Life Science:

a) Ecosystem
b) Health and Disease

iv. Chemistry

a) Atomic Structure

(5) Values

A course on values will be offered to both student and teachers wherein students will work with rich stories and games that expose them to a wide variety of personal and social situations and help them to reflect on how they can make decisions in such situations. Teachers will be also be oriented and trained to reflect on their own values, which will allow them to be more effective role models for children. Teachers will also be equipped to facilitate values learning sessions with children in a way such that students' ability to independently question and reflect on value dilemmas is strengthened.

Annexure 2 : Details of Teacher Professional Development

(1) Post Graduate Certificate in Reflective Teaching with ICT

CLIx blended learning courses are offered as part of a Certificate programme for teachers. This programme is open to all teachers including teachers in schools that are implementing the CLIx project. The programme allows in-service teachers to engage in learning extending over a school academic year in the following key areas:

1. Foundation courses focusing on 21st century learning skills including ICT
2. Blended courses in pedagogy of Mathematics, Science and English Language
3. Developing communities of practice for teachers
4. Establishing a pedagogical framework

Course will be offered in two phases.

1. 2017-18 TPD: (8 credits), it includes two courses:

i. Foundation Course - ICT in Education (4 credits)

ii. One Subject Specialization Course - English/Mathematics/Science (4 credits)

2. 2018-19 TPD: (9 credits), it includes following courses:

I. Action Research or Digital Portfolio (3 credits)

Electives:

i. Nurturing Values Development in Adolescents (2 credits)
ii. Using Media in Classrooms (2 credits)
iii. Hands-on Learning through Toy Making (2 credits)

Completion of 17 credits will lead to the award of the Post-Graduate Certificate (PGC) in Reflective Teaching with ICT.

(2) Teacher/Faculty Fellowships

CLIx Teacher/Faculty Fellowships for faculty from colleges, University Departments and teachers from schools involved with teaching Mathematics, Science, English, Technology and teacher education in the state of Rajasthan. The Fellows will be placed at TISS Mumbai to work with CLIx curriculum development teams to contribute to the design and development of modules. The fellowship will provide an opportunity to work on new and emerging ideas in technology integration into curriculum and teacher professional development.

(3) Develop Local Leadership and Expertise

For long term sustainability, TISS and partner institutes will share their expertise and build the capacities of the local groups to develop local leadership in the development of technology integrated curriculum and teacher professional development.

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