CLI — CONNECTED LEARNING INITIATIVE

Winner of the 2017 UNESCO -
*King Hamad Bin Isa Al-Khalifa Prize for **Use of ICTs in Education***

Key Research Findings

CLIx Research Objectives:

- To analyse impact on students, teachers, classroom processes, school systems and pedagogic cultures.
- To strengthen intervention through design based research and intervention monitoring.
- To draw evidence-based lessons through understanding of innovation diffusion, communities of practice, models of intervention.
- To contribute to literature and policy.

Impact on Students Learning and ICT Skills

- CLIx students are significantly better in English and ICT skills: basic and intermediate level digital skills and application.
- Students from marginalized communities in CLIx schools perform better than their counterparts in non-CLIx schools in all three states.
- Mizoram students show learning gains in Mathematics, Science and English.
- Rajasthan students show learning gains in Science, particularly in reasoning based skills.
- Chhattisgarh results are not statistically significant.

Table 1: State Wise Comparison of Average score of Students between CLIx and Non CLIx (Control) schools in Overall ICT skills showing where there are significant differences. *(Source: CLIx midline survey Jan 2018)*												
	3 States			**Chhattisgarh**			**Mizoram**			**Rajasthan**		
Factor	**CLIx**	**Non CLIx**	**P value**	**CLIx**	**Non CLIx**	**P value**	**CLIx**	**Non CLIx**	**P value**	**CLIx**	**Non CLIx**	**P value**
Application based technology	21	20	***	20	19		19.5	19.6		22	20	***
Basic digital skills	19	17.5	***	18.8	18	*	19.8	19.6		18.4	16.8	***
Internet based technology	12.2	12		11.2	11.2		12.6	13.1		12.5	12.1	*
Intermediate computer skills	5.5	5.1	***	5.5	5.4		5.4	5.4		5.5	4.9	***

Note: * $p<0.05$, ** $p<0.01$, *** $p<0.001$.

| Table 2 : Average Score of Students in select Digital Skills by Social Group. *(Source; CLIx midline survey Jan 2018)*								
Social group		**ST**	**SC**	**BC**	**OBC**	**General**	**Other**	
Basic Technical Skills	**CLIx**	19.11	18.64	18.28	18.96	18.6	17.53	***All results are significant at $p<0.05$**
	Non CLIx	20.05	18.2	17.09	16.38	17.46	18.6	
Internet Based skills	**CLIx**	12.54	12.32	12.34	11.9	12.52	12.18	
	Non CLIx	12.64	12.32	11.29	11.8	13.09	10.9	

As of February 2019

Table 3: Average Score of Students in Mathematics, Science and English.
(Source; CLIx midline survey Jan 2018)

		3 States			Chhattisgarh			Mizoram			Rajasthan		
		CLIx	Non CLIx	P value	CLIx	Non CLIx	P value	CLIx	Non CLIx	P value	CLIx	Non CLIx	P value
MATHEMATICS	Total score	34.3	36		33.67	32.65		36.14	31.72	*	34	38.4	***
	Knowledge based items	35.9	35		31.67	29.8		36.76	33.18	-	37	37.7	
	Application based items	33.4	34.6		35.36	34.01		36.99	34.06	-	32	35	*
	Reasoning based items	33.7	38.3	***	33.99	34.14		34.66	27.91	*	33.4	42.5	***
SCIENCE	Total score	33.7	35		34.39	33.67		32.99	30.62		33.7	36.6	**
	Knowledge based items	38.4	38.1		40.2	37.89		42.52	35.71		36.5	38.8	
	Application based items	34	38.1	***	35.19	35.66		29.91	28.93		34.8	41.2	***
	Reasoning based items	24.2	22.9		21.17	21.23		20.12	23.8		26.5	23.4	*
ENGLISH	Total score	37.4	40.3	**	31.6	31.8		62.39	58.57		31.5	39.5	***
	Language specification	34.8	37.7	**	28	30.4		59.11	52.56		29.3	37.2	***
	Reading comprehension	45.2	47.7		40.2	39.3		72.13	72.52		38.2	45.3	***

* p<0.05, ** p<0.01, *** p<0.001

Impact on Teachers' Beliefs and Skills
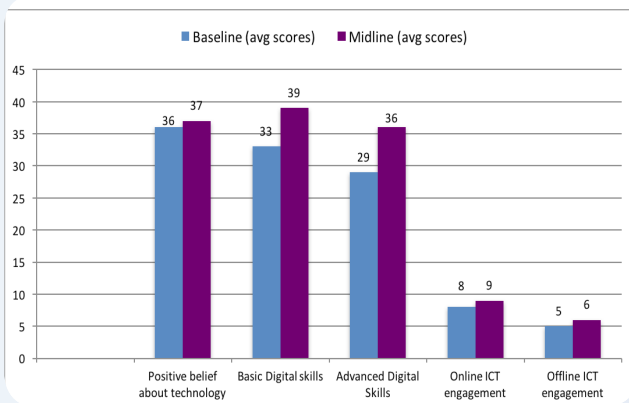
Graph 1: Change in teacher beliefs and skills in ICT
*Results are significant at 5% level of significance
(Source; CLIx Baseline survey 2016 and midline survey Jan 2018)*

- Teachers have more positive beliefs about role of technology in education.
- Teachers are more confident of various digital skills - basic and advanced - as per their self reports on 22 items.
- Teachers also show significant improvement in use of ICT for various teaching and learning purposes.

Change in Student Learning in Relation to changes in their teachers

In schools where teachers continued for over two years with CLIx, students consistently showed greater improvement in their respective subject (data for 60 teachers).

Table: 4 Average percentage score of students in select domains overtime.

(Source; CLIx Baseline Survey 2016 and Midline Survey Jan 2018)

|	English		Maths		Science	
	Baseline	Midline	Baseline	Midline	Baseline	Midline
3 States	33	45	33	34	30	34
Chhattisgarh	26	31	31	34	27	35
Mizoram	39	63	34	36	38	34
Rajasthan	29	29	31	30	25	34

- In Chhattisgarh, students on an average scored more in Midline in all three domains.
- In Mizoram students performed better in Midline in English and Maths.
- In Rajasthan, students performed better in Midline in Science.

MATH

Helps students move to higher levels of geometric reasoning, for e.g., moving from visual prototype based identification of shapes to property-based reasoning such as hierarchical class relations, conditions to form class of shapes and creating the minimal definitions. Scaffolds learner to make conjectures, arguments, examples, and counter-examples.

Performance (%) in Intervention and Non-intervention schools

Pre-test (%) ■ Post-test (%)
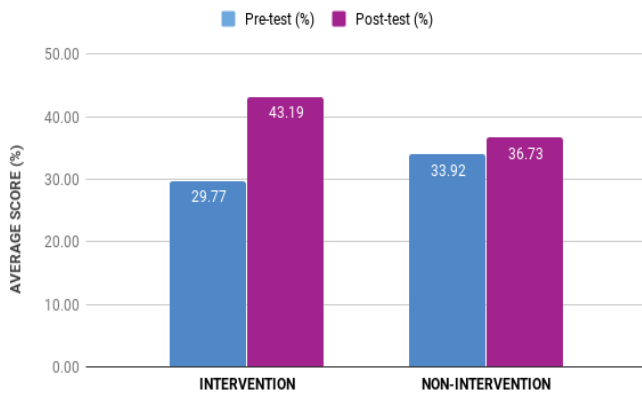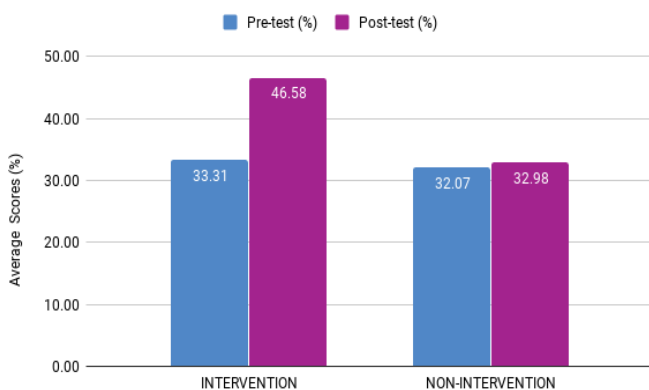

(Source: CLIx Learning Outcome study October, 2018)

- The gain from pre to post-test scores for the CLIx schools (13%) is significantly higher **(with p < 0.0001)**, whereas for non-CLIx schools (3%) is not significant.
- Students showed enhanced use of mathematical vocabulary and logical reasoning.
- Improvement in quality of student interaction and engagement in terms of extended response with
- reasoning is observed among CLIx students.
- Visible increase in students' confidence levels and interest to argue and collaborate.
- Teachers reported active participation of students who were otherwise quiet.
- Increase in meaningful classroom discussion and "Math-Talk" by teachers.

SCIENCE

Helps students construct mental models to explain commonplace astronomical phenomena. Since visuospatial thinking plays an important role in this process, the module relies on spatial tools such as concrete models, gestures, role-plays, photographs, animations and diagrams. It also connects indigenous knowledge to observations and textbooks.

Performance (%) in Intervention and Non-intervention schools
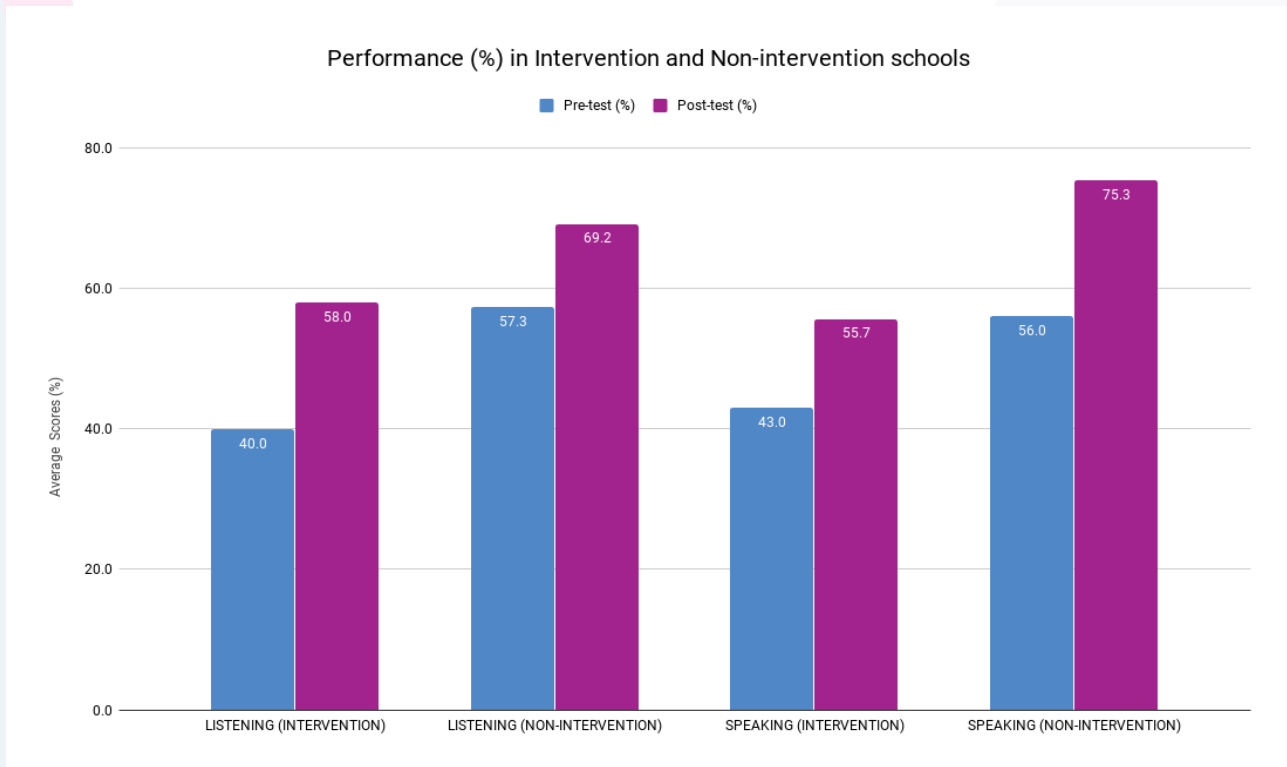
Pre-test (%) ■ Post-test (%)

(Source: CLIx Learning Outcome Study November, 2018)

- The gain from pre to post-test scores for the CLIx schools (13.27%) is significantly higher **(with p < 0.001)**, whereas for non-CLIx schools (0.90%) is not significant (with $p < 0.10$).
- CLIx students express positive attitude towards science and astronomy
- CLIx students achieve better understanding in a wide range of concepts
- Students from the CLIx school show better mental models.

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ENGLISH

Theme-based vocabulary across lessons help develop language competence. Audio stories and collaborative speaking activities help improve listening and speaking skills.

Performance (%) in Intervention and Non-intervention schools

■ Pre-test (%) ■ Post-test (%)

	LISTENING (INTERVENTION)	LISTENING (NON-INTERVENTION)	SPEAKING (INTERVENTION)	SPEAKING (NON-INTERVENTION)
Pre-test (%)	40.0	57.3	43.0	56.0
Post-test (%)	58.0	69.2	55.7	75.3

Average Scores (%)

(Source: CLIx Learning Outcome study July 2018)

Listening:

Gains in Listening skills in Intervention schools are higher and statistically significant as compared to the non-CLIx schools **(p=.0036)**. While both sets of schools showed an increase, in the intervention schools the increase was 24.2% more than the non-intervention schools.

Speaking:

In 3 of the 6 intervention schools, the pre-post-test gains were significant; This was true for all of the non-intervention schools **(p=.0301)**.

Other significant observations:

- Notable increase in collaborative learning and production of original content in English in CLIx schools.
- Improvement in the ability to identify topic of a short conversation and recall of specific details.
- Enhanced familiarity with language to achieve global and local comprehension of speech.

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