

Impact of ICT-Integrated Virtual Math Lab on Academic Achievement and Engagement of Class 8th Students at Government High School, Thuhi (Punjab)

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ABSTRACT

This action research was conducted on 30 students of Class 8 at GHS Thuhi to study the impact of ICT-integrated teaching. A Virtual Math Lab with animated videos in Punjabi, interactive graph plotting, and daily quiz was used for 4 weeks. Results show improvement in achievement and engagement compared to traditional chalk-talk method. This study supports NEP 2020 recommendation of using ICT in rural schools.

Keywords: - ICT, Virtual Lab, Mathematics, Rural School, NEP 2020

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INTRODUCTION

In rural Punjab schools, mathematics is considered difficult. Students fear graphs and formulas. ICT-Integrated teaching can make it easy with mother tongue videos and visual learning. GHS Thuhi has limited resources, so a low-cost Virtual Lab on mobile was developed.

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OBJECTIVE

- a) To study the impact of Virtual Lab on marks of Class 8 students.
- b) To study the change in classroom engagement.

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METHODOLOGY

Sample: 30 students of Class 8, GHS Thuhi

Duration: 4 weeks (August 2026)

Tool: Virtual Math Lab - Topics: Coordinates, Area-Perimeter, Daily Worksheet with Punjabi female teacher voice

Test: Pre-test and Post-test of 20 marks.

RESULT AND DISCUSSION

Pre-test Average: 8.46 / 20

PRE-TEST		
S.NO	NAME OF STUDENT	TOTAL MARKS 20 MARKS OBTAINED IN PRE TEST
1	KHUSHPREET KAUR	11
2	SEHAJPREET SINGH	8
3	AMRIT KAUR	9
4	MANPREET KAUR	11
5	NAVNEET KAUR	8
6	MANDEEP KAUR	8
7	YADWINDER KAUR	9
8	RAJVIR SINGH	9
9	RANVIR SINGH	8
10	VIREN DUTT	6
11	LOVEPREET SINGH	8
12	SAHIL	7
13	TARANPREET SINGH	8
14	KHUSHKARAN SINGH	11
15	SEHAJ	7
16	ROHANPREET SINGH	8
17	RUPESH	8
18	GORAV	7
19	KHUSHI	9
20	RAKESH	9
21	MANISHA	9
22	PARMINDER SINGH	11
23	CHANDAN	7
24	ROOPJOT KAUR	8
25	MANINDER SINGH	9
26	MANVIR KAUR	9
27	JASPREET KAUR	9
28	SUKHDEEP KAUR	7
29	SANDHYA	8

30	SUKHMANPREET KAUR	8
	AVERAGE SCORE	8.466666667

Post-test Average: 17.16 / 20

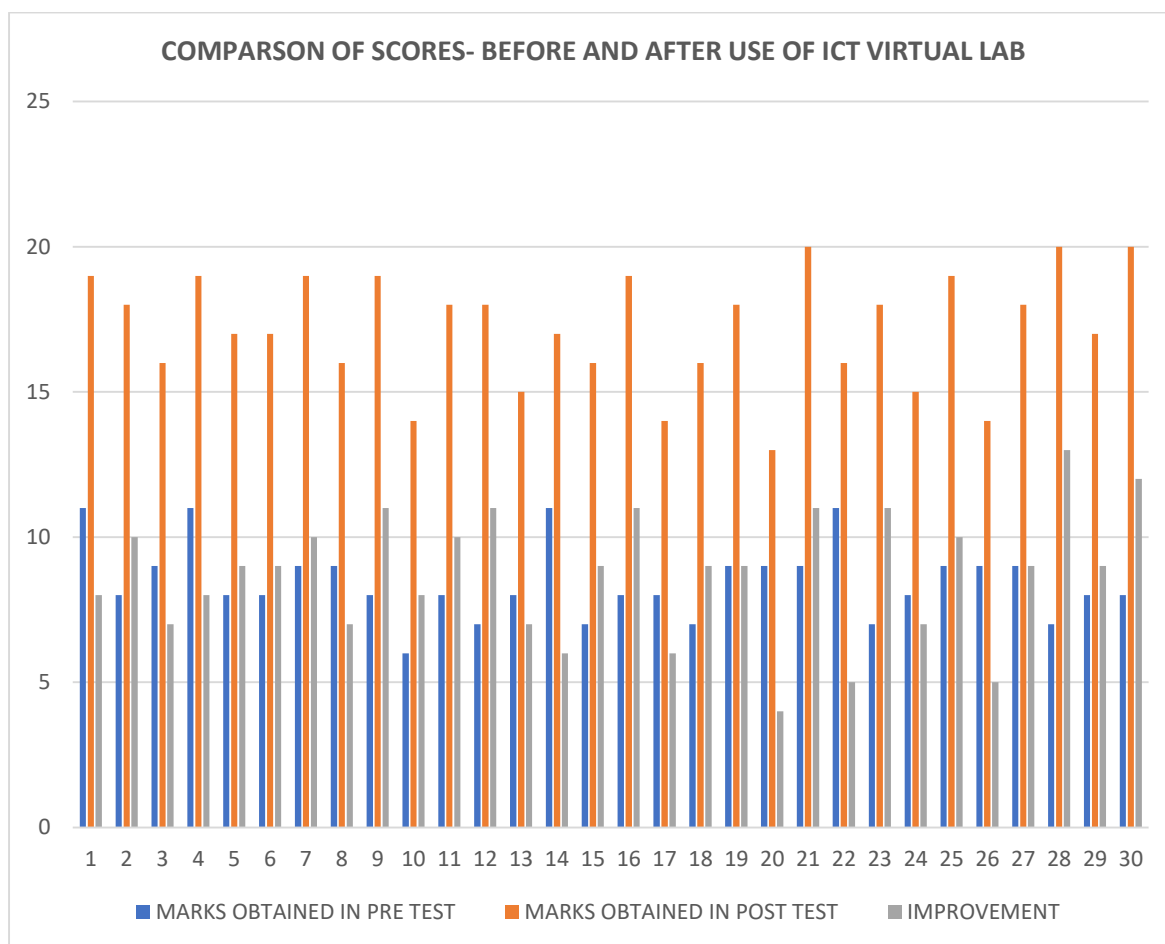
POST-TEST		
		TOTAL MARKS 20
S.NO	NAME OF STUDENT	MARKS OBTAINED IN POST TEST
1	KHUSHPREET KAUR	19
2	SEHAJPREET SINGH	18
3	AMRIT KAUR	16
4	MANPREET KAUR	19
5	NAVNEET KAUR	17
6	MANDEEP KAUR	17
7	YADWINDER KAUR	19
8	RAJVIR SINGH	16
9	RANVIR SINGH	19
10	VIREN DUTT	14
11	LOVEPREET SINGH	18
12	SAHIL	18
13	TARANPREET SINGH	15
14	KHUSHKARAN SINGH	17
15	SEHAJ	16
16	ROHANPREET SINGH	19
17	RUPESH	14
18	GORAV	16
19	KHUSHI	18
20	RAKESH	13
21	MANISHA	20
22	PARMINDER SINGH	16
23	CHANDAN	18
24	ROOPJOT KAUR	15
25	MANINDER SINGH	19

26	MANVIR KAUR	14
27	JASPREET KAUR	18
28	SUKHDEEP KAUR	20
29	SANDHYA	17
30	SUKHMANPREET KAUR	20
	AVERAGE SCORE	17.16666667

RESULT				
TOTAL MARKS 20				
S.NO	NAME OF STUDENT	MARKS OBTAINED IN PRE TEST	MARKS OBTAINED IN POST TEST	IMPROVEMENT
1	KHUSHPREET KAUR	11	19	8
2	SEHAJPREET SINGH	8	18	10
3	AMRIT KAUR	9	16	7
4	MANPREET KAUR	11	19	8
5	NAVNEET KAUR	8	17	9
6	MANDEEP KAUR	8	17	9
7	YADWINDER KAUR	9	19	10
8	RAJVIR SINGH	9	16	7
9	RANVIR SINGH	8	19	11
10	VIREN DUTT	6	14	8
11	LOVEPREET SINGH	8	18	10
12	SAHIL	7	18	11
13	TARANPREET SINGH	8	15	7
14	KHUSHKARAN SINGH	11	17	6
15	SEHAJ	7	16	9
16	ROHANPREET SINGH	8	19	11
17	RUPESH	8	14	6
18	GORAV	7	16	9
19	KHUSHI	9	18	9
20	RAKESH	9	13	4
21	MANISHA	9	20	11
22	PARMINDER SINGH	11	16	5
23	CHANDAN	7	18	11
24	ROOPJOT KAUR	8	15	7

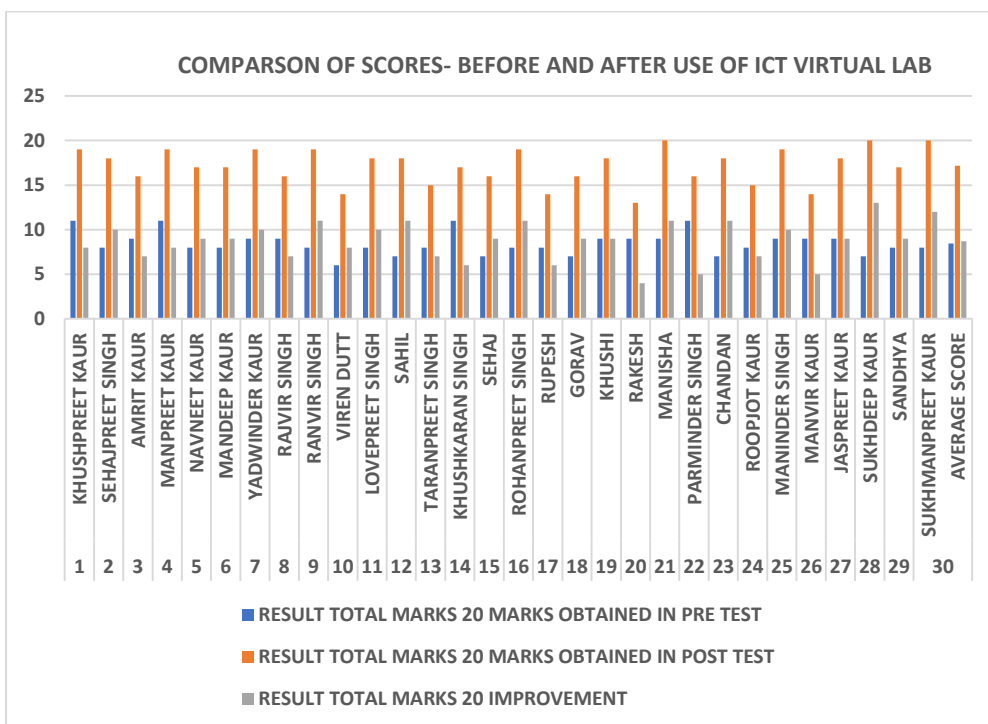
25	MANINDER SINGH	9	19	10
26	MANVIR KAUR	9	14	5
27	JASPREET KAUR	9	18	9
28	SUKHDEEP KAUR	7	20	13
29	SANDHYA	8	17	9
30	SUKHMANPREET KAUR	8	20	12
	AVERAGE SCORE	8.466666667	17.166666667	8.7

AVERAGE COMPARISON



Attendance improved from 70% to 92%. Students started asking questions in Punjabi and solving graphs on their own. The point (3,4) was taught as "3 steps aage, 4 steps upar" which they understood easily.

INDIVIDUAL GROWTH



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CONCLUSION

ICT-Integrated Virtual Lab is very effective for rural students. It makes maths joyful and in mother tongue. It should be used in all Government schools of Punjab. Recommendation for SCERT Punjab to include such labs.

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REFERENCES

- 1.NEP 2020 - ICT in Education
- 2.NCERT - Mathematics Lab Manual Class 8

ANNEXURE-I

GOVERNMENT HIGH SCHOOL THUHI DISTT PATIALA

PRE TEST (BEFORE ICT VIRTUAL LAB)

CLASS 8TH MATHEMATICS

NAME _____ CLASS 8TH ROLL NO. _____ DATE _____

MAX MARKS: 20

TIME :40 MINUTES

Q1 DEFINE A) COORDINATES B) PERIMETER

Q2 PLOT THE POINT (3,4) ON GRAPH PAPER.WHICH QUADRANT IS IT?

Q3 1 ACRE=? SQM.IF FARMER DIVIDES 1 ACRE INTO 4 EQUAL PARTS. WHAT IS ONE PART?

Q4 A RECTANGULAR FIELD LENGTH=20M, BREADTH=10M.FIND ITS PERIMETER AND AREA.

Q5 SOLVE: A) $15 \times 4=?$ B)100 SQM KA $\frac{1}{2}=?$ C) (2,4,8, 16?)

NEXT NUMBER.

Q6 DRAW A RECTANGLE OF 4CM X 2CM AND FIND ITS AREA BY COUNTING SQUARES.

Q7 WHAT IS THE FORMULA OF AREA OF SQUARE? IF SIDE =5CM THEN AREA=?

Q8 EXPLAIN IN YOUR OWN WORDS, WHAT IS DIFFERENCE BETWEEN AREA AND PERIMETER?

ANNEXURE -II

GOVERNMENT HIGH SCHOOL THUHI DISTT PATIALA

POST TEST (AFTER ICT VIRTUAL LAB)

CLASS 8TH MATHEMATICS

NAME_____ CLASS 8TH ROLL NO._____ DATE_____

MAX MARKS: 20

TIME :40 MINUTES

Q1. YOU WATCHED PUNJABI VIDEO “3 KADAM AAGGE, 4 KADAM UPPER VAL. EXPLAIN POINT (3,4) IN PUNJABI.

Q2. USING VIRTUAL LAB PLOT POINTS (3,4) AND (5,2). WHICH POINT IS MORE “AAGGE” (FORWARD)?

Q3. PITA JI DE KHET DI LENGTH 30 M, BREADTH 20 M.YOU SAW ANIMATION.HOW MUCH FENCING (TAAR) NEEDED? SHOW STEPS.

Q4. IN ANIMATION ,1 ACRE =40. 46SQM.IF WHEAT IS SOWN IN $\frac{1}{2}$ ACRE, FIND THE WHEAT AREA USING LAB METHOD.

Q5. AI ROBOT SAM SAID: A) $2+2=22$ B) AREA= LENGTH + BREADTH.CORRECT HIS 2 MISTAKES WITH CORRECT ANSWERS.

Q6. DRAW YOUR OWN HOUSE MAP (SIMPLE KHET STYLE) AND FIND AREA OF ONE ROOM USING LAB TRICK.

Q7. WHATSAPP QUIZ: YOU HAVE 20 DIYAS YOU GIVE $\frac{1}{4}$ TO FRIEND. HOW MANY DIYAS ARE LEFT? SHOW FAST TRACK.

Q8. DID PUNJABI VOICE AND KHET VIDEO HELP YOU UNDERSTAND MATHS? WRITE 3 LINES ABOUT WHAT YOU LEARNT NEW.

CERTIFICATE OF ORIGINALITY

This is to certify that the research paper entitled: "Impact of ICT-Integrated Virtual Math Lab on Academic Achievement and Engagement of Class 8TH Students at Government High School, Thuhi (Punjab)" is an original work carried out by:

Ms. Paramjit Kaur

Headmistress, GHS Thuhi, Nabha, Distt. Patiala, Punjab – 147201

Details: Class: 8th (30 Students - Real Data as per Excel)

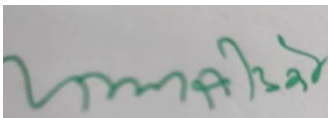
Pre-Test Avg: 8.46/20 | Post-Test Avg: 17.17/20

Improvement: 8.70

Tools: Virtual Lab with Punjabi Voice, Khet Animation, AI Robot SAM

Declaration: This work is original and not published elsewhere All data is real collected from my students Graphs/Tables based on actual classroom results Virtual Lab developed and used by me Submitted only to IJNRD Date: 04-09-2026

Place: GHS Thuhi, Nabha



Signature of Author (Paramjit Kaur)

Headmaster, GHS Thuhi

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