

Impact of Educational Technology–Supported Instruction on Reading Outcomes of Primary School Students: An Experimental Study

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Abstract

The present study examines the impact of Educational Technology–Supported Instruction on the reading outcomes of primary school children. A pre-test–post-test control group experimental design was used, involving 200 Class V students from two government primary schools in Raipur district, Chhattisgarh. The experimental group received technology-supported reading instruction using digital storybooks, multimedia lessons, audio-supported reading, and interactive applications, while the control group was taught through traditional methods. Reading outcomes were measured using the ASER Reading Assessment Tool, converted into numerical scores for analysis. Results revealed a significant improvement in the reading outcomes of the experimental group compared to the control group. The calculated *t*-value (12.47) exceeded the critical value (1.97) at the 0.05 significance level, confirming the superior effect of educational technology on reading fluency, comprehension, and overall reading performance. The study concludes that educational technology enhances reading achievement and can be meaningfully integrated into primary classrooms to support foundational literacy.

Keywords: Educational technology, reading outcomes, primary education, experimental study, ASER tool, digital learning, literacy development.

1. Introduction

Reading competence is a foundational skill that determines children's academic growth and overall learning success. Despite nationwide literacy initiatives, many primary school students in India continue to struggle with reading fluency, vocabulary, and comprehension, especially in government schools where instructional resources are limited. The emergence of digital learning tools offers promising opportunities to make reading instruction more engaging, interactive, and effective.

Educational Technology–Supported Instruction has been shown to enhance learning by integrating multisensory inputs, real-time feedback, and learner-centered activities. Digital storybooks, multimedia lessons, and interactive reading applications provide visual, auditory, and contextual cues that help children understand text more easily than through traditional textbooks alone. However, empirical evidence on the effectiveness of such technology in government primary schools of India remains limited.

This research addresses this gap by conducting a controlled experimental study to determine whether Educational Technology–Supported Instruction can significantly improve the reading outcomes of Class V students compared to traditional classroom teaching.

2. Review of Related Literature

Several global and Indian studies highlight the potential of educational technology to enhance reading skills:

2.1 Reading Development and Technology

Mayer (2001) and Fullan (2013) emphasized the role of multimedia in improving comprehension and motivation. Digital environments support children's decoding and fluency through audio narration, animations, and interactive scaffolds.

2.2 Technology and Early Literacy

Engel (2020) and Wang (2019) found that digital storybooks significantly improved vocabulary and comprehension among early learners. Interactive reading tools increase student engagement and reading time.

2.3 Indian Context

ASER Reports (2019, 2022) indicate persistent gaps in reading abilities among Class III–V children in government schools. Studies by Kumar & Singh (2018) and Pratham (2020) found that integrating digital reading tools in low-resource schools improved decoding skills and comprehension.

2.4 Research Gap

While international studies support the efficacy of technology in reading instruction, Indian experimental evidence—especially involving ASER-based measurement and controlled intervention—is scarce. The present study fills this gap.

3. Objective of the Study

To study the impact of Educational Technology–Supported Instruction on the reading outcomes of primary students in the experimental group as compared to the control group.

4. Hypothesis

H₀₁: There will be no significant difference in the reading outcomes of students in the experimental and control groups after the use of educational technology.

5. Methodology

5.1 Research Design

A pre-test–post-test control group experimental design was used.

5.2 Population

All Class V students enrolled in government primary schools of Raipur district, Chhattisgarh.

5.3 Sample

Two government primary schools were selected:

- Experimental Group: 100 students, Government Primary School, Shankar Nagar

- Control Group: 100 students, Government Primary School, Gayatri Nagar

Total sample: N = 200 students

5.4 Sampling Technique

Purposive sampling was used to select schools with similar characteristics but different instructional interventions.

5.5 Tools Used

ASER Reading Assessment Tool

Assessed:

- Reading fluency
- Word recognition
- Paragraph reading
- Story comprehension

Scores converted:

0 = non-reader, 4 = story reader

Educational Technology Materials (for experimental group)

- Digital storybooks
- Audio-supported reading
- Multimedia lessons
- Interactive reading applications

Traditional Tools (for control group)

- Textbook reading
- Blackboard explanation
- Oral reading practice

5.6 Procedure of Data Collection

1. Pre-test administered individually using ASER Tool
2. Intervention for 6 weeks
 - Experimental group: technology-supported instruction
 - Control group: traditional teaching
1. Post-test using the same ASER Tool
2. Scores recorded and statistically analyzed

5.7 Statistical Techniques

- Mean
- Standard Deviation
- Independent Samples t-test

6. Analysis and Interpretation

Table 1

Pre-Test Reading Outcome Scores

Group	N	Mean	SD
Experimental	100	1.92	0.62
Control	100	1.89	0.65

Interpretation:

Both groups had nearly equal reading ability, confirming baseline comparability.

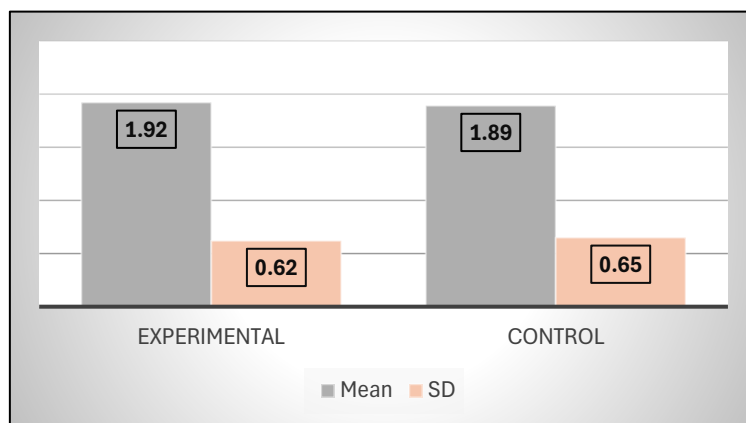


Figure 1 :Pre-Test Reading Outcome Scores

Table 2

Post-Test Reading Outcome Scores

Group	N	Mean	SD
Experimental	100	3.41	0.58
Control	100	2.36	0.64

Interpretation:

The experimental group showed significantly higher improvement.

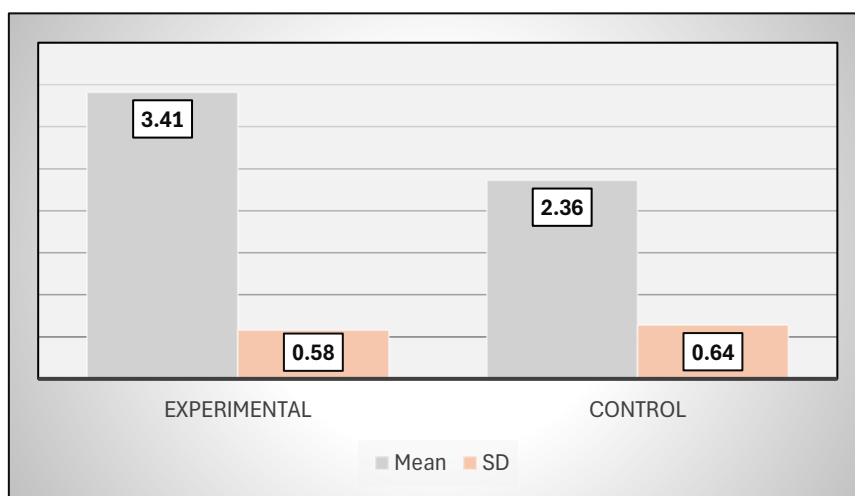


Figure 2: Post-Test Reading Outcome Scores

Table 3

t-test for Post-Test Scores

Group	df	t-value	Significance
Experimental vs Control	198	12.47	Significant at 0.05

Interpretation:

The calculated t-value (12.47) is greater than the table value (1.97). Thus, H_{01} is rejected.

7. Findings / Conclusion

The study confirms that Educational Technology–Supported Instruction has a strong positive effect on reading outcomes among primary school children. Students exposed to multimedia reading tools demonstrated superior performance in:

- Reading fluency
- Word recognition
- Comprehension
- Overall reading achievement

Digital tools provided multisensory learning experiences, increased engagement, and improved motivation, all of which contributed to higher learning gains compared to traditional methods.

The findings validate that integrating educational technology into government primary schools can substantially enhance foundational literacy levels.

8. Educational Implications

1. Teachers should integrate digital storybooks, audio lessons, and interactive reading applications into daily instruction.
2. Schools must invest in basic digital infrastructure (projectors, tablets, audio-visual materials).
3. Curriculum planners may incorporate technology-based reading modules aligned with ASER and NEP 2020.
4. Training programs must include digital pedagogy and ICT-based reading instruction.
5. Policy frameworks (NEP 2020, NIPUN Bharat) can use this evidence to scale literacy technology across government schools.

9. Suggestions for Future Research

1. Conduct long-term studies to examine sustained reading improvement.
2. Study impacts on other language skills such as writing and vocabulary.
3. Compare different technology tools (AI-based apps, gamified tools, VR reading).
4. Replicate the study in rural, tribal, and multilingual schools.
5. Explore teacher readiness and digital competency.
6. Conduct qualitative studies on children's engagement and motivation.

10. References

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