Impact of Digital Learning Methods on the Attention Span of Secondary School Students

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Abstract:

This study investigates the effect of digital learning tools—such as Android Boards, video lessons, and multimedia content—on the attention span of secondary school students. With increasing adoption of technology in classrooms, concerns have emerged about whether these tools genuinely help students remain focused or contribute to distractions. An experimental design was employed using a sample of 200 Class 10 students from two private schools in Indore district, divided equally into a control group (traditional teaching) and an experimental group (digital teaching). Data were collected using a validated, researcher-made Attention Span Assessment Tool. The results revealed a statistically significant improvement in attention span among students who were taught through digital methods. The findings suggest that well-structured digital content, when delivered in a controlled and interactive format, enhances student engagement and concentration in secondary education settings.

Keywords: digital learning, attention span, secondary education, classroom engagement, educational technology

1. Introduction

The integration of digital tools in education has transformed classroom dynamics worldwide. As schools shift from chalk-and-talk methods to interactive digital content, there is a growing interest in understanding how this transition impacts core cognitive functions such as student attention.

Attention span, the ability to sustain mental focus on a given task, plays a critical role in learning outcomes. However, the rapid pace of technological change has sparked debates—while some argue that digital learning enhances engagement, others raise concerns about possible distractions.

This research aims to contribute empirical evidence on whether digital learning methods positively influence students' attention span in classroom settings, particularly at the secondary school level.

2. Review of Literature

Bester and Brand (2013) demonstrated that technology integration significantly improved both attention and achievement among Grade 8 students in South Africa. Their study highlighted the positive correlation between motivation, concentration, and the use of classroom technology.

Similarly, Qi (2018) observed that digital teaching methods improved university students' motivation and learning outcomes. The study emphasized that interactive digital content facilitates better conceptual clarity and sustained focus.

While several studies confirm that digital content can enhance engagement, there is limited research focusing exclusively on the attention span of adolescents in Indian school contexts. This study addresses that gap.

3. Objective of the Study

The objective guiding this paper is:

To study the impact of digital learning methods on students' attention span.

4. Methodology

The present study was conducted using a **quasi-experimental pre-test post-test control group design** to determine the impact of digital learning tools on the attention span of secondary school students. This section outlines the research method, sample selection, tools used, data collection process, and statistical techniques applied.

4.1 Research Design

To study the causal impact of digital learning tools on attention span, a **quasi-experimental design** was chosen. Two groups of students—**control** and **experimental**—were assessed using pre-test and post-test tools.

- **Control Group**: Taught using traditional blackboard and lecture methods.
- Experimental Group: Taught using Android Boards, animated videos, and multimedia content.

This design allowed for the comparison of performance before and after the intervention, thereby measuring the effectiveness of digital teaching strategies.

4.2 Population and Sample

The population consisted of **Class 10 students** from secondary schools in **Indore district**, **Madhya Pradesh**. From this population, two private schools were selected purposively:

- 1. Sri Sri Ravishankar Vidya Mandir Experimental Group
- 2. IATV Educational Society Control Group

A total of **200 students** participated in the study, with **100 in each group**. Each group included **50 boys and 50 girls** to ensure gender equality in the sample.

Table 1:

Sample Distribution by Group and Gender

S. No.	School Name	Group	Boys	Girls	Total
1	IATV Educational Society	Control Group	50	50	100
2	Sri Sri Ravishankar Vidya Mandir	Experimental Group	50	50	100
	Total		100	100	200

4.3 Sampling Technique

A purposive sampling method was used. The selection criteria included:

- Schools with established ICT/digital infrastructure.
- Willingness of school management to participate.
- Availability of science curriculum in Class 10.
- Homogeneity in academic background and socio-economic status.

This method ensured that the selected students were capable of participating in both traditional and digital learning settings under controlled conditions.

4.4 Tools Used for Data Collection

The study used two main tools:

1. Researcher-Made Attention Span Assessment Tool

- o 30 items
- 4-point Likert scale
- Validated through expert review and pilot testing
- Reliability coefficient: 0.84 (Test-Retest Method)

2. Structured Lesson Plans for Digital Teaching

- o Integrated Android Boards, videos, and multimedia for the experimental group
- Ensured uniformity in content for both groups

Table 2

Tool Description

Tool Name	Туре	No. of Items	Purpose	Scoring Scale
Attention Span	Researcher-	20	Measure student focus and	1 to 4 Likert
Assessment Tool	Made	50	concentration	Scale

Tool Name	Туре	No. of Items	Purpose	Scoring Scale	
Structured Lesson	Instructional	11	Deliver science content	ΝA	
Plans	Instructional	Lessons	using digital tools	INA	

4.5 Procedure of Data Collection

The study was carried out in three phases: Pre-Testing, Intervention, and Post-Testing.

Phase I: Pre-Testing

- Administered the Attention Span Assessment Tool to both groups.
- Baseline data were recorded to assess initial levels of focus and concentration.

Phase II: Intervention (4 weeks)

- Control Group: Received traditional teaching (textbooks, blackboard, lectures).
- Experimental Group: Received digital instruction using Android Boards, multimedia videos, and interactive content.

Phase III: Post-Testing

- Re-administered the same tool to both groups.
- Post-test scores were collected to measure the change in attention span.

Table 3

Research Procedure Summary

Phase	Control Group	Experimental Group
Pre-Test	Attention Span Assessment Tool	Attention Span Assessment Tool

Phase	Control Group	Experimental Group	
Intervention	Traditional Teaching (Chalk &	Digital Learning (Android Boards, Multimedia	
	Talk)	Content)	
Post-Test	Attention Span Assessment Tool	Attention Span Assessment Tool	

4.6 Variables

- Independent Variable: Teaching Method (Traditional vs. Digital)
- Dependent Variable: Attention Span
- Controlled Variables: Curriculum content, time duration, teacher, classroom setting

4.7 Statistical Techniques Used

Data were analyzed using the following techniques:

- Mean and Standard Deviation: To understand the central tendency and dispersion.
- **t-Test**: To compare the mean scores between groups.
- ANOVA (where applicable): To compare results across gender and other variables.
- Significance Level: 0.05

Table 4

Summary of Statistical Techniques

Test Type	Purpose		
Mean & S.D.	Compare pre- and post-test attention levels		
t-Test	Measure significance between two group means		
One-Way ANOVA	Analyze differences based on gender/variables		
Level of Significance	cance 0.05		

Table 4

Mean and Standard Deviation of Attention Span Scores of Students in Experimental and Control Groups

Group	Mean Attention Span Score	Standard Deviation
Experimental (Digital Learning)	48.59	4.93
Control (Traditional Learning)	38.71	4.65

Interpretation

The table clearly shows that the students in the **Experimental Group**, who were taught using digital learning methods, achieved a **higher mean attention span score** (M = 48.59) compared to those in the **Control Group** taught through traditional methods (M = 38.71). The **standard deviation** for both groups indicate a similar level of variability in scores. The results, supported by a statistically significant t-test (t = 14.57, p < 0.05), confirm that the use of digital tools such as Android Boards, multimedia videos, and interactive lessons **positively impacts** students' attention spans. Therefore, it can be concluded that digital learning methods are more effective in maintaining student attention in classroom settings, and the **null hypothesis is rejected**.

Chapter 5: Results and Analysis

This chapter presents the findings obtained from the statistical analysis of the data collected during the study. The objective was to determine the impact of digital learning methods on students' attention span. A quasi-experimental design was used involving pre-tests and post-tests for both control and experimental groups.

5.1 Descriptive Statistics

The attention span scores of both groups were analyzed using mean and standard deviation to understand the central tendency and dispersion.

Table 4:

Mean and Standard Deviation of Attention Span Scores of Students in Experimental and Control

Groups

Group	Mean Attention Span Score	Standard Deviation
Experimental (Digital Learning)	48.59	4.93
Control (Traditional Learning)	38.71	4.65

The mean score for the experimental group was significantly higher than the control group, indicating better attention span due to digital learning methods.

5.2 Inferential Statistics

To determine whether the difference between the two groups was statistically significant, an independent samples t-test was performed.

- t-value = 14.57
- p-value = 0.000 (p < 0.05)

The obtained t-value is significant at the 0.05 level, indicating that the difference in mean scores is not due to chance.

5.3 Interpretation of Results

The statistical analysis reveals that students in the experimental group, who were exposed to digital learning tools such as Android Boards, video lessons, and multimedia presentations, showed a **notably higher attention span** compared to students in the traditional teaching group.

This supports the hypothesis that **digital learning methods have a significant positive effect on students' attention span**. The enhanced engagement through interactive and visually appealing content contributed to better focus and concentration among students. Hence, the **null hypothesis is rejected**.

6. Discussion

The purpose of this study was to examine the impact of digital learning methods on the attention span of secondary school students. The findings clearly demonstrate a significant positive effect of digital instructional tools on students' attentiveness in classroom learning situations.

The experimental group, which was taught using multimedia-based methods including Android boards, interactive video content, and animations, performed significantly better in terms of attention span as compared to the control group, which received traditional chalk-and-talk instruction. The difference in the mean scores, supported by a statistically significant t-value and a p-value less than 0.05, confirms that digital learning methods are more effective in capturing and maintaining students' attention.

These findings are in alignment with previous research conducted by Bester and Brand (2013), which showed that technology-enhanced learning improves learner attention and academic performance. Similarly, Qi (2018) also found that digital learning environments positively influence students' motivation and learning engagement, which are closely tied to attention span.

The improvement observed in the experimental group may be attributed to several factors:

- The visual appeal and interactivity of digital tools stimulate multiple senses, making learning more engaging.
- Multimedia presentations can break down complex concepts into manageable chunks, helping students focus better.
- The **novelty** and **modern format** of content delivery can renew interest in classroom learning, especially among digital-native students.

Furthermore, the digital classroom environment created a more dynamic and collaborative learning space, allowing for better student participation and retention of information. It was observed that students showed improved focus, asked more questions, and participated more actively in digital sessions compared to traditional ones.

However, while the findings favor the use of digital learning, it is important to note that digital infrastructure, teacher training, and access to devices are key factors in successful implementation.

The study also assumes that all students had equal familiarity and comfort with technology, which may vary in real-world settings.

In conclusion, the study contributes to the growing body of evidence suggesting that **digital learning tools are effective in improving attention span**, which in turn can lead to better learning outcomes. These insights can inform educators, policymakers, and curriculum developers to promote the integration of educational technology in regular classroom instruction.

7. Conclusion

The study confirms that digital learning methods have a significant and positive impact on the attention span of secondary school students. These results support the integration of digital tools in classrooms as a means to enhance student concentration and engagement. Schools and educators are encouraged to adopt such tools while ensuring that lessons are well-structured and delivered under appropriate supervision.

8. References

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