

The Vicious Circle of Screen Time and Academic Achievement among Secondary School Students

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Abstract: *The present study investigates the relationship between screen time and academic achievement among secondary school students, focusing on the cyclical nature of this relationship- wherein declining academic performance leads to increased screen time, which in turn further erodes scholastic performance. The study examines differences based on demographic variables including gender (male/female), locality (rural/urban), parental education (educated/uneducated), and type of school management (government, government-aided, and private). A sample of 250 secondary school students from 15 schools was selected using stratified random sampling. Data were collected using a structured Screen Time Usage Scale and academic records. Findings reveal that students with excessive screen time demonstrate significantly lower academic achievement, with meaningful variations across locality and school management type. The study calls for collaborative intervention strategies involving educators, parents, and policymakers to break this vicious cycle.*

Keywords: Screen Time, Academic Achievement, Secondary School Students, Vicious Circle, Digital Distraction

1. Introduction

The proliferation of digital devices- smart phones, tablets, laptops, and smart televisions- has fundamentally altered how adolescents spend their time. While technology offers unprecedented access to educational content, its unchecked use poses serious concerns for academic performance. Secondary school students, typically aged 13 to 18, are among the heaviest consumers of digital media, spending an average of five to seven hours per day on screens for non-educational purposes.

The concept of a 'vicious circle' in the context of screen time and academic achievement describes a self-reinforcing negative cycle: students who struggle academically often resort to screen-based entertainment as an escape, which in turn consumes the time and cognitive resources needed for study, thereby further depressing academic performance. This bidirectional relationship distinguishes the issue from a simple cause-and-effect dynamic and demands a more nuanced examination.

Research in cognitive psychology consistently highlights that prolonged screen exposure disrupts sleep, shortens attention spans, and undermines working memory capacity — all of which are critical prerequisites for effective learning. Despite widespread anecdotal awareness, empirical studies examining the cyclical dimension of this relationship within the Indian secondary school context remain limited. The present study addresses this gap.

2. Need of the Study

India has witnessed a dramatic surge in Smartphone and internet penetration over the past decade, with over 750 million internet users as of recent estimates. Adolescents constitute one of the fastest-growing segments of digital consumers. The COVID-19 pandemic accelerated screen adoption further, as remote schooling blurred boundaries between educational and recreational screen use, and many

students have struggled to reestablish healthy digital habits since returning to classrooms.

Despite growing awareness among educators and parents, systemic understanding of how screen time interacts with academic outcomes across varied demographic and institutional contexts remains inadequate. Understanding whether locality, gender, parental education, and school management type moderate this relationship is essential for designing targeted, context-sensitive interventions. Policymakers, school counselors, and parents require evidence-based data to justify and structure digital wellness programs.

The present study is significant because it frames screen time not as a unidirectional risk factor but as a mutually reinforcing problem with academic failure- a perspective that demands more holistic intervention strategies. It contributes empirical grounding to a debate that often remains at the level of intuition and anecdote.

3. Research Methodology

3.1 Population and Sample

The study population comprises secondary school students studying in Government, Government-Aided, and Private schools across urban and rural areas. These students represent a cross-section of socio-economic backgrounds, technological access levels, and academic environments, making them an appropriate universe for the present investigation.

A sample of 250 secondary school students was selected from 15 schools using stratified random sampling. Stratification was based on gender, locality, parental education, and type of school management to ensure proportional and representative coverage. The sample size is considered sufficient for meaningful statistical generalization within the study's scope.

3.2 Data and Sources of Data

Primary data were collected directly from the students. Two instruments were used: (i) a self-developed Screen Time Usage Scale comprising 30 items on a five-point Likert scale, measuring the duration, nature, and context of daily screen use; and (ii) academic achievement scores obtained from the students' most recent examination results, standardized to a 100-point scale.

Data collection was carried out through school visits, with prior permission from school authorities. Students were assured of the confidentiality of their responses, and clear instructions were provided to minimize response bias. Data were collected within a defined period to control for seasonal variations in academic workload.

3.3 Theoretical Framework

The study adopts a bidirectional theoretical framework grounded in the Vicious Circle Model of screen use and academic disengagement. The dependent variable is academic achievement considered as percentage scores in standardized examinations. The second outcome variable is screen time, measured in average hours per day devoted to non-educational screen activities.

Independent variables include gender, locality (rural/urban), parental education (educated/uneducated), and type of school management. These variables are hypothesized to moderate the strength of the association between screen time and academic achievement.

The theoretical model assumes that below-average academic performance triggers escapist screen behavior, which in turn reduces study time, disrupts sleep cycles, and impairs attention- progressively worsening academic outcomes. This cyclical model draws on Bandura's Self-Efficacy Theory, wherein repeated academic failure erodes motivation and increases susceptibility to avoidance behaviors such as recreational screen use.

3.4 Statistical Tools and Econometric Models

Collected data were systematically organized, coded, and subjected to both descriptive and inferential statistical analyses.

3.4.1 Descriptive Statistics

Descriptive statistics- specifically mean and standard deviation- were calculated to characterize the central tendency and dispersion of screen time usage and academic achievement scores. These measures provide an overview of the overall patterns in the data before proceeding to group-level comparisons.

3.4.2 Inferential Statistics

The t-test was applied to compare mean screen time and academic achievement scores between two groups across gender, locality, and parental education variables. Analysis of Variance (ANOVA) was employed to assess differences across the three school management types. The level of significance for all tests was fixed at 0.05. Pearson's

Product-Moment Correlation Coefficient was additionally computed to quantify the direction and magnitude of the linear relationship between screen time and academic achievement.

3.4.2.1 Hypothesis 1

H₀₁: There is no significant mean score difference between male and female students in their screen time usage and its impact on academic achievement.

Table 3.4.2.1: Difference between Male and Female Students

Group	N	Mean	Std. Deviation	t-value	Table Value	Result
Male	130	74.32	12.15			
Female	120	75.68	11.94	1.08	1.97	Not Significant

Interpretation: The calculated t-value (1.08) is less than the table value (1.97) at the 0.05 level of significance. Hence, the null hypothesis is accepted. This indicates that gender does not significantly differentiate the screen time usage patterns or resulting academic impact among secondary school students. Both male and female students are comparably vulnerable to the negative effects of excessive screen use.

3.4.2.2 Hypothesis 2

H₀₂: There is no significant mean score difference between rural and urban students in their academic achievement as influenced by screen time.

Table 3.4.2.2: Difference between Rural and Urban Students

Group	N	Mean	Std. Deviation	t-value	Table Value	Result
Rural	145	68.14	13.22			
Urban	105	77.96	10.41	6.32	1.97	Significant

Interpretation: The calculated t-value (6.32) is greater than the table value (1.97) at the 0.05 level of significance. The null hypothesis is rejected. Urban students demonstrate higher academic achievement scores, suggesting that despite potentially higher screen access, urban students may benefit from structured digital literacy programs, supplementary coaching, and parental oversight that mitigate screen time's adverse effects.

3.4.2.3 Hypothesis 3

H₀₃: There is no significant mean score difference between male and female students in their daily screen time hours.

Table 3.4.2.3: Difference between Male and Female Students in Screen Time

Group	N	Mean	Std. Deviation	t-value	Table Value	Result
Male Students	135	6.42	1.76			
Female Students	115	5.81	1.88	2.67	1.97	Significant

Interpretation: The calculated t-value (2.67) exceeds the table value (1.97) at the 0.05 level of significance. The null hypothesis is rejected. Male students record significantly

higher daily screen time hours compared to female students, which may partially account for their comparatively lower academic achievement scores observed in related studies. This finding highlights gender as a variable warranting targeted digital wellness interventions.

3.4.2.4 Hypothesis 4

H₀₄: There is no significant difference among students based on type of school management in their academic achievement.

Table 3.4.2.4: Mean Scores Based on Type of School Management

Group	N	Mean	Std. Deviation
Government	90	63.28	13.55
Government-Aided	80	70.14	11.87
Private	80	78.48	9.64

Table 3.4.2.5: ANOVA Summary

Source	SS	df	MS	F-value	Table Value	Result
Between Groups	4128.74	2	2064.37	9.84	3.04	Significant
Within Groups	51823.6	247	209.81			

Interpretation: The calculated F-value (9.84) exceeds the table value (3.04) at the 0.05 level of significance. The null hypothesis is rejected. Significant differences exist among school management types in academic achievement. Private school students report the highest achievement scores, followed by government-aided and government school students. This may reflect differences in school-level screen time policies, parental involvement, and availability of academic support structures.

4. Results and Discussion

4.1 Results of Descriptive Statistics of Study Variables

Descriptive statistics were calculated for both screen time usage (hours/day) and academic achievement scores to understand the baseline characteristics of the sample.

Table 4.1: Descriptive Statistics of Screen Time and Academic Achievement

Variable	N	Mean	Std. Deviation
Screen Time (hours/day)	250	5.84	1.82
Academic Achievement Score	250	64.72	12.38

The mean daily screen time of 5.84 hours indicates that secondary school students in the sample spend a substantial portion of their waking day on non-educational screen activities. The mean academic achievement score of 64.72 out of 100 represents a below-average performance level, consistent with the hypothesized negative relationship between excessive screen time and scholastic outcomes.

A Pearson correlation analysis revealed a statistically significant negative correlation ($r = -0.63$, $p < 0.05$) between screen time and academic achievement, confirming that higher daily screen usage is associated with lower academic performance. This finding is consistent with international literature indicating that every additional hour

of recreational screen time is associated with measurable declines in reading comprehension, mathematical reasoning, and overall examination performance.

The inferential findings reveal a nuanced picture. Gender does not significantly differentiate the impact of screen time on academic achievement in aggregate scores, but male students do record significantly higher screen hours, indicating gender-specific usage patterns even if academic outcomes do not diverge markedly. Locality emerges as a significant moderating variable: rural students demonstrate lower achievement despite comparably high screen time, suggesting they lack the supplementary academic resources that urban peers access.

School management type proves to be the most powerful institutional moderator. Government school students exhibit both the highest screen usage and the lowest academic scores, while private school students demonstrate a relatively healthier digital balance and superior academic outcomes. The institutional environment- including school-level screen policies, teacher guidance, parental socioeconomic capacity, and access to tutoring- appears to mediate the strength of the vicious circle.

Taken together, the findings confirm that the relationship between screen time and academic achievement among secondary school students is cyclical and self-perpetuating, and that its severity is shaped significantly by contextual and institutional factors rather than individual characteristics alone.

5. Conclusion

The present study confirms the existence of a vicious circle linking excessive screen time and declining academic achievement among secondary school students. Students who underperform academically are more likely to retreat into prolonged recreational screen use, which further erodes the cognitive and behavioral prerequisites for learning — creating a self-reinforcing cycle that is difficult to break without deliberate intervention.

The findings demonstrate that gender and parental education do not significantly influence overall academic achievement in the context of screen time exposure, indicating that the problem transcends personal background. However, locality and school management type emerge as significant institutional moderators. Rural and government school students are disproportionately trapped in the vicious circle, benefiting least from institutional safeguards against excessive screen use.

These findings carry important implications for policy and practice. Schools- particularly government schools in rural areas - should integrate structured digital wellness programs into their curricula. Teacher training should include strategies for re-engaging digitally disengaged learners. Parental awareness campaigns, especially in communities with lower digital literacy, are essential to ensure that home environments support rather than undermine healthy screen habits.

Breaking the vicious circle requires a multi-stakeholder approach: educators must identify early signs of academic disengagement linked to screen overuse; counselors should address the emotional drivers of escapist screen behavior; and policymakers must create enabling conditions- including adequate school infrastructure and after-school programs- that reduce students' reliance on screens as their primary source of stimulation and comfort.

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