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Impact of Social Media Usage on Academic Achievement of Secondary School Students: A Pre-test–Post-test Control Group Study with Correlational Evidence

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Abstract

Background: Social media is part of the daily routine of adolescents, yet its academic consequences remain contested: educational use is linked to collaborative learning, whereas heavy recreational use is linked to distraction and poorer time management. Evidence from Indian secondary schools is limited.

Objectives: To examine (i) the relationship between social media usage and academic achievement, (ii) differences in achievement between high- and low-usage students and between educational-purpose and entertainment-focused users, and (iii) the effect of a four-week guided-use intervention on achievement.

Methods: One hundred students of Classes IX and X (50 experimental, 50 control) participated. Usage patterns (duration, frequency, purpose, educational use) were recorded through a structured questionnaire administered via Google Forms, and achievement through a 100-mark test administered before and after the intervention. The experimental group received four weeks of structured guidance on educational and balanced social media use; the control group continued usual routines. Data were analysed with descriptive statistics, Welch's independent-samples t-test, Pearson correlation and chi-square at $\alpha = .05$.

Results: Groups were equivalent at pre-test ($M = 58.32$ vs 58.50; $p = .92$). At post-test the experimental group scored higher ($M = 71.08$ vs 63.80; Welch $t(95.7) = 3.77$, $p < .001$, Cohen's $d = 0.75$), and its mean gain was 12.76 versus 5.30 points. Social media usage was negatively correlated with achievement ($r = -.28$, $p = .005$), as was daily duration of use ($r = -.31$, $p = .002$), while educational use was positively correlated ($r = .24$, $p = .016$). High-usage students scored lower than low-usage students ($t(97.2) = -2.97$, $p = .004$), and educational-purpose users outperformed entertainment-focused users ($t(91.7) = 3.30$, $p = .001$).

Conclusion: How and why students use social media matters more than whether they use it. Guided, purposeful use is associated with higher achievement, and structured guidance produced measurable gains. Schools and parents should promote educational use and limit recreational overuse.

Keywords: social media usage; academic achievement; secondary school students; educational technology; digital learning; screen time; intervention

Highlights

- Heavier and longer social media use was associated with lower achievement ($r = -.28$ and $r = -.31$).
- Educational use of social media was positively associated with achievement ($r = .24$).
- A four-week guided-use programme raised mean scores by 12.76 points versus 5.30 in controls.

- Post-test difference between groups was moderate to large (d = 0.75).
- Findings support teaching purposeful, balanced social media habits in Indian secondary schools.

1. Introduction

Smartphones, inexpensive data and national digital-education initiatives have made social media platforms such as WhatsApp, YouTube, Instagram, Facebook, Telegram and Snapchat a routine part of adolescents' lives. These platforms were designed for communication and entertainment, but students also use them to watch lectures, share notes, join study groups and contact teachers, and school closures during COVID-19 accelerated this trend.

The academic consequences are contested. One line of research reports that purposeful use supports collaborative learning, communication and access to resources; another reports that heavy use, especially for entertainment, fragments attention, displaces study time and is linked to lower marks and problematic use. Secondary school is a particularly sensitive stage because students prepare for board examinations and are especially exposed to online distraction. Most existing studies, moreover, involve university or college students, and relatively few examine school students in the Indian context.

The present study addresses this gap. It examines how the duration, frequency and purpose of social media use relate to the achievement of Class IX and X students and tests whether a short, structured programme on balanced use improves achievement.

2. Review of Related Literature

Studies of university and college samples consistently show a dual effect. Educational use of social media is associated with better collaboration, communication and learning outcomes (Al-Rahmi et al., 2018; Khan & Idris, 2022; Sivakumar et al., 2023), whereas excessive or addictive use is linked to poor concentration, sleep disturbance, procrastination and lower performance (Wang et al., 2020; Salari et al., 2025). Using smartphone logs matched with academic records, Giunchiglia et al. (2018) found that heavy use of social applications reduced performance through distraction and poor time management. Problematic use among adolescents has been tied to weaker study habits and academic difficulty (Bányai et al., 2017), and multitasking with social media while studying has been associated with lower productivity (Paul & Baker, 2021).

Indian studies point the same way. Malik (2020) and Rathore (2020) found that moderate educational use improved communication and learning while excessive use harmed study habits and performance. Bhandarkar et al. (2021), Dhiman (2022), Sharma and Behl (2022) and Swathi (2023) reported that heavy recreational use reduced concentration and efficiency, whereas controlled, purposeful use was associated with better outcomes. Among school students, Jagannathan and Vezhaventhan (2022) and Panda (2024) reported both benefits of educational use and a negative association between time on social media and achievement.

Taken together, the literature suggests that the *purpose* and *duration* of use, not mere access, shape academic outcomes. Evidence on secondary students in India, and on whether guided use can improve achievement, remains thin.

Theoretical framing. The study draws on Bandura's social learning theory (students learn by observing and interacting online, but may also imitate distracting behaviours), constructivism (knowledge is built through exchange and collaboration) and uses-and-gratifications theory (media are used to satisfy needs for information, education or entertainment). Social media usage (duration, frequency, purpose) is treated as the independent variable and academic achievement as the dependent variable, with concentration, study habits and time management as plausible mediating processes.

3. Objectives and Hypotheses

Objectives

1. To study the level of social media usage among secondary school students.
2. To study the relationship between social media usage and academic achievement.
3. To compare the achievement of students with high and low social media usage.

4. To identify the educational use of social media and its relation to achievement.

5. To compare pre-test and post-test achievement of experimental and control groups following a guided-use intervention.

Null hypotheses

- H_{01}: There is no significant difference in the level of social media usage among secondary school students.
- H_{02}: There is no significant relationship between social media usage and academic achievement.
- H_{03}: There is no significant difference in achievement between students with high and low social media usage.
- H_{04}: There is no significant relationship between duration of social media use and academic achievement.
- H_{05}: There is no significant difference in achievement between students who use social media mainly for educational purposes and those who use it mainly for entertainment.
- H_{06}: There is no significant relationship between educational use of social media and academic achievement.
- H_{07}: There is no significant difference between the experimental and control groups in post-test achievement.

4. Methodology

4.1 Research design

The study used a quantitative design with two components: (a) a survey-correlational component relating questionnaire-based usage to achievement for all participants, and (b) a pre-test–post-test experimental and control group component evaluating a four-week intervention. [Author to confirm: how students were assigned to the experimental and control groups, e.g., random assignment or intact classes. If intact classes were used, describe the design as quasi-experimental.]

4.2 Participants

The target population was students of Classes IX and X. The sample comprised 100 students (50 in Class IX and 50 in Class X), drawn from [number and names/type of schools] by random selection from eligible students where a sampling frame was available. Participation was voluntary, and school permission, parental consent and student assent were obtained. Only complete and usable responses were retained. Fifty students formed the experimental group and 50 the control group.

Category	n
Total sample	100
Experimental group	50
Control group	50
Class IX	50
Class X	50

4.3 Variables

The independent variable was social media usage, operationalised through daily duration, frequency, level (high/low, by a questionnaire scoring rule), purpose (educational vs entertainment) and educational use. The dependent variable was academic achievement, measured as the score on a 100-mark achievement test. Students were classified as high- or low-usage using [cut-off rule, e.g., median split of questionnaire scores; report the median and group sizes].

4.4 Instruments

Social Media Usage Questionnaire. A structured questionnaire developed by the researcher and administered through Google Forms recorded class and gender, platforms used, daily duration, frequency, main purpose, educational activities, entertainment use, communication use and perceived distraction during study. [Author to report: expert validation procedure, number of items, scoring scheme and reliability coefficient (e.g., Cronbach's α).]

Achievement test. A 100-mark achievement test was administered to both groups before and after the intervention under the same scoring procedure. [Author to report: subject/content of the test, how it was validated and its reliability.]

4.5 Intervention

The experimental group received four weeks of structured sessions on using social media for educational purposes, including watching educational videos, sharing study materials, participating in academic discussion and managing online distractions. [Author to specify: who delivered the sessions, frequency and duration of each session.] The control group continued its usual learning activities during the same period.

4.6 Procedure

The pre-test was administered to both groups. The experimental group then received the four-week intervention, after which both groups took the post-test. Questionnaire responses were exported from Google Forms to a spreadsheet, screened for incomplete, duplicate and inconsistent entries, coded and analysed.

4.7 Statistical analysis

Frequencies, percentages, means and standard deviations summarised the data. Groups were compared with Welch's independent-samples t-test, which does not assume equal variances; effect size was expressed as Cohen's d. Relationships between usage and achievement were examined with Pearson's correlation coefficient, and the distribution of usage levels with a chi-square test. Mean gain was computed as post-test minus pre-test. The significance level was $\alpha = .05$. [Author to state software used.]

5. Results

5.1 Equivalence of groups and effect of the intervention

Table 1 shows that the groups were equivalent before the intervention (Welch $t(97.8) = -0.10$, $p = .92$; mean difference = −0.18, 95% CI [−3.62, 3.26]). After the intervention the experimental group's mean was 7.28 points higher than the control group's (Welch $t(95.7) = 3.77$, $p < .001$; 95% CI of the difference [3.44, 11.12]; Cohen's $d = 0.75$). The mean gain was 12.76 points in the experimental group and 5.30 in the control group, a difference of 7.46 points (Figure 1).

Table 1. Pre-test and post-test achievement of experimental and control groups (maximum = 100)

Group	N	Pre-test M (SD)	Post-test M (SD)	Mean gain
Experimental	50	58.32 (8.46)	71.08 (10.39)	12.76
Control	50	58.50 (8.86)	63.80 (8.88)	5.30
Difference		−0.18	7.28	7.46

Because the maximum score is 100, mean scores equal percentages: the experimental group rose from 58.32% to 71.08% and the control group from 58.50% to 63.80%.

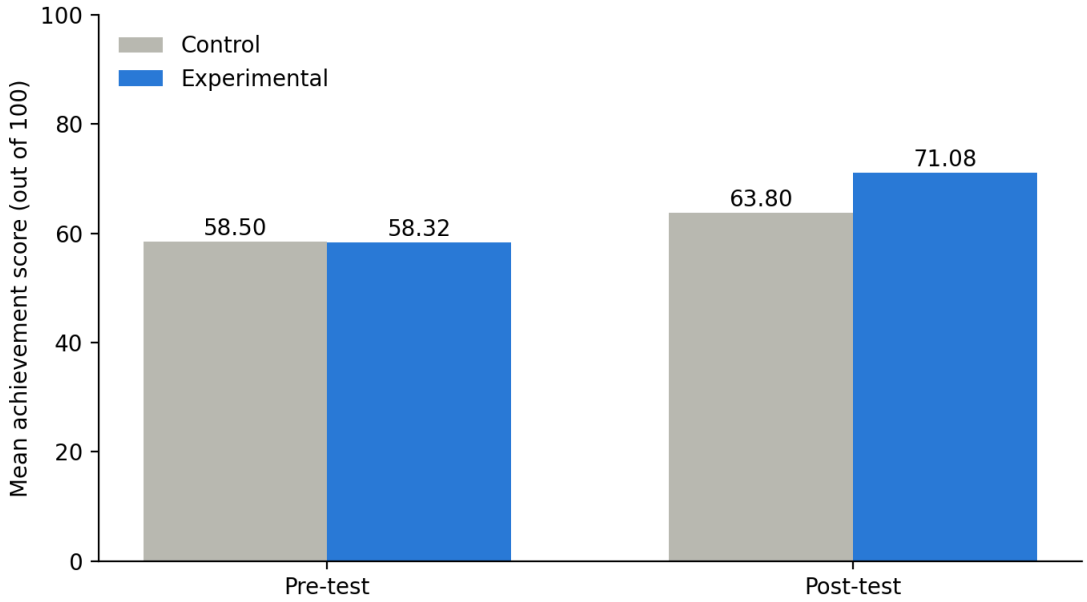

Figure 1. Mean pre-test and post-test achievement scores of the experimental and control groups (N = 50 per group).

5.2 Hypothesis testing

Table 2. Summary of hypothesis tests (α = .05)

Hypothesis	Analysis	Result	Decision
H_{01} Level of social media usage	Chi-square	$\chi^2(2) = 1.84$, $p = .399$	Fail to reject
H_{02} Usage and achievement	Pearson correlation	$r = -.28$, $N = 100$, $p = .005$	Reject
H_{03} High vs low usage, achievement	Welch t-test	$t(97.2) = -2.97$, $p = .004$	Reject
H_{04} Duration of use and achievement	Pearson correlation	$r = -.31$, $N = 100$, $p = .002$	Reject
H_{05} Educational vs entertainment users	Welch t-test	$t(91.7) = 3.30$, $p = .001$	Reject
H_{06} Educational use and achievement	Pearson correlation	$r = .24$, $N = 100$, $p = .016$	Reject
H_{07} Post-test, experimental vs control	Welch t-test	$t(95.7) = 3.77$, $p < .001$	Reject

The distribution of usage levels did not differ significantly (H_{01}). All other null hypotheses were rejected. The correlations were small to moderate in magnitude: more and longer use was associated with lower achievement, while educational use was associated with higher achievement.

6. Discussion

The negative association between overall usage ($r = -.28$) and daily duration ($r = -.31$) with achievement agrees with Indian and international studies that link heavy use to distraction, weaker study habits and lower performance (Giunchiglia et al., 2018; Panda, 2024; Salari et al., 2025). The positive correlation of educational use with achievement ($r = .24$), and the advantage of educational-purpose over entertainment-focused users, reflect the uses-and-gratifications view that the gratification sought determines the academic effect, and are consistent with research showing that purposeful use supports collaborative learning (Khan & Idris, 2022; Sivakumar et al., 2023).

The intervention group's larger gain (12.76 vs 5.30 points) with a moderate-to-large post-test effect ($d = 0.75$) suggests that short, structured guidance on educational use, resource sharing and distraction management can improve achievement. The control group also improved, which is expected given ordinary instruction, test

familiarity and the interval between tests. This is why gains were compared against a control group rather than interpreted alone.

The correlations are modest and do not show that social media use causes lower marks: students with lower achievement may also turn to social media more, and other factors, such as motivation, parental support and sleep, were not controlled. The experimental component provides stronger evidence for the benefit of guidance, subject to the design limitations below.

7. Implications

- **Teachers** can integrate educational video, study groups and shared resources while teaching students to manage notifications and multitasking.
- **Schools** can run digital-literacy and balanced-use programmes of the kind evaluated here.
- **Parents** can monitor duration of use and encourage purposeful rather than recreational use during study time.
- **Policy makers** can include responsible social media use in digital-education guidelines for secondary schools.

8. Limitations and Future Research

The study was confined to 100 students of Classes IX and X from selected schools, so generalisation is limited. Achievement was measured with a single test, and usage was recorded through self-report questionnaires, which may be affected by recall and social-desirability bias. The correlational component cannot establish causation. The follow-up period was short, so the durability of gains is unknown. Future studies should use larger multi-school samples, objective usage logs, validated scales, longer follow-up and covariate control (for example, prior achievement, socio-economic status and sleep), and could examine mediators such as concentration and time management.

9. Conclusion

Among Class IX and X students, longer and heavier social media use was associated with lower academic achievement, whereas educational use was associated with higher achievement, and a four-week programme on guided, balanced use produced larger gains than usual instruction. Social media is therefore neither inherently harmful nor beneficial to learning: outcomes depend on purpose, duration and self-regulation. Teaching students to use social media purposefully is a practical way to protect and improve achievement.

Declarations

Ethics approval and consent: [Add institutional ethics committee approval/reference number]. School permission, parental consent and student assent were obtained.

Funding: None. [Confirm]

Conflict of interest: The authors declare no conflict of interest.

Data availability: The anonymised dataset is available from the corresponding author on reasonable request.

Author contributions: Avantika: conceptualisation, data collection, analysis, writing. Anjulata Yadav: supervision, review and editing.

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