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A study of the impact of social media on the reasoning ability of secondary school students

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Abstract
The current study was conducted to investigate the influence of social media usage on the reasoning skills of secondary school students. A total of 120 students from Bareilly district, Uttar Pradesh, were selected using stratified sampling. Data was gathered through a self- constructed instrument named SMURAT (social media usage and Reasoning Ability Tool), which included 30 multiple-choice questions shared via Google Forms. Student scores were categorized into three levels: above 24, between 10 to 24, and below 10. The analysis using correlation techniques indicated that moderate usage of social media (around 1-2 hours daily) was linked to better reasoning performance, whereas excessive usage (more than 4 hours daily) was associated with diminished cognitive skills. The study emphasizes the importance of balanced social media engagement to support the development of students' reasoning abilities.

Keywords: Secondary school students, social media, reasoning ability

Introduction

In the modern era, social media has transformed communication, information access, and interaction across all age groups. Students enrolled in secondary education are among the most active users of platforms such as WhatsApp, Instagram, and Facebook, integrating these into their daily routines. While these platforms offer opportunities for collaboration and exposure, growing concerns have emerged regarding their impact on students' cognitive growth, especially reasoning skills. Though several studies have investigated social media's effects on students' academic performance in India, limited research is available focusing specifically on reasoning skills among school – aged students.

Moreover, the increasing reliance on digital media may influence learning behaviours, both positively and negatively. The continuous inflow of information through screens can shape students' thinking patterns and attention spans. In many instances, Social media serves as a distraction, often delaying completion of academic tasks and affecting classroom participation. From forming academic groups to sharing resources and announcements, digital platforms became essential educational tools.

At the same time, reasoning ability plays a fundamental role in students' decision- making, problem-solving, and critical evaluation of information. As adolescents continue to develop cognitively, understanding how external digital influences like social media affect their reasoning becomes crucial. Hence, this study aims to explore the connection between social media usage and reasoning skills among students enrolled in secondary education in the Bareilly district.

Review of Related Literature

Cheng et.al. (2024) examined the association between social media engagement and university students' critical thinking skills. Their study, conducted across three Chinese universities with a sample of 300 students, revealed that while general usage was positively related to critical thinking, excessive reliance (social media dependence) had an adverse effect.

In the separate study, Arijeniwa (2023) [1] explored the academic impact of social media usage on secondary school students residing in Benin Metropolis. The research pointed to significant negative academic outcomes linked to overuse of these platforms. Similarly, Panchanathan and Raj (2022) [3] conducted a survey among adolescents aged 14-19 in Chennai. They collected data both online and through interviews, concluding that social media can have both positive and negative effects on individual academic performance. Thomas (2020) [4] explored the relationship between social media addiction, critical thinking, and emotional responses in university-level English language learners in Thailand. His findings suggested that excessive usage adversely impacted achievement emotions and had a mild negative relationship with critical thinking. Additionally, Zaman et.al. (2017) [5] conducted a study in Pakistan evaluating logical reasoning in mathematics among Grade 9 students. Their findings highlighted performance variations influenced by gender, school type (public/ private), and location (urban/ rural), with male and private school students performing better overall.

These studies highlight a growing academic interest in understanding how digital behavior influences learning outcomes. However, there is still limited work focused on Indian secondary students, particularly regarding their reasoning skills. This gap underscores the need for the present investigation.

Operational definitions

- **Social media:** Social media refers to digital platforms and technologies that enable individuals and communities to interact, exchange information, share ideas, and communicate content in various forms. A few of the most well-known social media stages incorporate Facebook, Twitter, LinkedIn, YouTube, Wikipedia etc.

- **Reasoning ability:** The capacity of students to assess information critically and draw logical conclusions.

- **Secondary school students:** Students enrolled in secondary education include classes IX and XI grades and consists of students aged between 14 – 16 years.

Objectives

- To explore how the use of social media influences the reasoning skills of secondary school students in the Bareilly district.
- To investigate the relationship between the duration of social media use and students' logical reasoning abilities.
- To identify differences in reasoning ability among students with varying levels of social media engagement.

Hypotheses

- There is no significant impact of social media usage on the reasoning ability of secondary school students.
- There is no significant relationship between the duration of social media use and the reasoning ability of secondary school students.
- There is no significant difference in reasoning ability among students with varying levels of social media usage.

Delimitations

The present study was delimited to the following areas due to constraints of time, manpower and resources.

- The study was delimited to Bareilly district of Uttar Pradesh (India) only.
- The study was delimited to secondary school students from UP and CBSE board, studying in classes IX to XI.
- The study was delimited to students enrolled in secondary education for urban and rural areas of Bareilly district.
- The study was delimited to 65 male and 55 female secondary school students.

Methodology and Research Design

The present study was based on an individual survey and followed a descriptive research design within the quantitative research approach. For this investigation, the researchers adopted a stratified random sampling technique to select a sample of 120 students enrolled in secondary education from CBSE and UP board schools situated in urban and rural areas of Bareilly district. To collect the necessary data, a self – developed questionnaire titled SMURAT (social Media Usage and Reasoning Ability Tool) was created by the researchers using Google Forms. The tool consisted of 30 multiple – choice questions that assessed students' reasoning abilities and patterns of social media usage. The online survey link was distributed to the target group through WhatsApp, and data collection was conducted digitally. The responses were carefully screened and compiled for analysis. The collected data was then organized and analyzed using Microsoft Excel, applying various descriptive and inferential statistical techniques, including correlation analysis and t-tests, to test the hypotheses and interpret the findings.

Population and Sample

In the present study the population consisted of males and females of urban and rural areas secondary schools' students of Bareilly district affiliated to UP and CBSE boards. Stratified random sampling strategy was embraced to select a sample of 120 secondary school students.

Table 1: Demographic details of students enrolled in secondary education surveyed

Details	No. of students	Percentage (%)
Male	65	54.16
Female	55	45.83
Urban	77	64.16
Rural	43	35.83
Cbse	61	50.83
Up board	59	49.16
Time spent (0-1 hrs)	16	13.33
Time spent (2-3 hrs)	63	52.5
Time spent (4-6 hrs)	28	23.33
Time spent (7 hrs or more)	13	10.83

Out of these 120 total secondary school students, 65 male students, 55 female students were from CBSE board students 61, UP board students 59.

Tool used

For collecting requisite data, a self-developed tool for reasoning ability based on different aspects of social media and its uses. The self-developed tool was used to assess the impact of social media on reasoning ability of secondary school students to evaluate the social media usage pattern and the critical ability of secondary school students contained 30 items.

Table 2: The tool details have been provided in table 2

Areas of assessment	Serial number	Total marks
Analytical reasoning	1-5	5
Number series	6-10	5
Cubes	11-15	5
Statements	16-22	7
Coded	23-30	8
		Total = 30

Data Collection

The researcher used digital platform to carry out the survey. Survey was made on Google forms and shared it to target students through WhatsApp. The study was opened for response from 03 March 2024 to 10 March 2024. A total of 120 responses were collected to completing the study. The carefully chosen data response sheets (as received in online mode) were then utilized to fulfill the study objectives. The data was further analyzed using various statistical measures in MS- EXCEL.

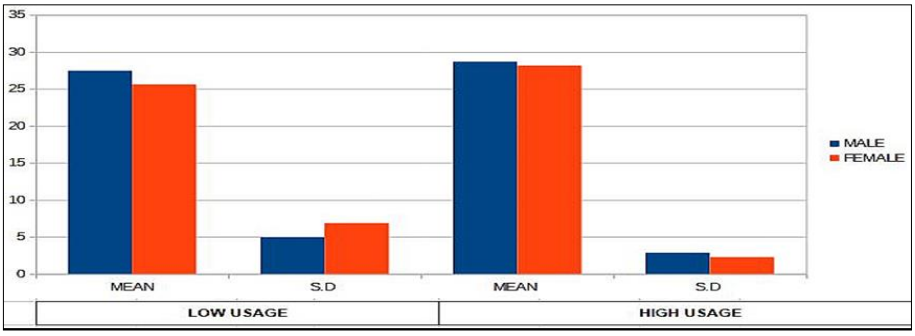
Analysis of data and interpretation

The data collected through Google forms and response sheet were collected and then combined for each section of the tool social media usage pattern and the thinking capacity of secondary school students and subsequently analyzed to discover answers to the earlier formulated research questions.

Table 3: The analysis of reasoning ability for both male and female secondary school students based on social media usage

Low Social Media Usage (N=79)			High Social Media Usage (N=41)		(t) value	Level of Significance (0.05)
Students	Mean	S. D	Mean	S. D		
Male	27.45	4.94	28.65	2.85	1.0693	0.2890 Not Significant
Female	25.59	6.85	28.16	2.26	1.5449	0.1283 Not Significant

The study of contents of Table 3 shows the mean reasoning ability of male students who use social media heavily is higher than those with lower usage. However, the t-test results (t = 1.0693, P = 1.97) indicate no statistically significant difference at the 0.05 level. Therefore, the hypothesis that social media usage has no significant difference on the reasoning ability of male students is accepted. Similarly, female students with high social media usage show a higher mean reasoning ability compared to those with lower usage. But again, the t-test results (t = 1.5449, P = 1.97) show no significant difference at the 0.05 level. Consequently, the hypothesis that social media usage has no significant difference on the reasoning ability of female students is also accepted.

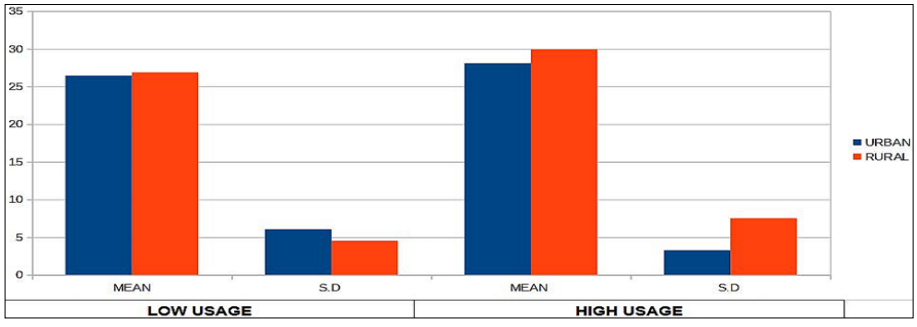


In conclusion, the study found no major variation affect of social media usage on the reasoning capacity of either male or female secondary school students.

Table 4: The analysis of reasoning ability among urban and rural students enrolled in secondary education based on social media usage

Social media usage	Low Social Media Usage (N=79)		High Social Media Usage (N=41)			Level of Significance (0.05)
students	mean	s. d	mean	s. d	(t) value	
urban	26.43	6.04	28.08	3.25	1.255	0.2132 not significant
rural	26.88	4.51	29.94	7.51	1.6724	0.1021 not significant

The study of contents of Table 4 shows that the mean reasoning ability of urban students with high social media usage is higher than those with lower usage. However, the t-test results (t = 1.255, P = 1.97) show statistically no major variation difference at the 0.05 level. This means that social media usage has a no major variation affect on the thinking capacity of urban students, and thus, the third hypothesis is accepted. Similarly, rural students with high social media usage demonstrate higher reasoning ability compared to those with low usage. However, the t-test results (t = 1.6724, P = 1.97) show no significant difference at the 0.05 level., Hence, it is concluded that social media usage does not significantly impact the reasoning ability of rural students, and thus the corresponding hypothesis is upheld.

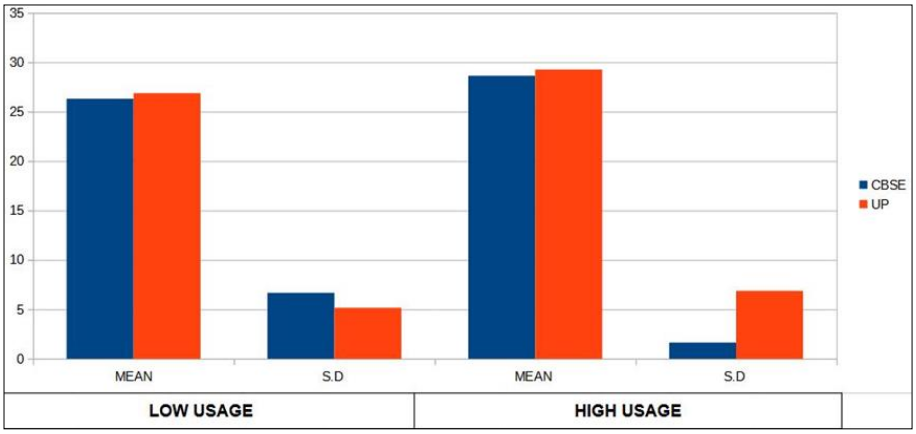


In conclusion, the study signifies that social media usage does not significantly affect the reasoning ability of either urban or rural secondary school students.

Table 5: The analysis of reasoning ability among CBSE and UP Board students enrolled in secondary education based on their social media usage

Social media usage →	Low Social Media Usage (N = 79)		High Social Media Usage (N = 41)		(t) value	Level of Significance (0.05)
Students ↓	MEAN	S. D	MEAN	S. D		
CBSE	26.31	6.66	28.63	1.62	1.4917	0.1412 Not Significant
UP	26.86	5.15	29.27	6.86	1.5437	0.1281 Not Significant

The study of contents given in Table 5 shows that the mean reasoning ability of CBSE students with high social media usage is higher than those with low usage. However, the t-test results (t = 1.4917, P = 1.97) indicate statistically no major variation difference at the 0.05 level. This means that social media usage does not significantly impact the reasoning ability of CBSE students, and the fifth hypothesis is accepted. Similarly, UP Board students with high social media usage show higher reasoning ability compared to those with lower usage. However, the t-test results (t = 1.5437, P = 1.97) also show no significant difference at the 0.05 level. Therefore, the hypothesis that social media usage has no significant difference on the reasoning ability of UP Board students is accepted?



In conclusion, the study finds no major variation affect of social media usage on the reasoning capacity of both CBSE and UP Board secondary school students.

Major finding of the study

- Male students generally showed higher thinking capacity than female students across urban, rural, CBSE, and UP board categories, except for rural students at high social media usage.
- The study highlights consistent differences in reasoning ability between male and female students across different categories (urban, rural, CBSE, and UP board), with male students generally showing higher reasoning ability except in rural areas at high social media usage. Despite these differences, significant differences were observed in reasoning abilities between male and female students across all groups.

Conclusion

The study concludes that social media usage does not have a statistically significant impact on the reasoning ability of secondary school students. While moderate usage shows slight improvement trends, no definitive relationship is established. Gender, board affiliation, and location (urban/rural) also did not show significant differences, confirming the multifactorial nature of cognitive development.

Educational Implications

The findings of this study indicate that while social media usage does not have a statistically significant impact on the reasoning ability of secondary school students, it remains important for educators to promote balanced and mindful usage among learners to minimize distractions. Targeted support programs may be needed to enhance reasoning skills, particularly for female students who, on average, showed lower reasoning ability compared to males. Schools can integrate reasoning and critical thinking activities into the curriculum – possibly through the educational use of social media platforms- to encourage student engagement and strengthen cognitive development. Furthermore, both parents and educators must work together to monitor and guide students' social media habits so that these platforms are used to support rather than hinder academic growth. Personalized teaching strategies may also be helpful, particularly for students from urban and rural backgrounds whose reasoning abilities differed across levels of social media usage.

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