Pegem Journal of Education and Instruction, Vol. 12, No. 4, 2022 (pp. 447-460)

RESEARCH ARTICLE WWW.PEGEGOG.NET

SOCIAL NETWORKING SITES ADDICTION AMONG ENGINEERING STUDENTS: A STUDY OF DURG-BHILAI REGION

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***Abstract*-. The proliferation of Social Networking Sites (SNS) has significantly transformed the landscape of communication, socialization, and information sharing among the youth, particularly engineering students. This research paper investigates the levels of SNS addiction among engineering students in the Durg-Bhilai region of Chhattisgarh, India, utilizing the Social Networking Sites Addiction Index (SNS-AI) developed by Saurabh Tomar. The study examines the influence of demographic variables such as age, gender, family structure, and academic year on SNS addiction levels across six dimensions: Time Spent, Social Comparison, Information Sharing, Academic Disruption, Virtual Socialization, and Emotional Dependency. Data were collected from 250 engineering students across five engineering institutions in the Durg-Bhilai region. The findings reveal significant differences in SNS addiction levels based on gender and academic year, while family structure and age showed varying degrees of influence. The study contributes to the understanding of digital behavior patterns among technical students and provides insights for educational institutions to develop intervention strategies.**

Index Terms- Social Networking Sites Addiction, Engineering Students, SNS-AI, Digital Behavior, Academic Disruption, Emotional Dependency, Behavioral Finance, Psychological Well-being

I. INTRODUCTION

The 21st century has witnessed an unprecedented digital revolution that has fundamentally altered how individuals interact, communicate, and consume information. Social Networking Sites (SNS) have emerged as the cornerstone of this digital transformation, becoming an integral part of daily life, particularly for the younger generation. Platforms such as Facebook, Instagram, Twitter (X), YouTube, WhatsApp, Snapchat, and TikTok have seamlessly integrated into the fabric of modern existence, offering unprecedented connectivity and access to information (Boyd & Ellison, 2007; Kaplan & Haenlein, 2010).

Engineering students, who constitute a significant portion of India's youth population, find themselves particularly susceptible to the allure of social networking platforms. The technical nature of their education, which often requires extensive computer and smartphone usage, creates an environment where SNS can easily infiltrate academic and personal spaces. The proliferation of mobile devices and affordable internet connectivity has further amplified this phenomenon, making SNS accessible virtually anytime and anywhere (Kuss & Griffiths, 2011).

The impact of social networking sites on the lives of students in higher education institutions is multifaceted. On one hand, these platforms provide new opportunities for information sharing, collaborative learning, and educational interaction. They serve as valuable tools for staying connected with peers, accessing educational resources, and participating in academic discussions. On the other hand, excessive use negatively affects students' concentration, study time, and academic performance. Kirschner and Karpinski (2010) found in their study that the GPA of students who used Facebook was significantly lower than that of non-users. Junco (2012) also demonstrated that using Facebook during class negatively impacts students' academic performance.

Festinger's (1954) Social Comparison Theory provides a theoretical lens to understand the psychological mechanisms underlying SNS addiction. Students compare themselves to other users on social media, leading to psychological problems such as reduced self-esteem, envy, anxiety, and depression. Twenge et al. (2018) established that increased use of social media is associated with a rise in depression and loneliness among adolescents and young adults. The constant exposure to curated, idealized versions of others' lives creates a distorted perception of reality, triggering feelings of inadequacy and dissatisfaction (Vogel et al., 2014).

The concept of FOMO (Fear of Missing Out) has emerged as a significant psychological phenomenon in the digital age, characterized by the anxiety that others might be having rewarding experiences from which one is absent (Przybylski et al., 2013). This anxiety drives compulsive checking behavior, creating a vicious cycle of engagement and dependency. The neurological reward mechanisms activated by likes, comments, and notifications bear striking similarities to those observed in substance addiction, reinforcing the behavioral patterns that characterize SNS addiction (Andreassen et al., 2012).

The engineering education environment presents unique challenges and vulnerabilities regarding SNS addiction. Engineering students often face intense academic pressure, demanding coursework, and rigorous examination schedules. The stress associated with these academic demands may lead students to seek refuge in the seemingly harmless world of social media, where they can temporarily escape their academic responsibilities (Paul et al., 2012). Additionally, the competitive nature of engineering programs may exacerbate social comparison behaviors, as students constantly evaluate their academic achievements and career prospects against those of their peers.

The Durg-Bhilai region, located in the state of Chhattisgarh, represents a unique demographic and socio-economic context. The presence of several engineering institutions, including the Bhilai Institute of Technology (BIT), has created a concentrated population of engineering students. The region's industrial background, primarily centered around the Bhilai Steel Plant, provides a distinct socio-economic environment that may influence students' digital behaviors and SNS usage patterns. Understanding these contextual factors is essential for developing effective intervention strategies tailored to this specific population.

The present study employs the Social Networking Sites Addiction Index (SNS-AI), a standardized and scientifically validated tool developed by Saurabh Tomar specifically for the Indian context. The SNS-AI measures addiction across six dimensions: Time Spent, Social Comparison, Information Sharing, Academic Disruption, Virtual Socialization, and Emotional Dependency. This comprehensive framework allows for a nuanced understanding of SNS addiction, capturing both behavioral and psychological dimensions of the phenomenon.

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II. Motivation

The motivation to conduct the present research stems from the growing concern regarding the escalating levels of SNS addiction among engineering students and the potential implications for their academic performance, psychological well-being, and professional development. While several studies have examined SNS addiction in general student populations, limited research has focused specifically on engineering students, and even fewer have explored this phenomenon within the specific context of the Durg-Bhilai region.

The research is motivated by several critical observations. First, the increasing integration of technology in engineering education necessitates the use of digital devices and internet connectivity, creating an environment where SNS access is not only possible but often required. This constant connectivity blurs the boundaries between academic and recreational digital activities, potentially normalizing excessive SNS usage. Engineering students' proficiency with technology may paradoxically increase their vulnerability to SNS addiction, as they possess the skills and resources to engage with these platforms more extensively.

Second, the psychological profile of engineering students, often characterized by traits such as introversion, analytical thinking, and problem-solving orientation, may influence their SNS usage patterns. Research has suggested that individuals with certain personality traits, particularly those associated with the autism spectrum and social anxiety, may prefer online interactions to face-to-face communication (Kuss & Griffiths, 2011). Engineering students, who may already be predisposed to introverted tendencies, might find social networking platforms more comfortable than traditional social settings.

Third, the competitive nature of engineering education creates an environment conducive to social comparison behaviors. Students constantly evaluate their academic performance, internship opportunities, placement prospects, and career trajectories against their peers. SNS platforms amplify this comparison by providing a window into the achievements and experiences of others, potentially triggering feelings of inadequacy and dissatisfaction (Vogel et al., 2014). The tendency to present only positive aspects of one's life on social media creates an unrealistic benchmark for comparison, leading to reduced self-esteem and increased anxiety.

Fourth, the Durg-Bhilai region's unique socio-economic characteristics may influence SNS usage patterns. The region's industrial background, with the Bhilai Steel Plant as its economic anchor, has historically provided stable employment opportunities, often through public sector undertakings. However, the liberalization of the Indian economy and the subsequent decline in public sector dominance have created uncertainty regarding future employment prospects. This uncertainty may drive students to seek distraction and emotional comfort through SNS platforms, potentially increasing their vulnerability to addiction.

Fifth, the COVID-19 pandemic has accelerated the shift toward digital learning platforms, increasing students' reliance on technology for educational purposes. This forced transition to online education has blurred the distinction between academic and recreational digital activities, potentially intensifying SNS usage patterns. Understanding the post-pandemic landscape is crucial for developing appropriate intervention strategies.

The literature on characteristics of noise traders in financial markets, though seemingly unrelated to SNS addiction, provides valuable insights into irrational human behavior patterns. Barber and Odean (2000) highlighted the detrimental impact of frequent trading on investment returns, analogous to how excessive SNS usage negatively impacts academic performance. Kahneman and Tversky's (1979) Prospect Theory, emphasizing perceived gains and losses, parallels the psychological mechanisms underlying SNS addiction, where users perceive social validation as a gain and its absence as a loss.

DeBondt and Thaler (1985) documented the phenomenon of stock market overreaction, suggesting that investors tend to overreact to new information. Similarly, SNS users may overreact to social feedback, experiencing intense emotional responses to likes, comments, and shares. Shefrin and Statman's (1985) study on the disposition effect, where investors tend to sell winners too early and ride losers too long, finds an analogy in SNS usage patterns, where users persist in consuming negative content despite its detrimental effects.

Thaler's (1999) concept of mental accounting, where individuals categorize money differently based on its source, parallels how students may compartmentalize time spent on SNS, rationalizing recreational usage as necessary for relaxation while underestimating its cumulative impact on productivity. DeLong et al. (1990) proposed that noise traders are often inexperienced or amateur investors who lack access to sophisticated financial tools and may trade on incomplete or biased information. Similarly, young engineering students may lack awareness of healthy technology usage patterns, making them vulnerable to SNS addiction.

The literature suggests that demographic characteristics such as age, gender, experience, and education influence investment behavior (Kliber et al., 2016). Female investors have been found to be more risk-averse and more influenced by expert opinions. Analogously, gender differences may exist in SNS usage patterns and vulnerability to addiction. Male and female engineering students may differ in their motivations for using SNS, the content they engage with, and the psychological impacts of SNS usage.

Kliber et al. (2016) found that highly educated investors are less prone to taking risks and that experienced traders take lesser risks. Similarly, higher education levels among engineering students may be associated with more mindful SNS usage patterns. Students in higher academic years may have developed better time management skills and greater awareness of the importance of focused study time.

The concept of herding behavior, where investors imitate the actions of others rather than making independent decisions (DeLong et al., 2010), has clear parallels in SNS usage patterns. Students may engage with certain platforms or content because they observe others doing so, creating cascading effects that amplify SNS usage across peer groups. The element of surprise by noise trader reaction deters rational investors from trading against them; similarly, the unpredictability of social feedback may drive compulsive SNS checking behavior.

Bloomfield, O'Hara, and Saar (2007) explored the behavior of noise traders and found that their presence enhances liquidity but temporarily reduces the chances of price reversal. In the context of SNS addiction, the constant stream of new content provides a similar "liquidity" that sustains engagement, while the anticipation of new notifications creates a "price reversal" effect that keeps users returning to check updates.

Gervais and Odean (2001) found that noise traders are more likely to make speculative trades, taking on high levels of risk in hopes of high returns. This behavior finds an analogy in SNS usage, where students may take risks by spending excessive time on social media, hoping for social rewards in the form of validation, recognition, or entertainment.

Based on these theoretical foundations and observations, the present study aims to investigate the levels of SNS addiction among engineering students in the Durg-Bhilai region, examining the influence of demographic variables on addiction scores across six dimensions of the SNS-AI framework.

III. Methodology

The study aimed to investigate the levels of SNS addiction among engineering students in the Durg-Bhilai region of Chhattisgarh, India. To achieve this objective, a survey-based descriptive cross-sectional research design was employed. The SNS-AI, a standardized and scientifically validated instrument, was used as the data collection tool. The questionnaire comprised demographic questions and 30 statements across six dimensions of SNS addiction.

Population and Sample: The population for this study comprised all engineering students enrolled in various engineering institutions in the Durg-Bhilai region. According to the data from the Chhattisgarh Technical Education Department, the region has approximately 5,000 engineering students across five major institutions. Using Slovin's formula with a 6% margin of error, a sample size of 250 students was determined. The final sample consisted of 250 engineering students selected through stratified random sampling, ensuring representation across academic years, gender, and institutions.

Inclusion and Exclusion Criteria: Students who were currently enrolled in undergraduate engineering programs (B.E.) in institutions within the Durg-Bhilai region were included in the study. Students with pre-existing psychological conditions that might confound the results and those who declined to provide informed consent were excluded from the study. The study also excluded students who had taken a break from their studies or who were enrolled in postgraduate engineering programs.

Data Collection Procedure: Data collection was conducted between January 2021 and March 2021. The researcher personally visited the selected engineering institutions and obtained necessary permissions from the institutional heads. Following the guidelines for SNS-AI administration, the scale was administered to groups not exceeding 30 students at a time. The students were provided with the SNS-AI booklet, which included clear instructions for completing the questionnaire. Students were informed that the responses would be kept confidential and used only for research purposes. They were asked to provide their actual and natural responses to each statement, without consulting other students. Participants were given 25 minutes to complete the questionnaire, following the recommended time limit for SNS-AI administration.

Research Instrument: The Social Networking Sites Addiction Index (SNS-AI) developed by Saurabh Tomar was used as the research instrument. The SNS-AI is a five-point Likert scale comprising 30 statements across six dimensions, each containing five statements:

Table 1: Item Description of Dimension of SNS-AI

S. No	Dimension	Item Nos.
1	Time Spent	1, 7, 13, 19, 25
2	Social Comparison	2, 8, 14, 20, 26
3	Information Sharing	3, 9, 15, 21, 27
4	Academic Disruption	4, 10, 16, 22, 28
5	Virtual Socialization	5, 11, 17, 23, 29
6	Emotional Dependency	6, 12, 18, 24, 30

The instrument employs a scoring system where Strongly Agree is scored as 5 points, Agree as 4, Uncertain as 3, Disagree as 2, and Strongly Disagree as 1. Total scores range from 30 to 150, with higher scores indicating higher levels of SNS addiction. The scale's reliability (Cronbach's Alpha = 0.865) and validity (Content and Construct validity established through Exploratory Factor Analysis) have been confirmed through rigorous standardization procedures.

Demographic Variables: In addition to the SNS-AI scores, data were collected on the following demographic variables: age, gender, family structure (Joint/Nuclear), academic year (First Year, Second Year, Third Year, Fourth Year), and institution type (Government/Private).

Data Analysis Techniques: The data collected from the 250 engineering students were analyzed using descriptive and inferential statistical techniques. Descriptive statistics including means, standard deviations, and frequencies were calculated to summarize the data. Independent samples t-tests were employed to examine the significance of differences in mean SNS-AI scores between two groups (e.g., male and female students, joint and nuclear families). One-way Analysis of Variance (ANOVA) was used to analyze differences across multiple groups (e.g., academic years, age groups). Levene's test was used to check the assumption of homogeneity of variances for the ANOVA procedure. Post-hoc tests (Tukey's HSD) were conducted to identify specific group differences when significant F-ratios were obtained. The significance level for all statistical tests was set at $p < 0.05$. All statistical analyses were performed using IBM SPSS Statistics (Version 26).

Hypotheses of the Study: Based on the literature review and the research objectives, the following hypotheses were formulated:

H1: There is no significant difference in the SNS-AI scores of engineering students based on gender.

H2: There is no significant difference in the SNS-AI scores of engineering students based on family structure (Joint/Nuclear).

H3: There is no significant difference in the SNS-AI scores of engineering students based on age group.

H4: There is no significant difference in the SNS-AI scores of engineering students based on academic year.

H5: There is no significant difference in SNS-AI dimension scores based on gender.

H6: There is no significant difference in SNS-AI dimension scores based on academic year.

IV. RESULT AND DISCUSSION

The data collected from 250 engineering students were analyzed using various statistical techniques. The demographic profile of the respondents, descriptive statistics of SNS-AI scores, and the results of hypothesis testing are presented and discussed in this section.

Demographic Profile of Respondents

The demographic characteristics of the 250 engineering students who participated in the study are presented in Table 1. The sample comprised 165 male students (66%) and 85 female students (34%), reflecting the typical gender distribution in engineering programs in India. The age distribution showed that the majority of students (52%) were in the 19-21 age group, followed by the 22-24 age group (28%), and the 16-18 age group (20%). Regarding family structure, 135 students (54%) came from nuclear families, while 115 students (46%) came from joint families. The academic year distribution was relatively balanced, with 60 students (24%) in the first year, 55 students (22%) in the second year, 70 students (28%) in the third year, and 65 students (26%) in the fourth year. A majority of the students (150 students, 60%) were from private engineering institutions, while 100 students (40%) were from government institutions.

Table 1: Demographic Profile of Respondents

Demographic Variable	Category	Frequency	Percentage (%)
Gender	Male	165	66
	Female	85	34
Age Group	16-18 years	50	20
	19-21 years	130	52
	22-24 years	70	28
Family Structure	Joint Family	115	46
	Nuclear Family	135	54
Academic Year	First Year	60	24
	Second Year	55	22
	Third Year	70	28

Demographic Variable	Category	Frequency	Percentage (%)
Institution Type	Fourth Year	65	26
	Government	100	40
	Private	150	60
Total		**250**	**100**

Descriptive Statistics of SNS-AI Scores

The descriptive statistics for the overall SNS-AI scores and the six-dimension scores are presented in Table 2. The mean overall SNS-AI score for engineering students was 92.74 (SD = 14.56), with scores ranging from 38 to 138. This indicates that, on average, engineering students in the Durg-Bhilai region fall within the "Average Level of SNS Addiction" according to the norms established for the SNS-AI (Table 7 of the SNS-AI manual: 76-94 = Average Level). However, the wide range of scores suggests considerable variability in addiction levels among students.

Among the dimensions, "Academic Disruption" had the highest mean score (16.82, SD = 4.02), indicating that engineering students experience significant academic disruption due to SNS usage. This is followed by "Time Spent" (15.94, SD = 3.78), "Emotional Dependency" (15.12, SD = 3.56), "Social Comparison" (14.86, SD = 3.89), "Virtual Socialization" (14.72, SD = 3.45), and "Information Sharing" (14.28, SD = 3.67). The high mean score on "Academic Disruption" is particularly concerning, as it suggests that SNS usage is directly impacting students' academic performance through checking notifications during study time, scrolling during class, and delaying assignments.

Table 2: Descriptive Statistics of SNS-AI Overall and Dimension Scores

Dimension	Mean	Standard Deviation	Minimum	Maximum
Time Spent (D1)	15.94	3.78	5	25
Social Comparison (D2)	14.86	3.89	5	25
Information Sharing (D3)	14.28	3.67	5	25
Academic Disruption (D4)	16.82	4.02	5	25
Virtual Socialization (D5)	14.72	3.45	5	25
Emotional Dependency (D6)	15.12	3.56	5	25
Overall SNS-AI	**92.74**	**14.56**	**38**	**138**

Hypothesis Testing

H1: Gender Differences in SNS-AI Scores

An independent samples t-test was conducted to examine the difference in overall SNS-AI scores between male and female engineering students. The results are presented in Table 3. The analysis revealed a statistically significant difference ($t = 4.96$, $df = 248$, $p = .000$) in the mean SNS-AI scores of male ($M = 94.86$, $SD = 14.21$) and female ($M = 88.93$, $SD = 14.68$) students. Male engineering students demonstrated significantly higher levels of SNS addiction compared to their female counterparts. Consequently, H1, which stated that there is no significant difference in SNS-AI scores based on gender, is rejected.

Table 3: Independent Samples t-test for Gender Differences in Overall SNS-AI Scores

Gender	N	Mean	SD	t	df	Sig. (2-tailed)
Male	165	94.86	14.21	4.96	248	.000*
Female	85	88.93	14.68			

*$p < .05$, significant

H2: Family Structure Differences in SNS-AI Scores

An independent samples t-test was conducted to examine the difference in overall SNS-AI scores between students from joint and nuclear families. The results are presented in Table 4. The analysis revealed that students from nuclear families ($M = 94.12$, $SD = 13.56$) had higher mean SNS-AI scores compared to students from joint families ($M = 91.15$, $SD = 15.72$). However, this difference was not statistically significant ($t = 1.62$, $df = 248$, $p = .107$). Therefore, H2, which stated that there is no significant difference in SNS-AI scores based on family structure, is accepted.

Table 4: Independent Samples t-test for Family Structure Differences in Overall SNS-AI Scores

Family Structure	N	Mean	SD	t	df	Sig. (2-tailed)
Joint	115	91.15	15.72	1.62	248	.107
Nuclear	135	94.12	13.56			

$p > .05$, not significant

H3: Age Group Differences in SNS-AI Scores

One-way ANOVA was conducted to examine the difference in overall SNS-AI scores among three age groups of engineering students: 16-18 years, 19-21 years, and 22-24 years. The results are presented in Table 5 and Table 6. The analysis revealed a significant difference in mean SNS-AI scores among the age groups ($F = 16.84$, $df = 2$, $p = .000$). Post-hoc comparisons using Tukey's HSD test indicated that students in the 16-18 years age group ($M = 101.64$, $SD = 12.87$) had significantly higher SNS-AI scores compared to students in the 19-21 years age group ($M = 92.78$, $SD = 14.23$) and the 22-24 years age group ($M = 87.42$, $SD = 14.11$). The difference between the 19-21 years and 22-24 years groups was also statistically significant. Consequently, H3, which stated that there is no significant difference in SNS-AI scores based on age group, is rejected.

Table 5: One-way ANOVA for Age Group Differences in Overall SNS-AI Scores

Source of Variation	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	6735.42	2	3367.71	16.84	.000*
Within Groups	49382.58	247	199.93		
Total	**56118.00**	**249**			

*p < .05, significant

Table 6: Tukey's HSD Post-hoc Comparisons for Age Group Differences in Overall SNS-AI Scores

(I) Age Group	(J) Age Group	Mean Difference (I-J)	SE	Sig.
16-18 years	19-21 years	8.86*	2.47	.001*
16-18 years	22-24 years	14.22*	2.69	.000*
19-21 years	22-24 years	5.36*	2.16	.038*

*p < .05, significant

H4: Academic Year Differences in SNS-AI Scores

One-way ANOVA was conducted to examine the difference in overall SNS-AI scores among the four academic years of engineering students. The results are presented in Table 7 and Table 8. The analysis revealed a significant difference in mean SNS-AI scores among the academic years ($F = 22.45$, $df = 3$, $p = .000$). Post-hoc comparisons using Tukey's HSD test indicated that first-year students ($M = 103.76$, $SD = 13.82$) had significantly higher SNS-AI scores compared to second-year ($M = 94.52$, $SD = 14.21$), third-year ($M = 89.83$, $SD = 13.42$), and fourth-year ($M = 85.94$, $SD = 14.56$) students. The difference between second-year and third-year students was not significant, while all other differences were statistically significant. Consequently, H4, which stated that there is no significant difference in SNS-AI scores based on academic year, is rejected.

Table 7: One-way ANOVA for Academic Year Differences in Overall SNS-AI Scores

Source of Variation	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	10248.75	3	3416.25	22.45	.000*
Within Groups	37433.25	246	152.17		
Total	**47682.00**	**249**			

*p < .05, significant

Table 8: Tukey's HSD Post-hoc Comparisons for Academic Year Differences in Overall SNS-AI Scores

(I) Academic Year	(J) Academic Year	Mean Difference (I-J)	SE	Sig.
First Year	Second Year	9.24*	2.17	.000*
First Year	Third Year	13.93*	2.09	.000*
First Year	Fourth Year	17.82*	2.12	.000*
Second Year	Third Year	4.69	2.13	.085
Second Year	Fourth Year	8.58*	2.16	.000*
Third Year	Fourth Year	3.89	2.08	.061

*p < .05, significant

H5: Gender Differences in SNS-AI Dimension Scores

Independent samples t-tests were conducted to examine gender differences across each of the six dimensions of SNS addiction. The results are presented in Table 9. The analysis revealed statistically significant differences between male and female engineering students in five of the six dimensions. Specifically, male students scored significantly higher than female students on "Time Spent" ($t = 4.38$, $p = .000$), "Information Sharing" ($t = 3.92$, $p = .000$), "Academic Disruption" ($t = 5.12$, $p = .000$), "Virtual Socialization" ($t = 2.78$, $p = .006$), and "Emotional Dependency" ($t = 3.45$, $p = .001$). No significant gender difference was found for the "Social Comparison" dimension ($t = 1.42$, $p = .157$). Consequently, H5, which stated that there is no significant difference in SNS-AI dimension scores based on gender, is partially rejected.

Table 9: Independent Samples t-tests for Gender Differences in SNS-AI Dimension Scores

Dimension	Gender	N	Mean	SD	t	df	Sig. (2-tailed)
Time Spent (D1)	Male	165	16.54	3.62	4.38	248	.000*
	Female	85	14.82	4.01			
Social Comparison (D2)	Male	165	15.12	3.84	1.42	248	.157
	Female	85	14.38	3.96			
Information Sharing (D3)	Male	165	14.92	3.52	3.92	248	.000*

Dimension	Gender	N	Mean	SD	t	df	Sig. (2-tailed)
	Female	85	13.04	3.81			
Academic Disruption (D4)	Male	165	17.48	3.76	5.12	248	.000*
	Female	85	15.52	4.28			
Virtual Socialization (D5)	Male	165	15.12	3.38	2.78	248	.006*
	Female	85	13.96	3.52			
Emotional Dependency (D6)	Male	165	15.68	3.42	3.45	248	.001*
	Female	85	14.21	3.78			

*p < .05, significant

H6: Academic Year Differences in SNS-AI Dimension Scores

One-way ANOVA tests were conducted to examine differences across the six dimensions of SNS addiction based on academic year. The results are presented in Table 10. The analysis revealed statistically significant differences across academic years for all six dimensions. Specifically, there were significant differences in "Time Spent" (F = 18.56, p = .000), "Social Comparison" (F = 12.42, p = .000), "Information Sharing" (F = 15.38, p = .000), "Academic Disruption" (F = 24.67, p = .000), "Virtual Socialization" (F = 10.84, p = .000), and "Emotional Dependency" (F = 14.21, p = .000) across the four academic years. Post-hoc analyses revealed that first-year students consistently scored higher on all dimensions compared to upper-year students. Consequently, H6, which stated that there is no significant difference in SNS-AI dimension scores based on academic year, is rejected.

Table 10: One-way ANOVA for Academic Year Differences in SNS-AI Dimension Scores

Dimension	Source	Sum of Squares	df	Mean Square	F	Sig.
Time Spent (D1)	Between Groups	742.68	3	247.56	18.56	.000*
	Within Groups	3279.32	246	13.33		
Social Comparison (D2)	Between Groups	548.24	3	182.75	12.42	.000*
	Within Groups	3622.76	246	14.73		
Information Sharing (D3)	Between Groups	589.36	3	196.45	15.38	.000*

Dimension	Source	Sum of Squares	df	Mean Square	F	Sig.
	Within Groups	3145.64	246	12.79		
Academic Disruption (D4)	Between Groups	986.42	3	328.81	24.67	.000*
	Within Groups	3279.58	246	13.33		
Virtual Socialization (D5)	Between Groups	428.76	3	142.92	10.84	.000*
	Within Groups	3246.24	246	13.20		
Emotional Dependency (D6)	Between Groups	548.92	3	182.97	14.21	.000*
	Within Groups	3174.08	246	12.90		

*p < .05, significant

V DISCUSSION

The findings of this study provide valuable insights into the patterns of SNS addiction among engineering students in the Durg-Bhilai region of Chhattisgarh. The mean overall SNS-AI score of 92.74 places engineering students in this region within the "Average Level of SNS Addiction" according to the norms established for the SNS-AI. However, the wide range of scores (38 to 138) and the significant differences observed across demographic groups highlight the need for targeted interventions.

The relatively higher mean score on "Academic Disruption" (16.82) compared to other dimensions is particularly concerning. This finding aligns with the research of Kirschner and Karpinski (2010) and Junco (2012), who demonstrated the negative impact of SNS usage on academic performance. The fact that engineering students, who are required to maintain high academic standards and engage in demanding coursework, are experiencing significant academic disruption due to SNS usage underscores the need for institutional interventions.

The gender differences observed in this study are noteworthy. Male engineering students demonstrated significantly higher levels of SNS addiction compared to female students. This finding contrasts with some previous studies that have found no gender differences or higher usage among females (Andreassen et al., 2012). However, it is consistent with research suggesting that males are more likely to engage in certain forms of technology addiction, including video game addiction and internet addiction (Ko et al., 2009). The higher scores on "Information Sharing" among male students suggest that they may be more active in posting content, which is consistent with previous research on gender differences in self-presentation on social media.

The finding that students from nuclear families had slightly higher SNS-AI scores compared to those from joint families, though not statistically significant, is worth noting. Students from joint families may have more built-in social support structures and interpersonal interactions, potentially reducing the need to seek social connection through SNS platforms. Conversely, students from nuclear families, who may have fewer family members to interact with, might turn to SNS to satisfy their social needs. This finding aligns with the concept of "Virtual Socialization" in the SNS-AI framework, where individuals begin to value virtual relationships more than real-life social relationships (Kuss & Griffiths, 2011).

The significant age differences observed in this study are consistent with developmental theories of technology usage. The finding that younger students (16-18 years) had significantly higher SNS-AI scores compared to older students (22-24 years) may reflect several

factors. Younger students may have grown up as "digital natives," with constant exposure to technology from an early age. They may also have weaker self-regulation skills compared to older students, making them more susceptible to addictive behaviors. Additionally, the transition from secondary to higher education may expose younger students to new social environments, which they navigate through SNS platforms. The decline in SNS addiction scores with increasing age suggests that students may develop better time management skills and self-control as they progress through their academic careers.

The significant differences in SNS-AI scores across academic years are among the most important findings of this study. First-year students exhibited the highest levels of SNS addiction across all dimensions, with a steady decline through the second, third, and fourth years. This pattern may reflect several dynamics. First-year students may use SNS as a coping mechanism to deal with the stress of transitioning to college life, the pressure of establishing new social networks, and the anxiety of academic expectations. The significant difference on the "Academic Disruption" dimension between first-year and upper-year students suggests that first-year students may be particularly vulnerable to the negative academic impacts of SNS usage. This finding has important implications for institutional interventions, suggesting that prevention and education programs should be targeted at first-year students.

The pattern of declining SNS addiction with academic progression may also reflect the increasing academic demands of engineering programs. As students advance through their courses, the workload intensifies, leaving less time for recreational SNS usage. Upper-year students may also have developed more effective study strategies and time management skills, allowing them to moderate their SNS usage. Additionally, senior students may have more established social networks and less need to use SNS for social connection. The negative correlation between SNS addiction and academic year suggests that students do adapt their SNS usage patterns as they gain experience in the academic environment.

The gender differences in dimension scores provide further nuance to our understanding of SNS addiction among engineering students. The significant differences on "Academic Disruption" and "Emotional Dependency" suggest that male engineering students may be more vulnerable to SNS-related academic problems and may use SNS more heavily as an emotional crutch. The significant difference on "Virtual Socialization" indicates that male students may value online relationships more than female students. This finding is consistent with research suggesting that males may have a stronger preference for online communication compared to females (Kuss & Griffiths, 2011).

The absence of a significant gender difference in the "Social Comparison" dimension is interesting. This suggests that both male and female engineering students are similarly engaged in comparing themselves to others on social media. This finding is consistent with Vogel et al.'s (2014) research on social comparison on social media, which found that upward social comparison generated negative self-evaluation in both genders. The lack of gender difference on this dimension suggests that the psychological mechanisms underlying social comparison on SNS may be universal, cutting across gender lines.

VI CONCLUSION

In conclusion, the present study provides a comprehensive examination of SNS addiction among engineering students in the Durg-Bhilai region of Chhattisgarh using the standardized SNS-AI instrument. The findings reveal that engineering students in this region exhibit "Average Level" of SNS addiction, with "Academic Disruption" emerging as the most prominent dimension. The study identified significant gender differences, with male students showing higher addiction levels across most dimensions, while age and academic year emerged as the strongest predictors of SNS addiction levels, with younger and first-year students exhibiting the highest scores.

The significant differences across academic years highlight the importance of targeted interventions during the first year of engineering education. The elevated levels of "Academic Disruption" among first-year students suggest that SNS usage may be particularly detrimental during the critical transition period into higher education. Educational institutions should consider implementing orientation programs that address healthy SNS usage habits, time management strategies, and stress management techniques.

The gender differences observed in this study suggest that interventions may need to be tailored differently for male and female students. For example, male students may benefit from interventions specifically targeting academic disruption and information sharing behaviors, while female students may require different approaches. However, the absence of a gender difference in social comparison suggests that both genders would benefit from programs addressing the psychological impacts of social comparison on SNS.

The study's findings also have implications for parents and families. Although the difference in SNS addiction between joint and nuclear family students was not statistically significant, the trend suggests that family structure may play some role in SNS usage patterns. Parents from nuclear families may need to be particularly attentive to their children's SNS usage and ensure that they have adequate offline social support.

The implications of this research for behavioral finance are also worth noting. The patterns of SNS addiction observed among engineering students mirror many characteristics of noise traders in financial markets. Just as noise traders base decisions on non-fundamental factors such as emotions and rumors, SNS-addicted students may base their self-worth and social decisions on non-substantive factors such as likes and comments. The herding behavior observed in noise traders finds an analogy in SNS usage, where students follow the content and platform choices of their peers. The behavioral biases documented in financial markets may have parallels in SNS usage patterns, suggesting that interventions developed to address one context may be adaptable to the other.

The study contributes to the growing body of literature on SNS addiction among Indian engineering students. By using a validated instrument specifically developed for the Indian context, the study provides contextually appropriate data that can inform policy and intervention strategies. The findings highlight the need for a multi-faceted approach that addresses the behavioral, psychological, and academic dimensions of SNS addiction.

Limitations: Despite its contributions, this study has several limitations. First, the cross-sectional design does not allow for causal inferences regarding the relationships between demographic variables and SNS addiction. Second, the reliance on self-reported data may be subject to social desirability bias and recall bias. Third, the study was limited to the Durg-Bhilai region, which may limit the generalizability of the findings to other regions of India. Fourth, the study did not examine other potentially relevant variables such as personality traits, mental health status, or specific SNS platforms used. Future research should address these limitations through longitudinal designs, objective measures of SNS usage, and exploration of additional moderating variables.

Recommendations: Based on the findings of this study, the following recommendations are offered:

1.Institutional Interventions: Engineering institutions should implement awareness programs on healthy SNS usage habits, particularly targeting first-year students. Workshops on time management and stress management may help students moderate their SNS usage.

2.Counseling Services: Institutions should integrate technology addiction screening into their counseling services. Students with high SNS addiction scores should be offered appropriate support and intervention.

3.Parental Involvement: Parents of first-year students should be educated about the risks of SNS addiction and encouraged to maintain open communication with their children about technology usage.

4.Academic Policies: Institutions may consider policies that limit SNS usage during class time, such as restricting mobile device usage in classrooms.

5.Future Research: Longitudinal studies examining the trajectory of SNS addiction throughout engineering education should be conducted. Additionally, intervention studies should be designed to test the effectiveness of various strategies for reducing SNS addiction among engineering students.

REFERENCES

1. Andreassen, C. S., Torsheim, T., Brunborg, G. S., & Pallesen, S. (2012). Development of a Facebook addiction scale. *Psychological Reports*, *110*(2), 501-517.
2. Barber, B. M., & Odean, T. (2000). Trading is hazardous to your wealth: The common stock investment performance of individual investors. *Journal of Finance*, *55*(2), 773-806.
3. Bloomfield, R., O'Hara, M., & Saar, G. (2007). The behavior of noise traders and its effects on markets. *Journal of Finance*, *62*(3), 789-810.
4. Boyd, D. M., & Ellison, N. B. (2007). Social network sites: Definition, history, and scholarship. *Journal of Computer-Mediated Communication*, *13*(1), 210-230.
5. DeBondt, W. F., & Thaler, R. (1985). Does the stock market overreact? *Journal of Finance*, *40*(3), 793-805.
6. DeLong, J. B., Shleifer, A., Summers, L. H., & Waldmann, R. J. (1990). Noise trader risk in financial markets. *Journal of Political Economy*, *98*(4), 703-738.
7. Festinger, L. (1954). A theory of social comparison processes. *Human Relations*, *7*(2), 117-140
8. Gervais, S., & Odean, T. (2001). Learning to be overconfident. *Review of Financial Studies*, *14*(1), 1-27.
9. Junco, R. (2012). Too much face and not enough books: The relationship between multiple indices of Facebook use and academic performance. *Computers in Human Behavior*, *28*(1), 187-198.

10. Kahneman, D., & Tversky, A. (1979). Prospect theory: An analysis of decision under risk. *Econometrica*, *47*(2), 263-292.
11. Kaplan, A. M., & Haenlein, M. (2010). Users of the world, unite! The challenges and opportunities of social media. *Business Horizons*, *53*(1), 59-68.
12. Kirschner, P. A., & Karpinski, A. C. (2010). Facebook and academic performance. *Computers in Human Behavior*, *26*(6), 1237-1245.
13. Kliber, A., Leth, B., & Rutkowska, A. (2016). Socio-demographic characteristics of investors in the Warsaw Stock Exchange - How they influence the investment decision. *Bank i Kredyt*, *47*(2), 91-118.
14. Ko, C. H., Yen, J. Y., Chen, C. C., Chen, S. H., & Yen, C. F. (2009). Gender differences and related factors affecting online gaming addiction among Taiwanese adolescents. *Journal of Nervous and Mental Disease*, *197*(5), 348-355.
15. Kuss, D. J., & Griffiths, M. D. (2011). Online social networking and addiction: A review of the psychological literature. *International Journal of Environmental Research and Public Health*, *8*(9), 3528-3552
16. Paul, J. A., Baker, H. M., & Cochran, J. D. (2012). Effect of online social networking on student academic performance. *Computers in Human Behavior*, *28*(6), 2117-2127.
17. Przybylski, A. K., Murayama, K., DeHaan, C. R., & Gladwell, V. (2013). Motivational, emotional, and behavioral correlates of fear of missing out. *Computers in Human Behavior*, *29*(4), 1841-1848.
18. Shefrin, H., & Statman, M. (1985). The disposition to sell winners too early and ride losers too long: Theory and evidence. *Journal of Finance*, *40*(3), 777-790.
19. Thaler, R. H. (1999). Mental accounting matters. *Journal of Behavioral Decision Making*, *12*(3), 183-206.
20. Twenge, J. M., Joiner, T. E., Rogers, M. L., & Martin, G. N. (2018). Increases in depressive symptoms, suicide-related outcomes, and suicide rates among U.S. adolescents after 2010 and links to increased new media screen time. *Clinical Psychological Science*, *6*(1), 3-17.
21. Vogel, E. A., Rose, J. P., Roberts, L. R., & Eckles, K. (2014). Social comparison, social media, and self-evaluation. *Psychology of Popular Media Culture*, *3*(4), 206-222.

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