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Alone Together: The Mental Health Costs of Online Gaming and Social Networking Addiction Among Youth

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addictive behaviour; COVID-19; internet gaming; social networking

ABSTRACT

Purpose: This study investigated the interplay between social networking addiction, excessive usage of internet gaming, and mental health outcomes, particularly stress, depression, and anxiety, among young students during the lockdown period of the COVID-19 pandemic in India.

Design/methodology/approach: The data was collected from students studying in high school, undergraduate, and postgraduate degree colleges in Mumbai, India. The duration of data collection was between March 2021 and December 2022. The purposive and quasi-experimental sampling technique was adopted.

Findings: The data was analyzed using ANOVA, regression analysis, and confirmatory factor analysis using structural equation modeling. The findings reveal gender as a significant predictor, with females experiencing higher levels of mental health issues. Further, COVID-19 infection status also correlates with heightened stress, depression, and anxiety. The findings underscore the importance of tailored interventions and support systems to address mental health challenges, especially during crises.

Originality: The study is original. The data was collected during the first and second lockdowns due to the COVID-19 pandemic in India.

Research limitations and implications: The study observes a limitation of only assessing a few demographic variables of the students from Mumbai, India. And hence generalization on the wider sample cannot be taken. This study would be useful for developing interventions to cope with problems of internet gaming, and social networking addiction and addressing issues of stress related to it.

Practical implications: This study would be useful for young individuals, parents, healthcare professionals, and academicians to develop coping mechanisms to overcome addictive technological behavior. Newer methods can be developed to channel this behavior for productive output.

Social implications: Further, the social implication of the study would be helpful for people to overcome internet addictive behaviors and cope with the negative outcomes arising out of it.

1. INTRODUCTION

In contemporary society, social media and online gaming have garnered immense popularity, particularly among the younger population and students. The allure of social media lies in its promise of social engagement, mitigating the fear of missing out on activities that everyone is doing. It has become ingrained as a societal norm, with platforms such as Facebook, Instagram, WhatsApp, Snapchat, Twitter, and LinkedIn serving multifaceted purposes including dating and socializing. However, incessant exposure to these platforms has also been linked to negative outcomes such as stress, loneliness, and cyberbullying (Müller et al. 2016; Duven et al. 2015). Excessive video gaming is associated with pathological gambling where addictive internet user imposes an impulse control disorder and impulse projections of bullying behavior. Consequently, individuals who immerse themselves in social networking and gaming activities are more susceptible to experiencing heightened levels of stress, depression, and emotional distress.

Today's younger generation seeks novel and immersive avenues for interpersonal interaction. Numerous studies have highlighted the potential overuse of specific online content leading to addiction syndrome (Ko et al. 2014a; 2014b; Ko, Liu, Yen, Yen, et al. 2013; Ko, Liu, Yen, Chen, et al. 2013; Kuss and Griffiths 2011; Duven et al. 2015). There is an increase in online social networking technology addiction and increased usage of online gaming and networking activity among young individuals has increased. Profoundly. The increased usage of the internet has provided positive output such as an increase in knowledge, development of wider and in-depth insights on varied knowledge, and ease of accessibility to people who are scattered geographically. There is also a profound increase in the negative side effects of the use of the internet and virtual presence, such as over-exposure to screen timing, and increased risk of being a victim of negative impacts on well-being such as anxiety, depression, and stress (Andreassen et al., 2016; Cheng and Li, 2014; Kuss and Griffiths, 2011).These youth have developed a significant addiction to continual engagement in online gaming, encompassing both single-player and multiplayer formats across various levels of competition. Gamers often personalize their profiles using human avatars, and private messaging chat rooms have surged in popularity among the youth. These platforms often feature customizable human avatars and anonymous usernames, allowing users to conceal their true identities, and adding a layer of immersion to their experiences. While this avatar feature offers a veil of anonymity, it also elevates the risk of falling victim to cyberbullying (Shahnawaz and Rehman 2020).The onset of the COVID-19 pandemic lockdown in India which started in March 2020 has been associated with a significant surge in cyberbullying incidents and depression cases. The enforced social isolation has brought about feelings of uncertainty, loss of control, and disruption to daily routines, resulting in distress compounded by the prolonged nature of the situation. To combat this, individuals have turned to social networking platforms and the internet as primary means of staying connected with loved ones. These platforms serve as vital tools for maintaining connectivity across distances and alleviating feelings of loneliness—a fundamental aspect of human nature driven by evolutionary impulses. Social networking in itself is a part of basic evolutionary drives, human are social beings and like to be surrounded by others.

Under lockdown conditions, people have devised strategies to preserve a sense of calm and maintain virtual social contact. Group gaming and interactive activities have seen rapid growth as avenues for communal engagement. In March 2020, the World Health Organization launched the "Play Apart Together" initiative as a means of fostering safer online human interaction (WHO, 2020a, 2020b). Although initially aimed at combating isolation and loneliness, the initiative has gradually led to an upsurge in gaming addiction as individuals increasingly rely on gaming for social connection.

In today's VUCA world (volatile, uncertain, complex, and ambiguous), prolonged separation from family and loved ones has led to a pervasive sense of loneliness among many individuals. The outbreak of the pandemic, sudden lockdowns, remote work setups, and overall changes in daily living have pushed people to seek solace in alternative activities, such as social networking. However, the flip side of increased reliance on social networking has been the proliferation of fake news, rumors, and misinformation, exacerbated by the surge in internet usage.

Numerous anecdotal reports have highlighted a parallel between addictive behaviors such as alcohol and drug addiction, pathological gambling, and video game addiction (Young 2004; Young 2009) in individuals exhibiting problematic internet usage. In today's society, where the internet permeates our professional and social spheres, its increased usage has been associated with academic, occupational, and social impairments. This situation has been exacerbated during the pandemic, with a documented rise in internet overuse among the younger population (Chandra, 2021; Zhao *et al.*, 2023), resulting in significant distress or impairment (Laconi *et al.*, 2014). This escalation underscores the perilous consequences of comorbid internet addiction and other mental health disorders, including depression, heightened interference in daily life, diminished concentration, increased instances of cyberbullying, engagement in online affairs, and impaired social functioning(Albert et al. 2008; Cramer et al. 2016).

While the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) acknowledges social media addiction as a diagnosable condition, internet gaming disorder (IGD) remains an area requiring further research according to the American Psychiatric Association (APA, 2013). Symptoms of IGD, delineated in the DSM-5, encompass preoccupation, withdrawal, tolerance, persistence, continuation, deception, escape, and displacement. IGD manifests as a persistent pattern of internet or online game use occurring frequently and leading to significant impairment or distress over a twelve-month period, necessitating the fulfillment of five or more of the specified criteria. These criteria encompass experiencing withdrawal symptoms, heightened urges to engage in online gaming, diminished interest in alternative activities, jeopardization of relationships or career prospects, disrupted work routines, and pronounced mood fluctuations (APA, 2013).

Further, internet gaming addiction has emerged as a substantial concern, characterized by excessive and distressing internet usage akin to non-substance-related behavioral addictions (Laconi, Rodgers, and Chabrol 2014; Young 2009; Zhao et al. 2023). While the DSM-V recognizes this issue, it underscores the need for further clinical research to elucidate the manifold impairments associated with excessive internet use and its impact on individuals (Andreassen, Pallesen, and Griffiths 2017; Young 2009).

Hence, based on the above background, this study was undertaken to analyze the effects of social networking and online gaming addiction on the well-being of students during the COVID-19 pandemic in India, particularly during the first and second lockdown periods. This study aimed to investigate how students, who were living remotely and primarily interacting

through virtual platforms, were affected by addiction to social networking and online gaming during these challenging times.

Objectives of the study

The author anticipated that stringent measures such as curfews, social distancing, quarantine, and lockdowns would adversely affect the younger population, who typically derive energy and social acceptance from activities like spending time with friends or going out. With the implementation of these measures during the pandemic, young individuals began to experience loneliness, fear of missing out, anxiety, and stress. This, in turn, directly impacted their physical, psychological, and emotional well-being, potentially hindering their academic and professional success. Thus, the objective of the present study was:

Assess the extent of the increase in internet gaming activity among college students during the COVID-19 pandemic.

Evaluate the prevalence of social networking addiction among college students amidst the COVID-19 pandemic.

Investigate the levels of depression, anxiety, and stress experienced by college students during the COVID-19 pandemic.

Examine the correlation between internet gaming activity and social networking addiction with levels of depression, anxiety, and stress among college students during the COVID-19 pandemic.

Data collection and procedure

The data was collected from respondents between March 2021 and December 2023. These respondents at the time of data collection were studying in high school, undergraduate, and postgraduate degree colleges in Mumbai, India. The purposive and quasi-experimental sampling technique was adopted. Following the elimination of incomplete replies, 832 samples in total were taken into consideration for the final study. Control variables included gender, age group, level of education at the time of submitting responses, and COVID-19 infection status.

Tools used for data collection were carefully selected considering the adaptations and language used for administration. To understand the reliability and validity of the scale, a pilot study of 84 students was conducted. The questionnaires were converted into an online Google form and responses to the statements along with demographic information were collected and analyzed. The Cronbach Alpha of the pilot study was observed as 0.79 was observed. The tools adapted were the social networking addiction scale (Andreassen *et al.*, 2016)internet gaming disorder scale (Pontes and Griffiths, 2015), and the depression anxiety stress scale (Lovibond & Lovibond, 1995; Lovibond & Lovibond, 1993). A detailed description of the tools is given below.

Tools for data collection

Bergen Social Networking Addiction Scale (SNA) (Andreassen *et al.*, 2016, 2017) is a short survey that measures the severity of social media addiction in young adults. The scale was developed by Andreassen and colleagues in 2016. The test assesses five elements of social networking addiction, which are salience, tolerance, mood modification, conflict, withdrawal, and relapse. Participants rate these items using a five-point Likert scale, where 1=very rarely and 5=very often. The scale has a test-retest reliability at a 3-week interval, with a Pearson's correlation coefficient of 0.75.

Internet Gaming Disorder Test (IGD-20 Test) (Pontes *et al.*, 2014) consists of 20 items that are rated on a 5-point Likert scale (where 1=very rarely and 5=very often). These items are designed to assess the nine criteria of Internet Gaming Disorder (IGD) as outlined in the DSM-5 (APA, 2013) and are also based on the components model of addiction proposed by (Griffiths, 2005), which includes salience, mood modification, tolerance, withdrawal symptoms, conflict, and relapse. The test measures the severity of internet gaming addiction by evaluating both online and/or offline gaming activities over a 12-month period.

Depression, Anxiety, and Stress Scale (DASS) (Lovibond and Lovibond 1995; Lovibond and Lovibond 1993) is a 21-item scale, a set of three self-report scales designed to measure the emotional states of depression, anxiety, and stress. For this study, this test analyses depression, stress, and anxiety among the respondents. The responses were collected on 1=did not apply to me and 5=applied to me very much or most of the time.

For the present study, the test of normality of data was checked using Shapiro-Wilk. To check the reliability of all three scales, Cronbach's alpha is used. It was observed that the reliability statistics for SNA was 0.913, for IGD it was 0.866 and for DASS the reliability was observed as 0.937. cluster sampling method.

Statistical Methods

This study investigated the underlying relationship between social networking addiction, internet gaming, and the experience of depression, stress, and anxiety among students. The analysis aims to uncover the interrelationships among gender, age group, current education level, and COVID-19 infection status. Statistical analysis was conducted using a combination of methods. ANOVA was employed to assess differences in social networking addiction and internet gaming across groups. Correlation analysis was performed to explore the relationships between social networking addiction,

internet gaming, and mental health outcomes. Finally, structural equation modeling (SEM) was used to investigate the complex interplay between social networking addiction, internet gaming, depression, stress, and anxiety.

2. FINDINGS AND ANALYSIS

Demographics of respondents

The first analysis started with understanding the demographic distribution of the respondents who participated in the study. it should be noted that demographic analysis provides valuable insights into the characteristics of the present study, and respondents and sheds light on their behaviors and concerns, particularly amidst the COVID-19 pandemic. As the data was collected during the first and second lockdowns in India, understanding the behavior patterns and coping mechanisms of students became very important.

As observed, the average age of respondents is around 21 years, which suggests that the sample primarily comprises young individuals, a demographic known to be highly engaged with social media and online gaming platforms. The distribution of participants across different age groups and educational programs indicates a diverse sample, allowing for a comprehensive examination of the research variables.

Demographic Analysis: A detailed demographic analysis observes that the average age of respondents here was 21 years, which comprises 394 females (mean=60.58, std dev=14.84) and 438 males (mean=57.16, std dev=14.90). Observation for other variables includes 403 respondents were between 14-18 years and pursuing high school and undergrad programs (mean=59.28, std dev=15.46); 429 respondents were between 19-24 years and pursuing undergrad or postgrad programs (mean=58.31, std dev=14.48). It was observed that 203 respondents have recorded not being infected by COVID-19 (mean=58.97, std dev=15.76) whereas 629 recorded being infected with COVID-19 at least once during the data collection period (mean=58.72, std dev=14.70).

The data on health concerns among respondents provides valuable insights into their psychological well-being and the impact of external factors, such as the COVID-19 pandemic, on their mental health.

Health concerns: The finding that 34.3% of respondents expressed worry about the health of their family members underscores the profound influence of familial relationships on individuals' emotional state. During times of uncertainty and crisis, such as the pandemic, concerns for the health and safety of loved ones can contribute significantly to heightened stress and anxiety levels among individuals.

Similarly, 18.8% of respondents expressing concern for the well-being of their friends or relatives highlights the importance of social connections and support networks in coping with stressful situations. Concerns for the health and safety of others reflect a sense of empathy and interpersonal connectedness, which can both buffer against stress and contribute to feelings of distress when those close to us are perceived to be at risk.

Furthermore, the significant proportion (38.7%) of respondents indicating concern about their health suggests a widespread awareness of personal well-being and the potential risks associated with the pandemic. This finding underscores the pervasive impact of health-related stressors on individuals' mental health, as concerns about contracting the virus or experiencing adverse health outcomes can contribute to heightened anxiety and fear.

Conversely, the 8.3% of respondents displaying no concern at all may reflect varying levels of resilience or coping mechanisms among individuals. While some may possess the ability to maintain a positive outlook and adapt to challenging circumstances, others may experience heightened levels of distress in response to health-related concerns.

Overall, the data on health concerns among respondents underscores the complex interplay between individual, interpersonal, and environmental factors in shaping psychological well-being during times of crisis. Hence, the researcher anticipated that recognizing and addressing these concerns is essential for promoting resilience and fostering mental health among individuals facing challenging circumstances.

Furthermore, to understand how these students are coping with the pandemic situation, the researcher anticipated to analyse their behavior or usage of internet activity. Here the researcher anticipated that young individuals are more prone to being affected by external situations and will seek other forms of solace to cope. Hence the study proceeded with understanding the patterns of social networking and internet usage with which these young individuals would be currently associated.

It was also observed that the increase in social networking and gaming activity during the pandemic aligns with broader trends seen worldwide. With restrictions on physical interactions and increased reliance on virtual communication, individuals, especially young students, have turned to social media and online gaming for entertainment, socialization, and stress relief. However, excessive engagement with these platforms can exacerbate mental health issues such as stress, depression, and anxiety. The prevalence of concerns related to health, both personal and familial, underscores the psychological impact of the pandemic on individuals. Heightened stress levels, coupled with prolonged screen time and sedentary behavior, can contribute to the development or exacerbation of mental health problems among young students. All these also have a subsequent impact on their academic output as well.

Patterns of social networking and Internet usage: When asked about the daily usage patterns of social networking platforms (such as Facebook, Twitter, and Instagram) and gaming activities (offline/online) it was observed that,

For social networking usage:

14.1% of respondents use social media for 0-2 hours daily.

28.2% of respondents spend 2-5 hours daily.

15.7% of respondents spend 5-10 hours daily.

38.0% of respondents are engaged around 10-15 hours daily.

4.0% of respondents indicated that they do not use social media.

For internet gaming activity:

32.8% of respondents engage in gaming for 0-2 hours daily.

10.3% of respondents spend 2-5 hours daily.

1.9% of respondents engage in gaming for 5-10 hours daily.

38.8% of respondents engage in gaming for 10-15 hours daily.

16.1% of respondents indicated that they do not play games either offline or online.

It can be noted here that social networking addiction and increased internet gaming activity may serve as coping mechanisms for these young students who were experiencing stress and isolation during the pandemic. However, these behaviors can ultimately lead to negative outcomes, including heightened levels of stress, depression, and anxiety. Further, the study also sought to understand the overall impact of the above experiences on any psychosomatic complaints these students might be experiencing during that time.

Hence, questions were also asked about any increased complaints experienced by the students. The data presented in Table 1 provides insights into the psychosomatic complaints experienced by students during the time of data collection, shedding light on the diverse range of challenges faced by them amidst the COVID-19 pandemic. Firstly, the prevalence of feelings of disengagement, boredom, and uneventful life due to quarantine and social distancing (23.3%) underscores the impact of restrictive measures on their daily routines and overall well-being. The disruption of regular activities and social interactions further contributes to feelings of isolation and monotony, which may exacerbate existing mental health concerns.

Similarly, the reported experiences of stress or burnout (5.6%) highlight the psychological toll of navigating uncertain and challenging circumstances. The prolonged exposure to stressors, such as concerns about health, financial instability, and disruptions to daily life, can lead to feelings of overwhelm and exhaustion (Vaghefi *et al.*, 2020). Also, changes in eating habits (12.4%) and disturbed sleep patterns (17.5%) further reflect the impact of stress and emotional distress on individuals' physical health and well-being. Disruptions to regular routines and heightened levels of anxiety or depression can contribute to alterations in eating and sleeping patterns, potentially exacerbating existing health conditions or leading to the development of new symptoms.

Further, feelings of loneliness, emptiness, depressive thoughts, and anxious thoughts reported by students (11.5%, 3.7%, 11.5%, and 2.3% respectively) highlight the prevalence of negative emotional experiences during the pandemic. These findings align with previous research indicating an increase in mental health issues, including depression, anxiety, and loneliness, during periods of social isolation and uncertainty (Chandra, 2021). Overall, the data on psychosomatic complaints underscore the complex interplay between psychological and physical health outcomes during times of crisis. Addressing these challenges requires comprehensive support systems and interventions that prioritize both mental and physical well-being, emphasizing the importance of holistic approaches to healthcare and mental health support.

Table 1: Current psychosomatic complaints experienced by respondents (N=832)

Current psychosomatic complaints experienced	**Respondents**
Disengaged/ Boredom and uneventful life due to quarantine and social distancing	23.3
Experiencing stress or burnout	5.6
Diabetes	0.7
Eating habits have changed	12.4

Feeling of loneliness, Feeling of emptiness	11.5
Surrounded with depressive thoughts most of the time	3.7
High blood pressure	1.8
Increased headaches	4.3
kidney diseases	1.3
Mood swings or feelings of extreme emotions	3.8
None	11.5
Sleep pattern getting disturbed	17.5
Surrounded with anxious thoughts most of the time	2.3

The next section of this paper analyses the three identified tools.

Analysis of students on Social Networking Addiction Scale (SNA)

To analyze the central tendency, variability, and distribution of participants' characteristics in the study, descriptive statistics were carried out. Table 2(a) shows the output of mean values, median, standard deviation, variance, skewness, standard error of skewness, and percentiles for participants' characteristics, including gender, age group, current education level, and COVID-19 infection status. Results from Table 2(b) suggest that gender may have a significant impact on the outcome variable, while age group, current education level, and COVID-19 infection status do not demonstrate significant effects. Similarly, table 3 shows the statistically significant positive correlation between total score and COVID-19 infection status, with COVID-infected individuals showing slightly higher total scores. This shows that there is an impact of social networking addiction and spending more time online when they are isolated.

When analyzing the individual impact of social networking addiction on gender, it provided a potential difference in the perceptions and experiences of addictive behaviors between genders, providing valuable insights into potential gender-specific patterns of addiction. As seen in Table 2(a) for female students scores were observed higher compared to male students, such as for mood modification females (mean=3.07) engaged in addictive behaviors more frequently to regulate their mood compared to male students; females experienced greater discomfort or distress with withdrawal behavior (mean=2.60); females experienced more interpersonal or intrapersonal conflicts (mean=2.19) related to addictive behaviors, had slightly higher relapse scores (mean=2.82), overall indicating that females had a slightly higher overall propensity towards addictive behaviors compared to male students.

The analysis of social networking addiction across gender lines yielded noteworthy insights into the nuanced differences in addictive behaviors between male and female students. Specifically, female students demonstrated higher scores across several dimensions of addiction compared to their male counterparts, indicating a potentially greater susceptibility to addictive behaviors among females.

The findings revealed that female students were more inclined to engage in addictive behaviors for mood modification, suggesting that they may rely more heavily on social networking platforms to regulate their emotions compared to male students. Additionally, females exhibited greater discomfort with withdrawal behaviors, experienced more interpersonal conflicts related to addictive behaviors, and showed slightly higher relapse scores, all of which collectively indicate a higher overall propensity towards addictive behaviors among females.

These gender-specific patterns align with previous research highlighting differential usage patterns between males and females in the realm of technology addiction (Andreassen *et al.*, 2016; Ioannidis *et al.*, 2018). Studies have consistently shown that male students are more prone to addictive usage of video games, while female students tend to be more associated with addictive usage of social media platforms. This suggests that gender plays a significant role in shaping individuals' engagement with and susceptibility to various forms of technology addiction, emphasizing the importance of gender-sensitive approaches in addressing addictive behaviors and designing targeted interventions.

Table 2 (a): Showing mean values of variables on SNA

Mean values	**Participants**	**Gender**	**Age Group**	**Current Education**	**Covid Infected**
	416.5	1.53	1.52	1.52	1.76

Median	416.5	2	2	2	2
Std. Deviation	240.32	0.5	0.5	0.5	0.43
Variance	57754.667	0.25	0.25	0.25	0.19
Skewness	0	-0.11	-0.06	-0.06	-1.19
Std. Error of Skewness	0.09	0.09	0.09	0.09	0.09

(Source: Author)

Table 2(b) presents the results of ANOVA analyses for the impact of control variables, namely gender, age group, current education, and COVID-19 infection status, on the total scores of the observed variables. The findings suggest that while gender significantly influences total scores, age group, current education, and COVID-19 infection status do not exhibit significant effects. These results provide insights into the differential impact of control variables on the observed variables, highlighting the importance of considering gender differences in addressing the studied phenomena.

Further, table 3 presents correlations between the control variables (gender, age group, current education, and COVID-19 infection) and the total score variable. Overall, it was observed that there are weak correlations between the control variables and total scores, only the correlation with COVID-19 infection reaches statistical significance, indicating a potential relationship between COVID-19 infection status and total score. However, as the correlations observed are relatively weak, the researcher here suggests that some other factors could be employed for future studies.

Table 2 (b): Calculated ANOVA of variables on SNA

Control Variables		**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
Gender	Between Groups	27.68	58	0.48	2.05	0.00*
	Within Groups	179.74	773	0.23		
	Total	207.42	831			
Age Group	Between Groups	18.53	58	0.32	1.31	0.07^{NS}
	Within Groups	189.26	773	0.25		
	Total	207.80	831			
Current Education	Between Groups	18.53	58	0.32	1.31	0.07^{NS}
	Within Groups	189.26	773	0.25		
	Total	207.80	831			
Covid Infected	Between Groups	9.85	58	0.17	0.91	0.66^{NS}
	Within Groups	143.63	773	0.19		
	Total	153.47	831			

**significant at 0.01 level (Source: Author)*

Table 3: Paired sample correlations on SNA (N=832)

Correlations						
Control Variables			**Gender**	**Age Group**	**Current Education**	**Covid Infected**
Total Score	Gender	Correlation	1	-0.066	-0.066	0.111
		Significance (2-tailed)	.	0.057	0.057	0.001
		df	0	829	829	829
	Age Group	Correlation	-0.066	1	1	-0.372
		Significance (2-tailed)	0.057	.	0	0
		df	829	0	829	829
	Current Education	Correlation	-0.066	1	1	-0.372
		Significance (2-tailed)	0.057	0	.	0
		df	829	829	0	829
	Covid Infected	Correlation	0.111	-0.372	-0.372	1
		Significance (2-tailed)	0.001	0	0	.
		df	829	829	829	0

(Source: Author)

Table 4: Showing the chi-square value chain or CMIN model

Model	NPAR	CMIN	DF	P	CMIN/DF
Default model	48	2229.102	183	.000	12.181
Saturated model	231	.000	0		
Independence model	21	11368.046	210	.000	54.134

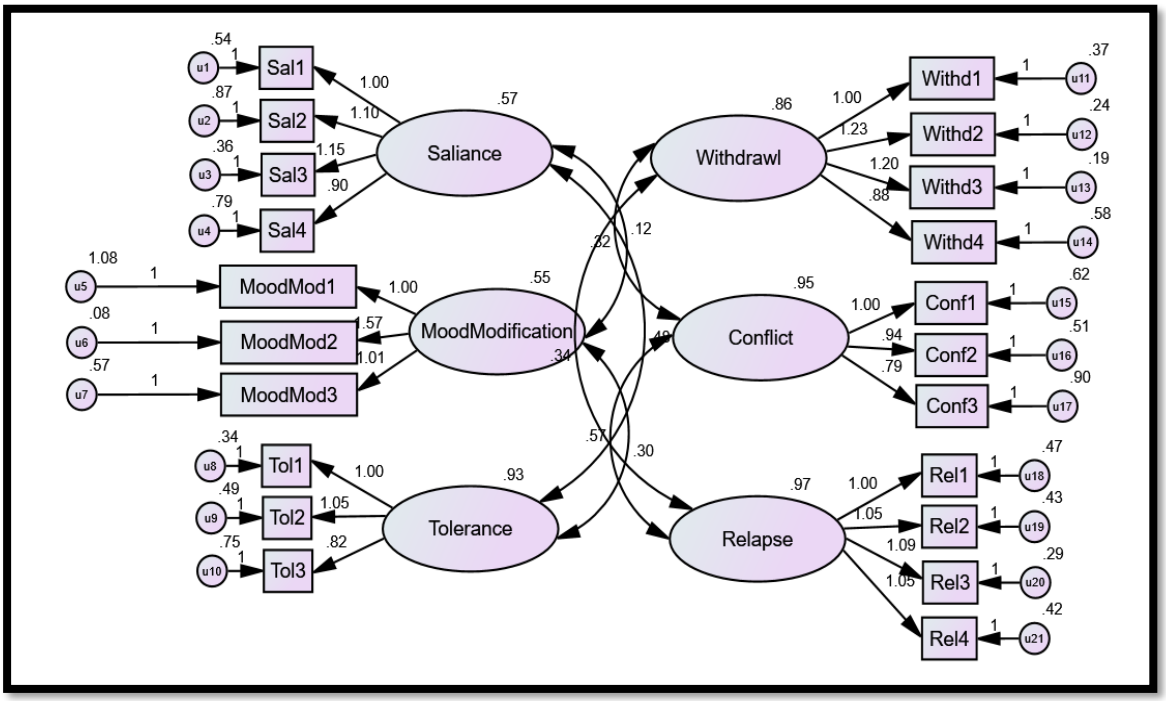
(Source: Author)

Table 4 presents the results of structural equation modeling (SEM) used to explore the intricate relationships among the six dimensions of the Social Networking Addiction (SNA) scale in the context of students. The chi-square statistic, with a value of 2229.102 and 183 degrees of freedom, yields a very small p-value (<0.001), indicating a significant difference between the proposed model and the observed data.

The ratio of chi-square to degrees of freedom (CMIN/DF) is 12.181, suggesting a notable discrepancy between the model and the actual data. However, considering the complexity of the SEM model and the inherent variability in human behavior, this value indicates a reasonable fit.

These findings underscore the importance of understanding the multifaceted nature of social networking addiction among students. Because of the absence of any data on students' academic performance, it becomes difficult here to develop deeper insights into various interventions that could be tailored to address these challenges effectively. The same is explained in Figure 1.

Figure 1: Confirmatory factor analysis using structural equation modeling on SNA dimensions (Source: Author)



Analysis of students on Internet Gaming Disorder Scale (IGD)

Table 4(a) The table presents descriptive statistics of identified variables on the scores of IGD. Table 4(b) analyses the calculated ANOVA for the variables. It was observed that the F-ratio is 3.78 with a significance level of 0.00, indicating a statistically significant difference in total scores between genders. This suggests that gender has a significant effect on total scores. Similar findings were observed in the analysis SNA, with females demonstrating higher levels of social networking addiction compared to their male counterparts. Specifically, females exhibited a statistically significant difference in addiction levels, indicating that gender plays a significant role.

Moreover, Table 5 reveals a weak positive correlation between total scores and internet gaming activity, suggesting that increased engagement in internet gaming may lead to higher addiction scores. This trend could be attributed to various factors, including the COVID-19 pandemic, which prompted increased time spent indoors and virtual socializing. With limited recreational opportunities and heightened stress levels due to isolation, individuals may have turned to online gaming as a coping mechanism, inadvertently exacerbating addictive behaviors (Liao *et al.*, 2020; Teng *et al.*, 2012). Consequently, these findings underscore the importance of addressing digital behavior addiction and promoting healthier coping strategies, particularly during times of heightened stress and social isolation.

Table 4 (a): Showing mean values of variables on IGD

	Gender	Age Group	Educational Qualification	Covid infected	Total Scores
Mean	1.53	1.52	1.52	1.76	15.38
Std. Deviation	0.50	0.50	0.50	0.43	6.53
Variance	0.25	0.25	0.25	0.19	42.68
Skewness	-0.11	-0.06	-0.06	-1.19	1.54
Std. Error of Skewness	0.09	0.09	0.09	0.09	0.09

(Source: Author)

Table 4 (b): Calculated ANOVA of variables on IGD

ANOVA						
		Sum of Squares	df	Mean Square	F	Sig.
Gender	Between Groups	20.95	24	0.87	3.78	0.00
	Within Groups	186.47	807	0.23		
	Total	207.42	831			
Age Group	Between Groups	8.54	24	0.36	1.44	0.08
	Within Groups	199.26	807	0.25		
	Total	207.80	831			
Current Education	Between Groups	8.54	24	0.36	1.44	0.08
	Within Groups	199.26	807	0.25		
	Total	207.80	831			
Covid infected	Between Groups	5.63	24	0.24	1.28	0.17
	Within Groups	147.84	807	0.18		
	Total	153.47	831			

(Source: Author)

Table 5: Pearson Correlations on IGD (N=832)

Control Variables		Gender	Age Group	Current Education	Covid infected
Gender	Pearson Correlation	1	-0.062	-0.062	.111**
	Sig. (2-tailed)		0.075	0.075	0.001
	N	832	832	832	832
Age Group	Pearson Correlation	-0.062	1	1.000**	-.371**
	Sig. (2-tailed)	0.075		0	0
	N	832	832	832	832
Current Education	Pearson Correlation	-0.062	1.000**	1	-.371**
	Sig. (2-tailed)	0.075	0		0
	N	832	832	832	832
Covid infected	Pearson Correlation	.111**	-.371**	-.371**	1

	Sig. (2-tailed)	0.001	0	0	
	N	832	832	832	832

***Correlation is significant at the 0.01 level (2-tailed) (Source: Author)*

Table 6: Showing the chi-square value chain or CMIN model

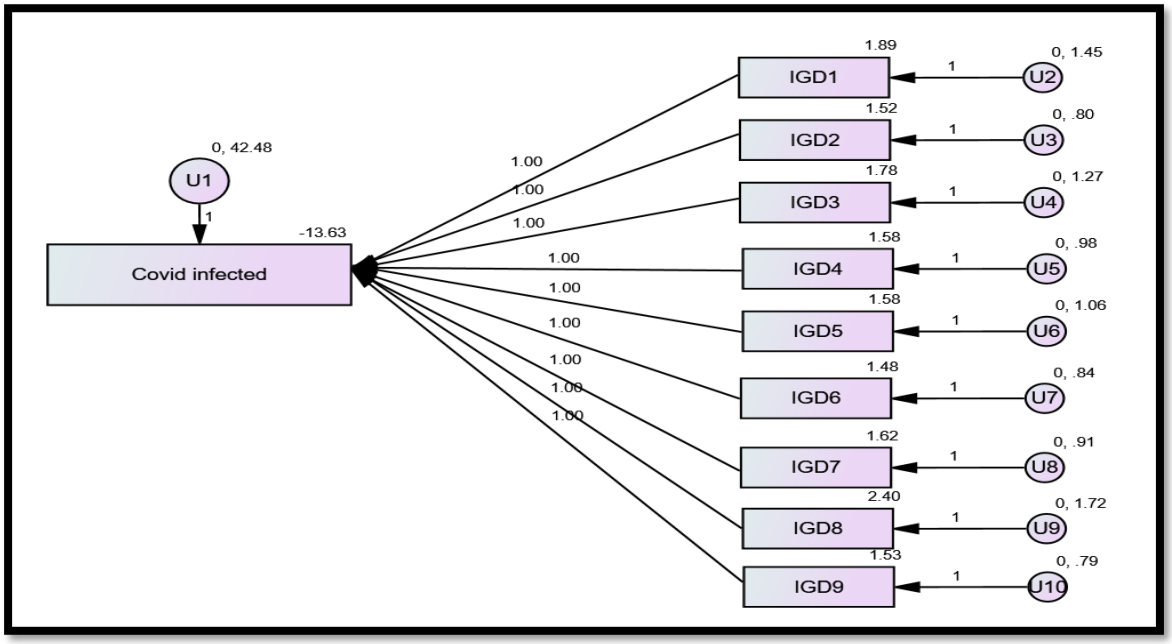
Model	NPAR	CMIN	DF	P	CMIN/DF
Default model	20	9531.199	45	.000	211.804
Saturated model	65	.000	0		
Independence model	20	5011.111	45	.000	111.358

(Source: Author)

The Structural Equation Modeling (SEM) analysis in Table 6 provides insights into the intricate relationships among the nine dimensions of Internet Gaming Disorder (IGD) and their impact on students' well-being. The fit statistics, particularly the CMIN/DF ratio, assess the adequacy of the SEM models in capturing these relationships. A calculated CMIN/DF value of 211.804 for the default model indicates a reasonable fit, suggesting that the model adequately represents the complex interplay among IGD dimensions.

Internet gaming addiction can profoundly affect students' well-being in various ways. The same was observed when analyzing the demographic characteristics and other factors associated, it was observed (See table 1) that the majority of these students (38.8%) have reported spending more than 10-15 hours daily on internet gaming activity, which can help to relate the excessive gaming has lead to them being a feeling of social isolation, 17.5% of them have reported of experiencing sleep disturbances, decreased academic performance, and impaired mental health. The SEM analysis here has helped to understand how different dimensions of IGD, such as preoccupation, tolerance, withdrawal, and conflict, interact and contribute to these adverse outcomes. By understanding these relationships, interventions can be tailored to address specific aspects of IGD and mitigate its impact on students' overall well-being (Andreassen *et al.*, 2017; Kuss *et al.*, 2017). The same is shown in Figure 2.

Figure 2: Confirmatory factor analysis using structural equation modeling on IGD statement analysis (Source: Author)



Analysis of students on Depression, Anxiety, and Stress Scale (DASS)

Table 7(a) The table presents descriptive statistics of identified variables on the scores of DASS. Table 7(b) shows the ANOVA results. The F-value of 2.203 (p=0.000) indicates that there is a statistically significant difference in total scores across different age groups. This suggests that age group has a significant impact on total scores. Further, table 8 shows a summary of correlations between control variables. Results showed that COVID-19-infected individuals tend to have slightly higher total scores, indicating a potential association between COVID-19 infection and the experience of depression, stress, and anxiety. It should be noted that this is a weak positive correlation which likely indicates levels of depression, stress, and anxiety. This suggests that students who have been infected with COVID-19 may have slightly higher levels of depression, stress, and anxiety compared to those who have not been infected. This underscores the need for further investigation into the psychological impact of COVID-19 on students' mental well-being.

Table 7 (a): Showing mean values of variables on DASS

	Gender	**Age Group**	**Current Education**	**Covid infected**	**Total Scores**
Mean	1.53	1.52	1.52	1.76	1.53
Std. Deviation	-.106	-.063	-.063	-1.194	-.106
Variance	.085	.085	.085	.085	.085
Skewness	-1.994	-2.001	-2.001	-.575	-1.994
Std. Error of Skewness	.169	.169	.169	.169	.169

(Source: Author)

Table 7 (b): Calculated ANOVA of variables on DASS

ANOVA						
		Sum of Squares	**df**	**Mean Square**	**F**	**Sig.**
Gender	Between Groups	11.074	51	.217	.861	.744
	Within Groups	196.723	780	.252		
	Total	207.797	831			
Age Group	Between Groups	26.112	51	.512	2.203	.000
	Within Groups	181.306	780	.232		
	Total	207.418	831			
Current Education	Between Groups	11.074	51	.217	.861	.744
	Within Groups	196.723	780	.252		
	Total	207.797	831			
Covid infected	Between Groups	9.555	51	.187	1.015	.446
	Within Groups	143.915	780	.185		
	Total	153.470	831			

(Source: Author)

Table 8: Pearson Correlations on DASS (N=832)

Control Variables		Gender	Age Group	Current Education	Covid infected
Gender	Pearson Correlation	1	-.062	-.062	.111**
	Sig. (2-tailed)		.075	.075	.001
	N	832	832	832	832
Age Group	Pearson Correlation	-.062	1	1.000**	-.371**
	Sig. (2-tailed)	.075		.000	.000
	N	832	832	832	832
Current Education	Pearson Correlation	-.062	1.000**	1	-.371**
	Sig. (2-tailed)	.075	.000		.000
	N	832	832	832	832
Covid infected	Pearson Correlation	.111**	-.371**	-.371**	1
	Sig. (2-tailed)	.001	.000	.000	
	N	832	832	832	832

** *Correlation is significant at the 0.01 level (2-tailed). (Source: Author)*

Table 9 (a): DASS – Depression analysis comparison with control variables (N=832)

DASS dimension - Depression		Gender	Age	Current Education	Covid infected
Did not apply to me	Mean	1.7500	1.5250	1.5250	1.7500
	N	40	40	40	40
	Std. Deviation	.43853	.50574	.50574	.43853
	Std. Error of Mean	.06934	.07996	.07996	.06934
Applied to me to some degree, or some of the time	Mean	1.5937	1.3750	1.3750	1.7500
	N	32	32	32	32
	Std. Deviation	.49899	.49187	.49187	.43994
	Std. Error of Mean	.08821	.08695	.08695	.07777
Applied to me to a considerable degree or a good part of the time	Mean	1.5400	1.4800	1.4800	1.6800
	N	50	50	50	50
	Std. Deviation	.50346	.50467	.50467	.47121
	Std. Error of Mean	.07120	.07137	.07137	.06664
Applied to me very much or most of the time	Mean	1.5610	1.5122	1.5122	1.8049
	N	41	41	41	41
	Std. Deviation	.50243	.50606	.50606	.40122
	Std. Error of Mean	.07847	.07903	.07903	.06266

	N	832	832	832	832
	Std. Deviation	.49960	.50006	.50006	.42975
	Std. Error of Mean	.01732	.01734	.01734	.01490

(Source: Author)

Table 9 (b): DASS – Anxiety analysis comparison with control variables (N=832)

DASS dimension - Anxiety		**Gender**	**Age**	**Current Education**	**Covid infected**
Did not apply to me	Mean	1.7424	1.4545	1.4545	1.7273
	N	66	66	66	66
	Std. Deviation	.44065	.50175	.50175	.44877
	Std. Error of Mean	.05424	.06176	.06176	.05524
Applied to me to some degree, or some of the time	Mean	1.4638	1.5797	1.5797	1.7391
	N	69	69	69	69
	Std. Deviation	.50234	.49722	.49722	.44233
	Std. Error of Mean	.06047	.05986	.05986	.05325
Applied to me to a considerable degree or a good part of the time	Mean	1.5631	1.5825	1.5825	1.7670
	N	103	103	103	103
	Std. Deviation	.49843	.49555	.49555	.42482
	Std. Error of Mean	.04911	.04883	.04883	.04186
Applied to me very much or most of the time	Mean	1.6780	1.5085	1.5085	1.8136
	N	59	59	59	59
	Std. Deviation	.47127	.50422	.50422	.39280
	Std. Error of Mean	.06135	.06564	.06564	.05114
	N	832	832	832	832
	Std. Deviation	.49960	.50006	.50006	.42975
	Std. Error of Mean	.01732	.01734	.01734	.01490

(Source: Author)

Table 9 (c): DASS – Stress analysis comparison with control variables (N=832)

DASS dimension - Stress		**Gender**	**Age**	**Current Education**	**Covid infected**
Did not apply to me	Mean	1.8286	1.5143	1.5143	1.6571
	N	35	35	35	35
	Std. Deviation	0.38239	0.50709	0.50709	0.48159
	Std. Error of Mean	0.06463	0.08571	0.08571	0.0814

Applied to me to some degree, or some of the time	Mean	1.6667	1.4167	1.4167	1.8056
	N	36	36	36	36
	Std. Deviation	0.47809	0.5	0.5	0.40139
	Std. Error of Mean	0.07968	0.08333	0.08333	0.0669
Applied to me to a considerable degree or a good part of the time	Mean	1.75	1.6	1.6	1.825
	N	40	40	40	40
	Std. Deviation	0.43853	0.49614	0.49614	0.38481
	Std. Error of Mean	0.06934	0.07845	0.07845	0.06084
Applied to me very much or most of the time	Mean	1.5333	1.4667	1.4667	1.7833
	N	60	60	60	60
	Std. Deviation	0.5031	0.5031	0.5031	0.41545
	Std. Error of Mean	0.06495	0.06495	0.06495	0.05363
	N	832	832	832	832
	Std. Deviation	0.4996	0.50006	0.50006	0.42975
	Std. Error of Mean	0.01732	0.01734	0.01734	0.0149

(Source: Author)

Table 9(a, b, and c) presents a descriptive analysis of the experience of depression, anxiety, and stress among individual students, as assessed by the Depression, Anxiety, and Stress Scale (DASS). Intriguingly, individuals reporting higher levels of depression across all three dimensions also reported being COVID-infected. This observation suggests a potential association between COVID-19 infection and heightened levels of depression, anxiety, and stress.

The experience of depression, anxiety, and stress during the COVID-19 pandemic can be attributed to various factors such as uncertainty, social isolation, fear of health, academic disruptions, and economic concerns (Zhao *et al.*, 2023). These factors, combined with the physical symptoms and stigma associated with COVID-19, can significantly impact individuals' mental health and well-being, leading to elevated scores on measures of anxiety and stress. Therefore, the findings underscore the importance of addressing the psychological impact of the pandemic and implementing targeted interventions to support individuals' mental health during challenging times.

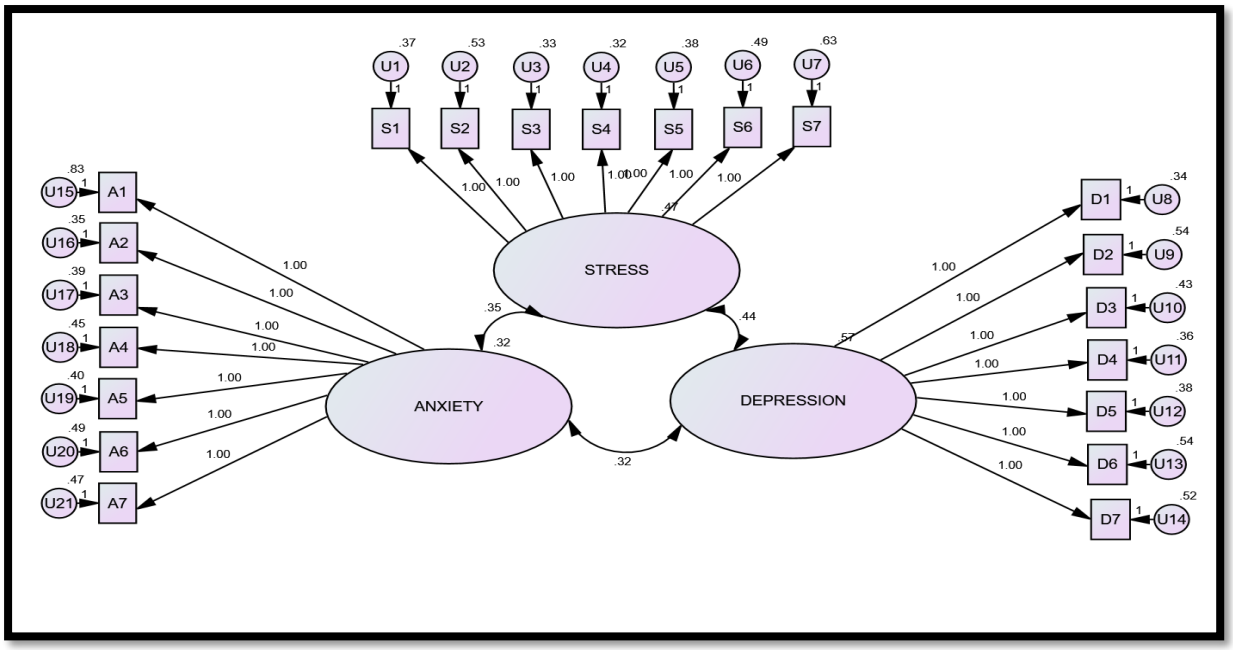
Table 10 presents the results of the chi-square test for model fit, also known as the CMIN model. The default model yielded a chi-square value of less than 0.001 ($p < 0.001$), indicating that the fit of the model is statistically significant. The ratio of CMIN to degrees of freedom (DF) is 13.803, which suggests a reasonable fit. This ratio indicates how well the observed data align with the model's expectations, with a lower value indicating a better fit. Figure 3 provides a visual representation of the model fit statistics, helping to illustrate the adequacy of the model in representing the relationships between variables.

Table 10: Showing the chi-square value chain or CMIN model

Model	NPAR	CMIN	DF	P	CMIN/DF
Default model	27	2815.785	204	.000	13.803
Saturated model	231	.000	0		
Independence model	21	11100.845	210	.000	52.861

(Source: Author)

Figure 3: Confirmatory factor analysis using structural equation modeling on DASS dimensions (Source: Author)



Overall Conclusion and Findings

This study investigated the interplay between social networking addiction, excessive usage of internet gaming, and mental health outcomes, particularly stress, depression, and anxiety, among young students during the lockdown period of the COVID-19 pandemic in India. Various elements were identified to explore the relationship between various factors, including gender, age group, educational qualification, and COVID-19 infection status. The overall observations suggest that:

Gender Differences: Female students consistently reported higher levels of addiction, stress, depression, and anxiety compared to males. This trend was observed across different dimensions of the study.

Age Group Variation: Younger age groups tended to report slightly higher levels of stress, depression, and anxiety compared to older age groups. However, this difference was not statistically significant in all cases.

Educational Qualification: No clear pattern emerged regarding the association between educational qualification and mental health outcomes.

Impact of COVID-19: Participants who reported being infected with COVID-19 generally exhibited higher levels of stress, depression, and anxiety compared to those who did not report being infected.

In summary, the findings highlight the significant impact of gender and COVID-19 infection on mental health outcomes, emphasizing the importance of targeted interventions and support systems, particularly for vulnerable groups such as females and those affected by the pandemic (Andreassen *et al.*, 2016, 2017; Chandra, 2021). The hypotheses proposed in the study were largely supported by the findings. Specifically, the hypotheses regarding the relationship between social networking addiction, internet gaming disorder, and mental health outcomes were validated. Females and individuals who reported being infected with COVID-19 exhibited higher levels of stress, depression, and anxiety, consistent with the hypotheses. The study provides valuable insights into the complex relationship between demographic factors and mental health outcomes, shedding light on vulnerable groups and potential risk factors. This information can inform the development of targeted interventions and support systems to address mental health challenges, particularly during times of crisis such as the COVID-19 pandemic.

Future Implications and Further Research

Future research could delve deeper into the mechanisms underlying the observed associations, exploring factors such as social support, coping strategies, and access to mental health resources. Longitudinal studies could provide a clearer understanding of the trajectory of mental health outcomes over time, especially in response to significant events like the COVID-19 pandemic. Additionally, qualitative research methods could capture the lived experiences and perspectives of individuals affected by mental health issues, offering rich contextual insights.

3. LIMITATIONS OF THE STUDY

Despite its contributions, the study has several limitations. The cross-sectional design limits the ability to establish causality or temporal relationships between variables. Self-report measures may be subject to bias and social desirability effects. The sample may not be fully representative of the broader population, potentially limiting the generalizability of the findings.

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