Annual Methodological Archive Research Review
http://amresearchreview.com/index.php/Journal/about
Volume 3, Issue 11 (2025)
https://doi.org/10.5281/zenodo.17583948

Online ISSN 3007-3197
Print ISSN 3007-3189

http://amresearchreview.com/index.php/Journal/about

The Triple Burden: Depression, Anxiety and Stress as Predictors of Internet Addiction in University Students

Muhammad Ausama Saleem
Bahauddin Zakaria University, Sub-campus Vehari
Contact No. 0300-6326910
Email:m.ausama.saleem_vcamp@bzu.edu.pk
ORCID: 0009-0004-3454-1793

Misbah Saghir
MNS - University of Agriculture, Multan
Email: misbah.saghir@mnsuam.edu.pk

Amir Nawaz
Bahauddin Zakaria University, Multan
Email: amirnawaz842@gmail.com

ABSTRACT

The ubiquity of internet use among university students has raised concerns about the emergence of problematic behaviours such as internet addiction, which may be driven by psychological distress and academic demographic factors. This study examined relationships between depression, anxiety, and stress (DAS) and Internet Addiction (IA) among 100 university students, testing demographic differences and depression's mediating role. Participants completed the Depression, Anxiety, and Stress Scale–21 (DASS-21; Lovibond & Lovibond, 1995) and Young's Internet Addiction Test (IAT; Young, 1998). Correlation analyses supported H1, revealing significant positive associations between IA and depression ($r = .52$, $p < .001$), stress ($r = .36$, $p < .001$), and anxiety ($r = .22$, $p = .027$). Hierarchical regression partially supported H2: the combined DAS model explained 30% of variance in IA, but only depression emerged as a significant predictor ($\beta = .45$, $p < .001$). For H3, males reported higher IA than females ($t(98) = 2.15$, $p = .034$), and significant departmental differences were observed ($F(5, 94) = 3.70$, $p = .004$), with Sociology students exceeding Chemistry students in IA severity; semester showed no effect. The combined psychological demographic model (H4) explained 37% of variance, with depression ($\beta = .37$, $p = .001$) and semester ($\beta = .19$, $p = .030$) as significant predictors. Mediation analysis (H5) confirmed that depression significantly mediated the stress with IA relationship (indirect effect = 0.90, 95% CI [0.45, 1.46]). Findings highlight depression as the central psychological pathway to IA, operating both directly and as a mediator of stress effects, and support integrated DAS screening protocols in university mental health services. Targeted prevention should prioritize depression focused interventions for male students and those in high stress academic contexts.

Annual Methodological Archive Research Review
http://amresearchreview.com/index.php/Journal/about
Volume 3, Issue 11 (2025)
https://doi.org/10.5281/zenodo.17583948

Online ISSN 3007-3197
Print ISSN 3007-3189
http://amresearchreview.com/index.php/Journal/about

Keywords: Internet Addiction, Depression, Anxiety, University Students, Mediation, Psychological Distress

Introduction

The emergence of the digital revolution has fundamentally transformed the landscape of human communication, learning, and social interaction. As of 2024, global internet penetration has surpassed 5.3 billion users, representing approximately 66% of the world's population (International Telecommunication Union, 2023). While this connectivity has democratized access to information and facilitated unprecedented opportunities for education and social engagement, it has also engendered a parallel phenomenon of maladaptive use patterns. Among these, Internet Addiction (IA) has been identified as a significant behavioral concern, particularly within academically demanding environments (Kuss et al., 2014; Young, 2015). Internet Addiction, conceptualized as an impulse control disorder characterized by excessive preoccupation with online activities, tolerance, withdrawal symptoms, and functional impairment (Young, 1998), has demonstrated notable prevalence rates among university students, with recent meta-analytic evidence suggesting that 20-30% of this population exhibits moderate to severe addictive patterns (Cheng & Li, 2020; Álvarez- Mármol et al., 2021).

University students represent a uniquely vulnerable demographic to the development of Internet Addiction, navigating a critical developmental period marked by academic pressures, social transitions and identity formation. The university environment, increasingly mediated through digital platforms for coursework, socialization, and recreation, creates an ecological context wherein boundaries between productive and pathological internet use become progressively blurred (Anderson, 2021). This vulnerability is compounded by the psychological burden many students carry, with research consistently documenting elevated levels of depression, anxiety, and stress (DAS) within this population (Beiter et al., 2015). The convergence of these mental health challenges with the structural necessity of constant
connectivity positions university students at elevated risk for developing problematic internet use patterns that serve both as coping mechanism and compounding stressor (Kardefelt- Winther, 2014; Longstreet & Brooks, 2017).

The theoretical nexus between psychological distress and Internet Addiction has been substantiated through multiple explanatory frameworks. Davis's (2001) cognitive behavioral model posits that maladaptive cognitions regarding self-worth and social competence, often stemming from underlying psychopathology, drive individuals toward the anonymous, controllable environment of online interactions as a compensatory strategy. Similarly, Kardefelt-Winther's (2014) compensatory internet use theory specifically articulates that individuals experiencing offline distress, particularly depressive symptoms and social anxiety, gravitate toward online engagement to alleviate negative affective states. This theoretical orientation is empirically supported by robust evidence demonstrating that depressive symptomatology correlates significantly with problematic internet use, as individuals seek social support, escapism, or mood regulation through digital platforms (Lam, 2020; Tran et al., 2021).

Anxiety, particularly social anxiety, has emerged as a particularly potent predictor of

Annual Methodological Archive Research Review
http://amresearchreview.com/index.php/Journal/about
Volume 3, Issue 11 (2025)
https://doi.org/10.5281/zenodo.17583948
Online ISSN 3007-3197
Print ISSN 3007-3189
http://amresearchreview.com/index.php/Journal/about

Internet Addiction among university students. Caplan's (2010) research on problematic internet use indicates that socially anxious individuals demonstrate preference for online communication, wherein they perceive greater control over self-presentation and reduced risk of negative evaluation. This preference becomes cyclical, as increased online engagement further attenuates face to face social skills, exacerbating social anxiety and reinforcing dependence on digital interaction modalities (Lee & Stapinski, 2020). Academic related anxiety, including performance anxiety and fear of failure, similarly drives students toward procrastinatory internet use as a maladaptive emotional regulation strategy (Cao et al., 2021).

Stress, encompassing academic pressure, social adjustment difficulties, and future uncertainty, represents a third critical pathway to Internet Addiction. The transactional model of stress and coping (Lazarus & Folkman, 1984) provides a framework for understanding how students experiencing chronic stress may adopt avoidant coping strategies, including immersive internet use, to temporarily escape stressors (Nawaz & Tunio, 2021). Recent longitudinal research demonstrates that perceived stress predicts subsequent increases in problematic internet use over academic semesters, suggesting a temporal causality wherein stress precedes and exacerbates addictive patterns (Wang et al., 2022).

While psychological distress provides a robust explanatory framework for Internet Addiction, demographic and academic characteristics systematically moderate these relationships. Gender has been identified as a consistent, albeit complex, correlate of IA. Meta-analytic evidence suggests that male students exhibit higher rates of gaming and pornography related addiction, while female students demonstrate greater vulnerability to social media and relationship oriented online compulsions (Su et al., 2020). These patterns reflect differential socialization processes and coping strategy preferences, necessitating gender disaggregated analysis (Odaci & Kalkan, 2017).

Academic achievement, operationalized through Cumulative Grade Point Average (CGPA), has demonstrated inverse relationships with Internet Addiction. Students with lower CGPA exhibit significantly higher IA severity, potentially reflecting a reciprocal relationship wherein academic underperformance increases stress and escapist internet use, while excessive internet engagement further compromises academic outcomes (Rahmani et al., 2021; Shakya & Singh, 2022). This relationship suggests that IA may function as both cause and consequence of academic difficulties, creating a self-perpetuating cycle of maladjustment.

Academic progression, represented by semester of study, introduces developmental and curricular variability in IA risk. Early semester students face social transition stressors and identity exploration that may increase IA vulnerability, while lat semester students encounter intensified academic demands and career anxiety (Alhazmi et al., 2022). Departmental affiliation further structures internet use patterns, with students in technology intensive disciplines (e.g., Computer Science, Engineering) demonstrating higher IA prevalence due to both increased computer access and curricular integration of digital tools, whereas humanities students may show different patterns of social media engagement (Kavithamani et al., 2021).

Statement of the Problem and Research Gap

Annual Methodological Archive Research Review
http://amresearchreview.com/index.php/Journal/about
Volume 3, Issue 11 (2025)
https://doi.org/10.5281/zenodo.17583948
Online ISSN 3007-3197
Print ISSN 3007-3189
http://amresearchreview.com/index.php/Journal/about

Despite substantial evidence establishing the DAS and IA relationship, several critical gaps persist in the literature. First, most investigations examine depression, anxiety, and stress as isolated predictors rather than as an integrated "triple burden" that may exert synergistic effects on IA vulnerability. Second, demographic and academic factors are frequently treated as control variables rather than as theoretically meaningful moderators that shape the psychological pathways to addiction. Third, university specific contextual factors, including departmental culture and semester based stressors, remain understudied as systemic influences on IA development. Fourth, existing research often relies on cross sectional designs that preclude examination of temporal dynamics, though the current study addresses this through its correlational framework as foundational research.

Significance of the Study

This research provides a contextually embedded analysis of Internet Addiction within the university ecosystem, advancing theory by integrating compensatory internet use with person environment fit perspectives. Practically, findings will inform targeted prevention strategies for high risk segments (e.g., males with high stress in technology departments) and enable university counseling centers to allocate resources toward indicated prevention programs. By testing incremental validity, the study clarifies whether comprehensive demographic psychological profiling enhances predictive precision, directly informing screening protocol development.

Objectives of the Study

The present research addresses these gaps through the following specific objectives:
To examine the correlations among depression, anxiety, stress and internet addiction among university students
To assess the predictive power of depression, anxiety, and stress on internet addiction
To identify significant differences in internet addiction levels across gender, academic achievement, semester, and departmental groups.
To evaluate the combined predictive model integrating psychological (depression, anxiety, stress) and demographic (gender, academic achievement, semester, department) factors for internet addiction among university students

Hypotheses

H1: Depression, anxiety, and stress would be positively correlated with internet addiction among university students.
H2: Depression, anxiety, and stress will significantly predict internet addiction.
H3: Gender, academic achievement, semester, and department will show significant differences in levels of internet addiction.
H4: The combined model of psychological (depression, anxiety, stress) and demographic (gender, academic achievement, semester, department) factors will significantly predict internet addiction among university students.
H5: Depression will mediate the relationship between stress and internet addiction among university

Literature Review

Annual Methodological Archive Research Review
http://amresearchreview.com/index.php/Journal/about
Volume 3, Issue 11 (2025)
https://doi.org/10.5281/zenodo.17583948
Online ISSN 3007-3197
Print ISSN 3007-3189
http://amresearchreview.com/index.php/Journal/about

Internet Addiction (IA) is characterized by compulsive internet engagement, loss of control, tolerance, withdrawal, and functional impairment across academic and social domains (Young, 1998; Kuss et al., 2014). Meta analytic evidence documents a 20–30% prevalence of moderate to severe IA among university students globally, rates substantially exceeding those in the general population (Álvarez-Mármol et al., 2021; Cheng & Li, 2020). This heightened vulnerability reflects developmental transitions, academic pressures and the structural integration of digital platforms into university life, which blurs boundaries between productive and pathological use (Anderson, 2021; Longstreet & Brooks, 2017). The university context functions as a risk enhancing environment where constant connectivity is mandated for coursework while developmental tasks of emerging adulthood are increasingly mediated through online spaces (Alhazmi et al., 2022).

Depression, anxiety, and stress (DAS) function as interrelated psychological pathways to Internet Addiction, forming a "triple burden" that exponentially increases vulnerability when co-occurring (Tran et al., 2021). Depression drives Internet Addiction through compensatory mechanisms, as Kardefelt-Winther's (2014) theory posits that anhedonia and social withdrawal motivate online engagement to fulfill unmet needs for connection and mastery. Longitudinal evidence confirms temporal precedence, with baseline depression predicting 1.8-fold increases in Internet Addiction severity six months later, mediated by maladaptive coping that disrupts sleep and academic performance (Cao et al., 2021; Lam, 2020). Anxiety operates through distinct mechanisms: socially anxious individuals prefer online communication for its perceived control and alleviated evaluation risk, creating a cyclical pattern where increased engagement attenuates face to face skills and reinforces digital dependence (Caplan, 2010; Lee & Stapinski, 2020). Academic anxiety compounds this effect, as fear of failure drives avoidant internet use (Nawaz & Tunio, 2021). Stress functions as both distal risk factor and proximal trigger; Lazarus and Folkman's (1984) transactional model frames Internet Addiction as avoidant coping when demands exceed resources, with longitudinal data showing perceived stress predicts Internet Addiction(IA) trajectory steepness, particularly during examinations, via sleep disruption (Wang et al., 2022). Critically, the co-occurrence of DAS demonstrates non-additive effects, with students elevated on all three measures exhibiting Internet Addiction severity 3.5 times higher than those elevated on a single measure (Tran et al., 2021). This synergistic effect, combined with moderate to large effect sizes for individual DAS components (Cheng & Li, 2020), justifies their integrated treatment in a unified predictive model.

Three complementary theories guide this investigation. Compensatory Internet Use Theory (Kardefelt-Winther, 2014) specifies why distressed students turn online: to compensate for offline deficits in autonomy, competence and connection. Davis's (2001) cognitive behavioral model elucidates how maladaptive cognitions regarding self-worth mediate this process, reinforced by intermittent rewards. The transactional model of stress and coping (Lazarus & Folkman, 1984) clarifies when stress translates into Internet Addiction: under conditions of high demand and low perceived control. Together, these frameworks support hypotheses that Depression, Anxiety, Stress (DAS) would be significantly predict Internet Addiction (H2) and that relationships would be moderated by demographic factors reflecting differential

Annual Methodological Archive Research Review
http://amresearchreview.com/index.php/Journal/about
Volume 3, Issue 11 (2025)
https://doi.org/10.5281/zenodo.17583948
Online ISSN 3007-3197
Print ISSN 3007-3189
http://amresearchreview.com/index.php/Journal/about

offline needs and resources.

Demographic and academic characteristics systematically shape Internet Addiction risk. Gender functions as a multifaceted moderator: meta-analyses reveal higher overall Internet Addiction in males (d = 0.31), driven by gaming addiction (d = 0.67), whereas females show elevated social media addiction (Su et al., 2020). Importantly, gender moderates DAS with IA pathways, with the social anxiety with IA link stronger among males (online gaming provides socially acceptable engagement without face to face demands) (Lee & Stapinski, 2020). Academic achievement demonstrates a bidirectional inverse relationship with IA (r = -.38; Rahmani et al., 2021). The longitudinal evidence indicates that IA predicts subsequent decline in academic achievement and alleviated academic achievement predicts increased Internet Addiction, establishing a self-perpetuating cycle of academic disengagement and maladaptive coping (Shakya & Singh, 2022). This reciprocal dynamic suggests academic achievement may moderate Depression, Anxiety, Stress effects, with high stress and students with alleviated academic achievement are at compounded risk.

Semester and department introduce contextual variability. First year students face social transition stressors, whereas final year students encounter intensified career anxiety (Alhazmi et al., 2022). Technology intensive departments show higher Internet Adddiction prevalence (42% vs. 28% in humanities), attributable to increased access and normative heavy use (Kavithamani et al., 2021), though these differences are attenuated in institutions with digital wellness programs (Anderson, 2021). Whether departmental differences persist after controlling for DAS and academic achievement (AA) remains unclear, representing a key empirical question.

Method

Research Design

This study employed a cross-sectional, correlational design to examine associations between psychological distress and internet addiction among university students. The design was non-experimental, allowing for the assessment of predictive relationships without manipulation of variables. The correlational framework permitted testing of hypotheses regarding directional predictions while acknowledging inherent limitations in establishing causality from cross-sectional data.

Participants

The sample comprised 100 undergraduate students recruited from public and provate universities in district Vehari (Pakistan) using a convenience sampling strategy. Convenience sampling was used to recruit participants from multiple academic departments, ensuring adequate representation across gender and semester categories.

Measures

Depression, Anxiety and Stress Scale–21 (DASS-21)

The DASS-21 (Lovibond & Lovibond, 1995) measured psychological distress via three 7-item subscales rated on 4-point Likert scales (0 = did not apply to me at all to 3 = applied to me very much). Subscale scores range from 0 to 21, with higher scores indicating greater severity. In the current sample, internal consistency was excellent: depression $\alpha = .91$, anxiety $\alpha = .88$, stress $\alpha = .90$.

Annual Methodological Archive Research Review
http://amresearchreview.com/index.php/Journal/about
Volume 3, Issue 11 (2025)
https://doi.org/10.5281/zenodo.17583948
Online ISSN 3007-3197
Print ISSN 3007-3189
http://amresearchreview.com/index.php/Journal/about

Young's Internet Addiction Test (IAT)

The 20-item IAT (Young, 1998) assessed Internet Addiction severity on 5-point scales (1 = rarely to 5 = always). Total scores range from 20 to 100, with 20–39 indicating normal use, 40–69 indicating problematic use, and ≥70 indicating severe addiction. The scale demonstrated excellent reliability (α = .93) in the present sample.

Procedure

After getting permission from concerned authorities, paper and pencil surveys were manually distributed to university students across participating departments. Research assistants coordinated with faculty to administer questionnaires during regular class sessions in weeks 3–7 of the semester to minimize examination period confounds. Participation was voluntary and students were informed of their right to withdraw without penalty. No identifying information was collected; completed surveys were placed directly into sealed collection boxes to ensure anonymity. The data collection period spanned four weeks, with departmental reminders issued after two weeks to maintain response rates. Approximately 15 minutes were required to complete all measures.

Results

This section presents the statistical findings addressing the study objectives. Descriptive analyses were conducted to summarize demographic characteristics and main variables. Reliability coefficients indicated satisfactory internal consistency. Pearson correlations examined relationships among depression, anxiety, stress, and internet addiction.

Multiple regression analyses tested the predictive role of psychological and demographic factors on internet addiction, while t-tests and one-way ANOVA assessed group differences across gender, academic achievement, semester and department.

Table 1

Frequency Distribution of Demographic Variables (N = 100)

Variable	Categories	n	%
Gender	Male	50	50.0
	Female	50	50.0
Semester	1st	7	7.0
	2nd	67	67.0
	3rd	3	3.0
	4th	10	10.0

Annual Methodological Archive Research Review
http://amresearchreview.com/index.php/Journal/about
Volume 3, Issue 11 (2025)
https://doi.org/10.5281/zenodo.17583948

Online ISSN 3007-3197
Print ISSN 3007-3189

	6th	8	8.0
	8th	5	5.0
Department	Chemistry	22	22.0
	English	13	13.0
	Economics	11	11.0
	Psychology	19	19.0
	Law	17	17.0
	Sociology	18	18.0

Table 2
Pearson Correlations among Internet Addiction, Academic Achievement, Semester and Psychological Distress (N = 100)

Variables	**1**	**2**	**3**	**4**	**5**	**6**
1. Internet Addiction	—					
2. Academic Achievement(AA)	−.08	—				
3. Semester	.14	.11	—			
4. Stress	.36**	−.10	−.16	—		
5. Anxiety	.22*	−.03	−.16	.28**	—	
6. Depression	.52**	−.10	−.10	.43**	.34**	—

Note. p < .05*, p < .01 (two-tailed).

A Pearson product moment correlation analysis was conducted to examine associations between internet addiction Academic Achievement, semester and Psychological Distress. The results indicated that internet addiction was significantly and positively correlated with depression (r = .52, p < .001), stress (r = .36, p < .001), and anxiety (r = .22, p = .027). This suggests that students reporting higher levels of depression, stress, and anxiety also exhibited greater internet addiction tendencies. In contrast, no significant correlations were found between internet addiction and academic variables including academic achievement (r = −.08, p = .42) and semester of study (r = .14, p = .18). Overall, the results support Hypothesis 1, confirming that higher psychological distress is associated with greater internet addiction, whereas academic indicators do not show a meaningful relationship.

Annual Methodological Archive Research Review
http://amresearchreview.com/index.php/Journal/about
Volume 3, Issue 11 (2025)
https://doi.org/10.5281/zenodo.17583948
Online ISSN 3007-3197
Print ISSN 3007-3189
http://amresearchreview.com/index.php/Journal/about

Table 3
Multiple Regression Analysis Predicting Internet Addiction from Depression, Anxiety, and Stress (N = 100)

Predictor	B	SEB	β	t	p
(Constant)	24.09	4.59	—	5.25	< .001
Stress	0.77	0.44	0.17	1.74	.085
Anxiety	0.10	0.41	0.02	0.25	.807
Depression	1.72	0.38	0.45	4.54	< .001

$R = .547$, $R^2 = .299$, Adjusted $R^2 = .277$, $F(3, 96) = 13.65$, $p < .001$
Note. Dependent variable: Internet Addiction. Predictors: Depression, Anxiety, Stress.

A multiple linear regression was performed to determine whether depression, anxiety, and stress significantly predicted internet addiction. The overall regression model was significant, $F(3, 96) = 13.65$, $p < .001$, explaining approximately 30% of the variance in internet addiction ($R^2 = .30$, Adjusted $R^2 = .28$). Among the three predictors, depression emerged as a significant positive predictor of internet addiction ($\beta = .45$, $t = 4.54$, $p < .001$),indicating that higher depressive symptoms were associated with greater internet addiction. In contrast, stress ($\beta = .17$, $p = .085$*) and anxiety ($\beta = .02$, $p = .807$*) did not significantly predict internet addiction when entered simultaneously in the model. These findings partially support Hypothesis 2, demonstrating that while the combined psychological factors significantly explain variance in internet addiction, depression specifically plays the most influential role in predicting problematic internet use among university students.

Table 4
Group Differences in Internet Addiction by Gender, Semester, and Department (N = 100)

Variable	Group(s)	n	M	SD	Test	f	p
Gender	Male	50	49.86	12.73	t(98) = 2.15	98	.034
	Female	50	43.38	17.14			
Semester	1st–8th	—	—	—	F(5, 94) = 0.47	94	.797

Annual Methodological Archive Research Review
http://amresearchreview.com/index.php/Journal/about
Volume 3, Issue 11 (2025)
https://doi.org/10.5281/zenodo.17583948

Online ISSN 3007-3197
Print ISSN 3007-3189

http://amresearchreview.com/index.php/Journal/about

Department	Chemistry, English, Economics, Psychology, Law, Sociology	—	—	—	F(5, 94) = 3.70	94	.004

Note. Dependent variable = Internet Addiction.

An independent samples t-test revealed a significant gender difference in internet addiction, t(98) = 2.15, p = .034, with male students (M = 49.86, SD = 12.73) scoring higher than female students (M = 43.38, SD = 17.14). A one-way ANOVA examining semester differences showed no significant effect, F(5, 94) = 0.47, p = .797, suggesting that internet addiction levels did not vary across semesters. However, a one-way ANOVA across academic departments indicated a significant difference, F(5, 94) = 3.70, p = .004. Post hoc Tukey tests revealed that students from the Sociology department reported significantly higher internet addiction scores than those from the Chemistry department (p = .003*). No other departmental differences reached significance. Overall, Hypothesis 3 was partially supported: gender and department were associated with differing levels of internet addiction, whereas semester showed no effect.

Table 5
Hierarchical Multiple Regression Predicting Internet Addiction from Demographic and Psychological Variables (N = 100)

Predictor	**B**	**SE B**	**β**	**t**	**p**
Model 1					
(Constant)	49.92	15.27	—	3.27	.002
Gender	−5.51	2.89	−.18	−1.91	.060
Academic Achievement (AA)	−2.53	4.71	−.05	−0.54	.592
Semester	0.84	0.83	.10	1.01	.314
Department	3.07	0.79	.36	3.91	< .001
Model Summary 1: $R = .437$, $R^2 = .191$, $F(4, 95) = 5.61$, $p < .001$					
Model 2					
(Constant)	23.58	14.67	—	1.61	.111
Gender	−1.90	2.81	−.06	−0.67	.502
Academic Achievement (AA)	−1.62	4.23	−.03	−0.38	.702
Semester	1.69	0.77	.19	2.20	.030

Annual Methodological Archive Research Review
http://amresearchreview.com/index.php/Journal/about
Volume 3, Issue 11 (2025)
https://doi.org/10.5281/zenodo.17583948

Online ISSN 3007-3197
Print ISSN 3007-3189

http://amresearchreview.com/index.php/Journal/about

Department	1.47	0.77	.17	1.91	.059
Stress	0.76	0.44	.16	1.73	.087
Anxiety	0.25	0.41	.06	0.61	.543
Depression	1.43	0.41	.37	3.50	.001

Model Summary 2:R = .611, R^2 = .373, ΔR^2 = .182, F(7, 92) = 7.81, p < .001

Note. Dependent variable: Internet Addiction. Predictors entered in Step 1: Gender, AA, Semester, Department. Predictors entered in Step 2: Depression, Anxiety, Stress, AA = Academic Achievement.

A hierarchical multiple regression was conducted to examine the combined effects of demographic (gender, AA, semester, department) and psychological (depression, anxiety, stress) factors on internet addiction among university students. In the first step, demographic variables accounted for a significant portion of variance in internet addiction, R = .44, R^2 =.19, F(4, 95) = 5.61, p < .001. Among these, only department emerged as a significant predictor (β = .36, p < .001), indicating that internet addiction levels varied by department. In the second step, psychological variables were entered, resulting in a significant improvement in the model, ΔR^2 = .18, $\Delta F(3, 92) = 8.88$, p < .001. The final model was significant, F(7, 92) = 7.81, p < .001, explaining 37% of the variance in internet addiction (R^2 = .37, Adjusted R^2 = .33). Within the final model, depression was a strong positive predictor of internet addiction (β = .37, p = .001), and semester also had a small but significant positive effect (β = .19, p = .030*). Stress showed a trend level association (β = .16, p = .087*), while anxiety, gender, AA, and department were non-significant after psychological factors were entered. These findings suggest that higher levels of depressive symptoms and advanced academic standing are associated with greater internet addiction, even when demographic factors are controlled. The inclusion of psychological predictors significantly improved the explanatory power of the model, supporting the hypothesis that both psychological distress and demographic factors jointly influence internet addiction.

Table 6

Mediation Analysis of Depression in the Relationship between Stress and Internet Addiction (N = 100)

Path / Effect	**B**	**SE**	**t**	**p**	**LLCI**	**ULCI**
Model 1: Effect of Stress on Depression						
Constant	3.96	1.04	3.81	.000	1.90	6.02
Stress → Depression	0.51	0.11	4.72	.000	0.30	0.73
Model Summary	R = .43	R^2 = .19	F(1, 98) = 22.25, p < .001			

Annual Methodological Archive Research Review
http://amresearchreview.com/index.php/Journal/about
Volume 3, Issue 11 (2025)
https://doi.org/10.5281/zenodo.17583948
Online ISSN 3007-3197
Print ISSN 3007-3189
http://amresearchreview.com/index.php/Journal/about

Model 2: Effect of Stress and Depression on Internet Addiction

Constant	24.62	4.02	6.12	.000	16.64	32.60
Stress → Internet Addiction	0.79	0.43	1.81	.073	-0.08	1.65
Depression → Internet Addiction	1.75	0.37	4.79	.000	1.02	2.47
Model Summary	$R = .55$	$R^2 = .30$	$F(2, 97) = 20.65$, $p < .001$			
Indirect Effect of Stress on Internet Addiction via Depression	Effect = 0.90	BootSE = 0.25			BootLLCI = 0.45	BootULCI = 1.46

Note. Dependent variable = Internet Addiction; Mediator = Depression; Predictor = Stress. Bootstrap sample size = 5000; 95% confidence intervals reported. Mediation tested using PROCESS macro (Model 4; Hayes, 2022).

A mediation analysis was conducted using Hayes' (2022) PROCESS macro (Model 4) to examine whether depression mediates the relationship between stress and internet addiction among university students. The results indicated that stress significantly predicted depression ($B = 0.51$, $SE = 0.11$, $t(98) = 4.72$, $p < .001$), accounting for approximately 19% of the variance in depression ($R^2 = .19$). In the second model, both stress and depression were entered as predictors of internet addiction. Depression emerged as a significant positive predictor of internet addiction ($B = 1.75$, $SE = 0.37$, $t(97) = 4.79$, $p < .001$), whereas the direct effect of stress on internet addiction was not statistically significant ($B = 0.79$, $SE = 0.43$, $t(97) = 1.81$, $p = .073$). The overall model accounted for 30% of the variance in internet addiction ($R^2 = .30$). The indirect effect of stress on internet addiction through depression was significant ($B = 0.90$, BootSE = 0.25, 95% CI [0.45, 1.46]), as the confidence interval did not include zero. This result indicates that depression partially mediates the relationship between stress and internet addiction. Specifically, higher stress levels increase depression, which in turn contributes to higher levels of internet addiction.

Discussion

This study examined the relationships between depression, anxiety, and stress (DAS) and internet addiction (IA) among university students, while testing the mediating and incremental contributions of gender, academic achievement, semester, and department. The findings provide partial support for the hypothesized models and offer novel insights into the mechanisms linking psychological distress to problematic internet use in academic contexts.

Consistent with Hypothesis 1, all three components of psychological distress including depression, anxiety and stress have demonstrated significant positive correlations with Internet Addiction, with depression exhibiting the strongest association ($r = .52$). This aligns robustly with meta-analytic evidence reporting moderate to large effect sizes for the depression and internet addiction relationship in

Annual Methodological Archive Research Review
http://amresearchreview.com/index.php/Journal/about
Volume 3, Issue 11 (2025)
https://doi.org/10.5281/zenodo.17583948
Online ISSN 3007-3197
Print ISSN 3007-3189
http://amresearchreview.com/index.php/Journal/about

university samples (Cheng & Li, 2020) and supports Kardefelt-Winther's (2014) compensatory internet use theory. This theory posits that depressive symptoms drive individuals toward online environments to fulfill unmet needs for social connection and mastery. The particularly strong correlation observed here suggests that among Pakistani university students, depression may function as the primary affective pathway to internet addiction, potentially reflecting cultural stigma surrounding offline mental health help seeking that makes anonymous online engagement more appealing (Tran et al., 2021).

However, when entered simultaneously in the regression model (Hypothesis 2), only depression emerged as a significant predictor, while anxiety and stress effects were suppressed. This pattern, wherein depression accounts for unique variance but related distress constructs do not, has been documented previously (Tran et al., 2021) and likely reflects the substantial conceptual and empirical overlap among DAS components. Depression's dominance may be attributable to its more direct activation of maladaptive cognitions regarding self-worth and social efficacy, core mechanisms in Davis's (2001) cognitive behavioral model of pathological internet use. The 30% of variance explained by DAS alone underscores depression's centrality while highlighting that substantial unexplained variance remains, necessitating inclusion of additional predictors.

Hypothesis 3 received partial support. Male students reported significantly higher internet addiction than females, consistent with meta-analytic findings that males show greater vulnerability to gaming and information seeking addictions (Su et al., 2020). This gender difference may reflect differential socialization toward technology use and greater male participation in online gaming communities, which provide socially acceptable engagement for socially anxious individuals (Lee & Stapinski, 2020). The absence of semester differences contradicts Alhazmi et al. (2022) but may reflect our cross-sectional design, which cannot capture within individual trajectories across academic progression. The significant departmental differences with Sociology students reporting higher internet addiction than Chemistry students, suggests that disciplinary culture and curriculum demands shape risk profiles. This finding may extends Kavithamani et al.'s (2021) work by controlling for psychological distress.

The combined model (Hypothesis 4) explained 37% of variance, with depression and semester emerging as significant predictors in the final equation. The significant ΔR^2 of .18 demonstrates that psychological factors add meaningful explanatory power beyond demographics alone, supporting the incremental validity of comprehensive screening protocols. The emergence of semester as a predictor only after controlling for DAS suggests that academic progression influences internet addiction through mechanisms distinct from psychological distress, possibly reflecting cumulative exposure to academic stressors or changes in peer networks (Wang et al., 2022). Notably, department effects became nonsignificant after adding DAS, indicating that departmental differences in internet addiction are largely accounted for by variations in psychological distress across disciplines rather than by curricular or cultural factors directly.

The mediation analysis revealed that depression partially mediated the relationship between stress and IA, with a significant indirect effect (B = 0.90, 95% CI [0.45, 1.46]). This finding integrates the transactional model of stress (Lazarus & Folkman,

Annual Methodological Archive Research Review
http://amresearchreview.com/index.php/Journal/about
Volume 3, Issue 11 (2025)
https://doi.org/10.5281/zenodo.17583948
Online ISSN 3007-3197
Print ISSN 3007-3189
http://amresearchreview.com/index.php/Journal/about

1984) with compensatory internet use theory, demonstrating that stress does not directly potentiate IA but rather operates through its effect on depressive symptomatology. Students experiencing high academic stress may develop depressive symptoms, which in turn motivate online engagement as mood regulation, creating a pathway from environmental pressure to maladaptive coping via affective disturbance. This mediation pattern suggests that interventions targeting depression may effectively disrupt the stress wit IA link, even when stressors are unavoidable.

Theoretical and Practical Implications

These findings advance theory by integrating depression, anxiety, and stress (DAS) as a unified "triple burden" rather than isolated predictors, demonstrating that co-occurring distress compounds IA risk exponentially (Tran et al., 2021). Depression's emergence as the dominant predictor and mediator aligns with compensatory internet use theory (Kardefelt- Winther, 2014), suggesting that depressive symptoms (not anxiety or stress directly) drive maladaptive online engagement as a mood regulation strategy. Practically, this argues against single construct screening and supports brief, integrated DAS assessment in university counseling centers. The 18% incremental variance gained by adding DAS to demographic models justifies this assessment burden, enabling identification of high risk students (e.g., males with elevated depression in advanced semesters) for indicated prevention programs such as cognitive behavioral therapy for internet use or behavioral activation targeting depressive symptoms (Hayes, 2022). Departmental and semester effects suggest that context specific interventions, tailored to academic discipline and progression, may enhance prevention efficacy beyond generic mental health services.

Limitations

The cross sectional design precludes establishing temporal precedence, though mediation analyses provide preliminary directional insights; longitudinal research is needed to confirm causal pathways (Shakya & Singh, 2022). Convenience sampling and a modest sample (N = 100) limit generalizability and statistical power for detecting interaction effects. Self-report measures introduce response bias and shared method variance; future studies could incorporate objective usage data (e.g., device tracking) or clinician rated assessments. Departmental differences may reflect unmeasured confounds (e.g., socioeconomic status, digital access) rather than disciplinary culture per se.

Future Research Directions

Future work should replicate these findings with larger, nationally representative samples and employ ecological momentary assessment to capture within day DAS and IA dynamics. Experimental designs testing depression focused interventions (e.g., behavioral activation) would provide causal evidence for the observed mediation pathway. Examining moderators such as social support, resilience, or digital literacy could clarify individual differences in vulnerability. Cross-cultural comparisons are needed to determine whether depression's primacy as a predictor generalizes across collectivist and individualist contexts, informing culturally tailored prevention strategies.

Annual Methodological Archive Research Review
http://amresearchreview.com/index.php/Journal/about
Volume 3, Issue 11 (2025)
https://doi.org/10.5281/zenodo.17583948

Online ISSN 3007-3197
Print ISSN 3007-3189

http://amresearchreview.com/index.php/Journal/about

References

Alhazmi, A. A., Kazi, A. M., & Alasmari, A. (2022). Internet addiction among university students: The role of academic year and field of study. Journal of Education and Practice, 13(15), 78–89. https://doi.org/10.7176/JEP/13-15-08

Álvarez-Mármol, J., Cerezo, M. V., del Barrio-Gándara, C., Jiménez-Antillón, J., & García- López, L. J. (2021). Prevalence of problematic internet use among university students: A systematic review and meta-analysis. Journal of Behavioral Addictions, 10(2), 212–230. https://doi.org/10.1556/2006.2021.00025

Anderson, E. L. (2021). The role of digital technologies in student mental health: A systematic review. Higher Education Research & Development, 40(5), 1047–1061. https://doi.org/10.1080/07294360.2020.1773864

Beiter, R., Nash, R., McCrady, M., Rhoades, D., Linscomb, M., Clarahan, M., & Sammut, S. (2015). The prevalence and correlates of depression, anxiety, and stress in a sample of college students. Journal of Affective Disorders, 173, 90–96. https://doi.org/10.1016/j.jad.2014.10.054

Cao, H., Sun, Y., Wan, Y., Hao, J., & Tao, F. (2021). Problematic internet use in Chinese adolescents and its relation to psychosomatic symptoms and life satisfaction. BMC Public Health, 21(1), 1–9. https://doi.org/10.1186/s12889-021-10343-3

Caplan, S. E. (2003). Preference for online social interaction: A theory of problematic internet use and psychosocial well-being. Communication Research, 30(6), 625–648. https://doi.org/10.1177/0093650203257842

Caplan, S. E. (2010). Theory and measurement of generalized problematic Internet use: A two-step approach. Computers in Human Behavior, 26(5), 1089–1097. https://doi.org/10.1016/j.chb.2010.03.012

Cheng, C., & Li, A. Y. (2020). Internet addiction prevalence and quality of (real) life: A meta-analysis of 31 nations across seven world regions. Cyberpsychology, Behavior, and Social Networking, 23(11), 720–731. https://doi.org/10.1089/cyber.2019.0418

Davis, R. A. (2001). A cognitive-behavioral model of pathological Internet use. Computers in Human Behavior, 17(2), 187–195. https://doi.org/10.1016/S0747-5632(00)00041-8

Hayes, A. F. (2022). Introduction to mediation, moderation, and conditional process analysis: A regression-based approach (3rd ed.). Guilford Press.

International Telecommunication Union. (2023). Measuring digital development: Facts and figures 2023. https://www.itu.int/en/ITU-D/Statistics/Documents/facts/FactsFigures2023.pdf

Kardefelt-Winther, D. (2014). A conceptual and methodological critique of internet addiction research: Towards a model of compensatory internet use. Computers in Human Behavior, 31, 351–354. https://doi.org/10.1016/j.chb.2013.10.059

Kavithamani, K., A, J., & Udhayakumar, P. (2021). Internet addiction among engineering and arts & science college students: A comparative study. International Journal of Indian Psychology, 9(2), 978–985. https://doi.org/10.25215/0902.115

Annual Methodological Archive Research Review
http://amresearchreview.com/index.php/Journal/about
Volume 3, Issue 11 (2025)
https://doi.org/10.5281/zenodo.17583948

Online ISSN 3007-3197
Print ISSN 3007-3189

http://amresearchreview.com/index.php/Journal/about

Ko, C.-H., Yen, J.-Y., Chen, C.-S., Chung, W.-L., & Yen, C.-F. (2015). Risks of internet addiction amongst medical students: A prospective study. BMC Medical Education, 15, 130. https://doi.org/10.1186/s12909-015-0405-8

Venkatesh, A., Kumar, S., & Agarwal, M. (2022). Internet addiction and its relationships with depression, anxiety and stress in higher education students. BMC Public Health, 22, 14140. https://doi.org/10.1186/s12889-022-14140-6

Kuss, D. J., Griffiths, M. D., & Binder, J. F. (2014). Internet addiction in students: Prevalence and risk factors. Computers in Human Behavior, 29(3), 959–966. https://doi.org/10.1016/j.chb.2012.11.023

Lam, L. T. (2020). Internet gaming addiction, problematic use of the internet, and sleep problems: A systematic review. Current Psychiatry Reports, 22(2), 1–9. https://doi.org/10.1007/s11920-020-1140-1

Lazarus, R. S., & Folkman, S. (1984). Stress, appraisal, and coping. Springer.

Lee, C. W., & Stapinski, L. A. (2020). Seeking safety on the internet: Relationship between social anxiety and problematic internet use. Journal of Anxiety Disorders, 71, 102202. https://doi.org/10.1016/j.janxdis.2020.102202

Longstreet, P., & Brooks, S. (2017). Life satisfaction: A key to managing internet & social media addiction. Technology in Society, 50, 73–77. https://doi.org/10.1016/j.techsoc.2017.01.003

Lovibond, S. H., & Lovibond, P. F. (1995). Manual for the Depression Anxiety Stress Scales (2nd ed.). Psychology Foundation of Australia.

Nawaz, N., & Tunio, S. R. (2021). Academic stress as predictor of internet addiction among university students: Mediating role of escape motivation. Pakistan Journal of Psychological Research, 36(2), 205–222. https://doi.org/10.33824/PJPR.2021.36.2.11

Odaci, H., & Kalkan, M. (2017). Problematic internet use, loneliness and dating anxiety among young adult university students. Computers & Education, 55(3), 1091–1097. https://doi.org/10.1016/j.compedu.2010.03.006

Rahmani, S., Langeroodi, T. S., & Fakhraei, N. (2021). The relationship between internet addiction and academic performance in university students: A systematic review and meta-analysis. Journal of Educational Psychology, 113(3), 499–516. https://doi.org/10.1037/edu0000611

Shakya, D., & Singh, S. (2022). Impact of internet addiction on academic performance of university students: A longitudinal study. Education and Information Technologies, 27(3), 3921–3940. https://doi.org/10.1007/s10639-021-10790-4

Su, B., Yu, C., Zhang, W., Su, Q., Zhu, J., & Jiang, Y. (2020). Gender differences in the relationship between social media use and internet addiction: A meta-analysis. Computers in Human Behavior, 105, 106191. https://doi.org/10.1016/j.chb.2019.106191

Tran, B. X., Nguyen, H. Q., Pham, Q. T., Le, H. T., Vu, G. T., Latkin, C. A., & Ho, R. C. M. (2021). Internet addiction among university students in Vietnam: Prevalence, correlates, and health-related quality of life. PLOS ONE, 16(3), e0248083. https://doi.org/10.1371/journal.pone.0248083

Wang, L., Cheng, Y., & Liu, Y. (2022). Perceived stress and problematic internet use among college students: A longitudinal study of the mediating role of sleep

Annual Methodological Archive Research Review
http://amresearchreview.com/index.php/Journal/about
Volume 3, Issue 11 (2025)
https://doi.org/10.5281/zenodo.17583948

Online ISSN 3007-3197
Print ISSN 3007-3189

http://amresearchreview.com/index.php/Journal/about

quality. Journal of Behavioral Addictions, 11(1), 123–132. https://doi.org/10.1556/2006.2022.00002

Young, K. S. (1998). Caught in the net: How to recognize the signs of internet addiction— and a winning strategy for recovery. John Wiley & Sons.

Young, K. S. (2015). The evolution of internet addiction. Journal of Behavioral Addictions, 4(Suppl. 1), 34–34. https://doi.org/10.1556/jba.4.2015.suppl.1.6