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The interplay between internet addiction and academic procrastination: a gender-based analysis among students

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Abstract

Context and relevance. The relationship between internet addiction and academic procrastination represents a critical challenge to students' achievement and psychological well-being in digital learning environments. The theoretical basis of this study integrates cognitive-behavioral theory, the I-PACE model, and Temporal Motivation Theory to explain how maladaptive internet use disrupts academic self-regulation. Objective. To investigate gender differences in the levels of internet addiction and academic procrastination, and to explore the bivariate relationship between these constructs among Indian university students. Hypothesis. We hypothesized that (1) internet addiction would be positively correlated with academic procrastination, and (2) male students would report higher mean levels of both internet addiction and procrastination compared to female students. Methods and materials. The study involved 315 students ($M = 20,4$; $SD = 1,4$); aged 17–27 from Kerala, India, with a gender distribution of (55%) male and (45%) female. Participants were assessed using Young's Internet Addiction Test (IAT; $\alpha = 0,85$) and McCloskey's Academic Procrastination Scale (APS; $\alpha = 0,95$). Gender differences were analyzed through t-tests, with correlation analyses examining variable relationships. Results. A strong positive correlation was found between internet addiction and procrastination ($r = 0,859$; $p < 0,01$). Male students scored significantly higher in both internet addiction ($M = 76,33$ vs. $70,71$; $p = 0,04$) and procrastination ($M = 95,86$ vs. $84,43$; $p < 0,001$), indicating gender differences in prevalence/severity. Conclusions. These findings demonstrate that compulsive internet use severely compromises academic self-regulation, particularly among male students. To disrupt this cycle, educational institutions should implement gender-tailored digital literacy programs and cognitive-behavioral strategies. This study's results are vital to understanding contemporary educational challenges.

Keywords: internet addiction, academic procrastination, students, gender differences, digital behavior

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Взаимодействие интернет-зависимости и академической прокрастинации: гендерный анализ в студенческой среде

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Резюме

Контекст и актуальность. Взаимосвязь между интернет-зависимостью и академической прокрастинацией представляет собой критическую проблему для успеваемости студентов и их психологического благополучия в условиях цифровой образовательной среды. Теоретическую основу данного исследования составляет интеграция когнитивно-поведенческой теории, модели I-PACE и теории временной мотивации, что позволяет объяснить, как дезадаптивное использование интернета нарушает академическую саморегуляцию. Цель. Изучить гендерные различия в уровнях интернет-зависимости и академической прокрастинации, а также исследовать парную взаимосвязь между этими конструктами среди студентов индийских университетов. Гипотеза. Мы выдвинули гипотезу о том, что (1) интернет-зависимость будет положительно коррелировать с академической прокрастинацией и (2) студенты-мужчины будут демонстрировать более высокие средние уровни как интернет-зависимости, так и прокрастинации по сравнению со студентками-женщинами. Методы и материалы. В исследовании приняли участие 315 студентов ($M = 20,4$; $SD = 1,4$) в возрасте от 17 до 27 лет из штата Керала, Индия, с гендерным распределением: 55% мужчин и 45% женщин. Участники прошли тестирование с использованием Теста интернет-зависимости Янга (IAT; $\alpha = 0,85$) и Шкалы академической прокрастинации Макклоски (APS; $\alpha = 0,95$). Гендерные различия были проанализированы с помощью t -критерия, а также проведен корреляционный анализ для изучения взаимосвязей между переменными. Результаты. Была выявлена сильная положительная корреляция между интернет-зависимостью и прокрастинацией ($r = 0,859$; $p < 0,01$). Студенты-мужчины показали значительно более высокие результаты как по интернет-зависимости ($M = 76,33$ против $70,71$; $p = 0,04$), так и по прокрастинации ($M = 95,86$ против $84,43$; $p < 0,001$), что указывает на гендерные различия в распространенности/выраженности этих явлений. Выводы. Полученные результаты показывают, что компульсивное использование интернета серьезно нарушает академическую саморегуляцию, особенно у студентов-мужчин. Чтобы разорвать этот замкнутый цикл, образовательные учреждения должны внедрять гендерно-адаптированные программы цифровой грамотности и когнитивно-поведенческие стратегии. Результаты данного исследования имеют важнейшее значение для понимания современных образовательных проблем.

Ключевые слова: интернет-зависимость, академическая прокрастинация, студенты, гендерные различия, цифровое поведение

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The Internet is growing simultaneously with the development of technology. However, excessive usage gave rise to internet addiction, a behavioral addiction characterized by compulsive use of the Internet despite detrimental effects (Bickham, 2021). At the same time, academic procrastination and delaying academic work have skyrocketed among learners (Klassen et al., 2008) and are positively associated with poor performance and increased stress. These two phenomena have a cyclical relationship in which internet addiction leads to procrastination through the provision of distractions, while procrastination sustains addictive online behaviors (Malyshev, Arkhipenko, 2019).

This interplay is illuminated through theoretical frameworks. According to the cognitive-behavioral model (Davis, 2001), maladaptive cognitions lead to maladaptive thoughts that result in excessive use of the internet as a form of coping. This model (Brand et al., 2019), referred to as the I-PACE model, combines personal and environmental factors, e.g., impulsivity and social isolation, that are thought to lead to compulsive behavior online. The Temporal Motivation Theory (Steel, K nig, 2006) explains that the long-term academic benefits of studying for a qualified career become dwarfed by the immediate rewards that the internet offers, thereby contributing to procrastination. These models highlight the potential mechanisms for targeted interventions to help break this cycle.

According to Kuss et al. (2014, p. 1), 58,34 percent of adults in India have shown some symptoms of internet addiction, and students are at the highest risk of using the internet for both academic and recreational purposes. According

to Ferrari (2010), procrastination impacts about 80% of students in college and hinders motivation and self-efficacy. The males appear more susceptible to addiction (for example, gaming), whereas the females suffer more from procrastination motivated by perfectionism (Steel, Ferrari, 2013). These disparities require targeted approaches to address the academic and mental health consequences of these issues.

While prior research has established both the high prevalence of internet addiction and procrastination among students and their general association, the role of gender in this dynamic remains ambiguous. Although mean-level gender differences are often reported (e.g., higher addiction in males, perfectionism-linked procrastination in females), it is less clear whether gender moderates the strength of the association between these constructs. Theoretical models such as the I-PACE model posit that core characteristics, including gender, can shape the pathways to specific internet-use disorders by influencing affective and cognitive responses (Brand et al., 2019). This suggests that the relationship between compulsive internet use and subsequent self-regulatory failure (procrastination) may itself differ by gender. However, this potential moderating role has not been empirically tested in non-Western contexts. Therefore, this study has two primary aims: first, to examine gender differences in the levels of internet addiction and academic procrastination among university students in Kerala, India; and second, to assess the strength of the correlation between these two variables. This foundational analysis is a necessary step toward future research testing gender as a moderator in this relationship.

The evolution from Arpanet (1969) to the participatory digital environment of today fundamentally altered communication and education across the globe (Ryan, 2010). Although this technological revolution has opened up unprecedented access to information and collaborative opportunities, it has also engendered circumstances for problematic internet use. Broad studies indicate that prolonged time spent on such platforms activates neurobiological adaptations parallel to substance addiction, especially in terms of the brain's reward circuitry (Brand et al., 2016). Among the symptoms of internet addiction, around 58% of adult Indians complain of having internet addiction, and specifically, students are most prone to tech addiction as most of their academic work and socializing is now through digital technologies (Kuss et al., 2014).

The issue of academic procrastination is another parallel, as about 80% of college students worldwide exhibit this type of behavior (Klassen et al., 2008). Different theoretical models shed light on this phenomenon from various angles: In Temporal Motivation Theory, procrastination is attributed to hyperbolic discounting of future benefits (Steel, König, 2006), while the cognitive-behavioral model includes maladaptive cognitions such as perfectionism and fear (Davis, 2001). The I-PACE model (Brand et al., 2019; Hayat et al., 2020) structures a framework offering an integrative view of the contributions of personal traits (e.g., impulsivity), mood, and cognitive control that lead to maintaining addictive behaviors related to internet use and procrastination.

Gender differences in these phenomena show different patterns of vulnerability. Males show a greater prevalence of high rates of internet addiction (Mari et al., 2023), and females exhibit procrastination patterns based on perfectionism (Steel, Ferrari, 2013). Neuroscientific work backs up these behavioral insights: compulsive internet use induces structural alterations of prefrontal areas that regulate inhibition (Ding et al., 2023), whereas procrastinating correlates with network dysregulation of self-regulatory activity (González-Brignardello et al., 2023; Ragusa et al., 2023). These biomarkers highlight the clinical relevance of both disorders.

Internet addiction and academic procrastination mutually reinforce each other in a vicious cycle. Too much internet usage gives instant gratification that can bring down academic feelings (Zhang et al., 2022), and procrastination leads people to seek digital distractions as avoidance strategies (Adeyinka, 2022; Malyshev, Arkhipenko, 2019). These pieces of the puzzle conjoin into quantifiable academic outcomes, such as reduced performance (Hayat et al., 2020) and exposure to a fragile state of well-being wherein their sleep is disrupted, and social withdrawal occurs (Jiang et al., 2022). Cultural factors complicate this dynamic further, with collective societies such as India inadvertently enabling these behaviors through academic pressure and limited emotional release avenues (Gencer, Koc, 2012; Gold, 2023).

Such interventions are also lacking from the current research, much of which is culturally insensate. Many studies are based on Western samples and self-report measures susceptible to bias (Podsakoff et al., 2003), and neurological findings must be translated into practical solutions. To be effective on an individual level (e.g., via CBT and mindfulness training) as well as on a systemic level (e.g., digital literacy curricula), Longitudinal studies in the future should be carried out to explore developmental trajectories, and interventions should be tested in parallel addressing both patterns of internet use and academic self-regulation skills to halt this vicious cycle.

Materials and methods

This research describes the methodological framework adopted to explore the relationship between internet addiction and academic procrastination, with a specific focus on gender differences among university students in Kerala, India. The methodology emphasizes transparency and replicability to ensure the appropriateness, reliability, and validity of the findings.

Participants

The study included 315 university students (aged 17–27 years, $M = 21.4$; $SD = 2.1$) from Kerala, India, with gender distribution of 48% male

($n = 151$) and 52% female ($n = 164$). The participants were enrolled across various academic levels, including secondary, undergraduate, and postgraduate programs, in universities located in Kerala, India. The sampling method employed was convenience sampling, chosen for practical access to a diverse student demographic.

Inclusion criteria. Students currently enrolled in academic programs and aged between 17–27 years.

Exclusion criteria. Participants who failed to complete the survey or did not provide informed consent were excluded.

Ethical considerations. Ethical approval was obtained from the Institutional Review Board (IRB). Informed consent was acquired electronically, and all data were anonymized to ensure privacy and confidentiality.

Procedures

Prior to analysis, normality was assessed using skewness and kurtosis measures. While an ideal normal distribution would yield values of zero, psychometric literature considers values between -2 and $+2$ acceptable (Field, 2018). Our data met these criteria, with internet addiction (skewness = 1,012; kurtosis = 0,900) and academic procrastination (skewness = 1,141; kurtosis = 1,653) falling within this range, supporting the use of parametric tests. The study employed a quantitative, cross-sectional, correlational design to examine the natural relationship between internet addiction and academic procrastination without experimental manipulation. This approach aligns with our goal of identifying real-world associations while controlling for measurement robustness through normality checks.

Recruitment and data collection. Participants were invited via online platforms and completed a structured survey through an online form.

Instruments. Internet Addiction was measured using Young's Internet Addiction Test (IAT). The IAT consists of 20 items rated on a 5-point Likert scale and demonstrated high internal consistency in this study (Cronbach's $\alpha = 0,85$).

Academic Procrastination was assessed using McCloskey's Academic Procrastination Scale

(APS), a psychometrically validated tool also rated on a Likert scale (Cronbach's $\alpha = 0,95$).

The assessment conducted via self-report, which allowed broad participation but introduced potential biases, such as social desirability and inaccurate self-assessment. All statistical analyses were conducted using IBM SPSS Statistics Version 27, with significance set at $p < 0,05$. Descriptive statistics, including means and standard deviations were computed for internet addiction and academic procrastination scores. Pearson's correlation coefficient was used to evaluate the strength and direction of the relationship between internet addiction and academic procrastination. Independent sample t-tests were performed to examine gender-based differences in internet addiction and academic procrastination.

All ethical protocols were followed (i.e., IRB approval, electronic informed consent, and data were stored anonymously). To reduce potential harm to participants, we took precautions in the study design, such as carefully phrasing survey questions and a post-survey relaxation practice. Although the cross-sectional design hinders causal inference and convenience sampling impacts generalizability, the use of psychometrically validated instruments and inclusion of participants across diverse educational levels (secondary to postgraduate) strengthen the ecological validity of the present study. Such methodological decisions reflect efforts to balance rigor and pragmatism, particularly when studying sensitive behavioral attributes in student populations.

Results

This study aims to examine the relationship between internet addiction and academic procrastination in students, as well as how demographic characteristics (like gender) affect this relationship. More specifically, the aims of this study are to: (1) explore the relationship between internet addiction and academic procrastination; (2) examine gender differences in internet addiction; (3) evaluate gender-based differences in academic procrastination.

According to these goals, it is predicted that the level of academic procrastination will in-

crease in the presence of high levels of internet addiction. Furthermore, it is also presumed that there are considerable differences in internet addiction and academic procrastination by gender.

H1: Internet addiction scores will be positively correlated with academic procrastination scores.

Table 1 shows the correlation between internet addiction and academic procrastination. The results indicate a significant positive correlation between internet addiction and academic procrastination ($r = 0,859$; $p = 0,01$), indicating that higher internet addiction is linked to higher academic procrastination. The correlation coefficient was above 0,7, indicating a high correlation.

H2: Male students will report significantly higher mean scores on the Internet Addiction Test (IAT) than female students.

The analysis summary in Table 2 shows significant gender differences in internet addiction ($t = 2,939$; $p = 0,004$), with males exhibiting higher internet addiction ($M = 76,33$; $SD = 14,96$) compared to female ($M = 70,71$; $SD = 17,90$).

H3: Male students will report significantly higher mean scores on the Academic Procrastination Scale (APS) than female students.

Table 3 presents the differences in academic procrastination among students based on gender. The results show **significant gender differences** in academic procrastination ($t = 5,609$; $p < 0,001$), with males exhibiting higher levels ($M = 95,86$; $SD = 16,92$) than females ($M = 84,43$; $SD = 18,48$).

Discussion

A strong positive correlation ($r = 0,859$) was found between internet addiction and academic procrastination, indicating that students' excessive internet use leads them to procrastinate when completing their academic tasks. This implies that internet addiction has been found to lead to maladaptive coping, which negatively impacts academic engagement, in line with the cognitive-behavioral model (Davis, 2001). Actions taken online produce immediate gratification that seems to establish neurological patterns of reward (Brand et al., 2016) that may compromise motivation for wider academic objectives while also lending support to predictions made by Temporal Motivational Theory about how delayed tasks are valued (Steel, König, 2006). These findings build upon earlier studies to show how specific online activities

Table 1

Correlation between internet addiction and academic procrastination

	Variable	Mean	SD	r	p-value
1	Internet addiction	73,06	16,93	0,859	0,001
2	Academic procrastination	89,22	18,69		

Note: Correlation is significant at the 0,01 level (2-tailed).

Table 2

Gender differences of internet addiction in students

Gender	M	SD	t-value	p-value
Male	76,33	14,96	2,939	0,04
Female	70,71	17,90		

Table 3

Gender differences of academic procrastination in students

Gender	M	SD	t-value	p-value
Male	95,86	16,92	5,609	0,001
Female	84,43	18,48		

(e.g., social media use, gaming) have different consequences for different types of academic procrastination.

The results confirm significant gender differences in the levels of both internet addiction and academic procrastination, with male students scoring higher on average. This aligns with meta-analytic findings indicating males' greater engagement with and vulnerability to addictive internet applications, particularly online gaming (Mari et al., 2023). For procrastination, our finding contrasts with some Western literature linking female procrastination to perfectionism (Steel, Ferrari, 2013), but may reflect culturally specific academic pressures or gender-role expectations in the Indian context that warrant further exploration. These disparities highlight that male students in our sample represent a higher-risk group in terms of severity of both constructs, suggesting that intervention resources could be initially prioritized for this demographic.

The strong positive correlation ($r = 0,859$) between internet addiction and academic procrastination substantiates a close linkage between these constructs, consistent with the cognitive-behavioral model and Temporal Motivation Theory. It suggests that compulsive internet use and task delay are deeply intertwined behaviors in our student sample. However, a critical limitation of our analysis, as rightly noted in peer review, is that a single-group correlation cannot demonstrate gender differences in the *relationship itself*. Our study did not test for moderation — that is, whether the strength of this correlation is statistically different for male and female students. Therefore, while we observed gender differences in *levels*, we cannot conclude that the *interconnection* between addiction and procrastination is gender-specific. This is a vital distinction for future research: longitudinal or experimental designs incorporating moderation analysis are required to determine if the pathogenic pathway from internet overuse to academic impairment differs qualitatively by gender, as suggested by the I-PACE model's emphasis on individual predisposing factors.

The study's cross-sectional nature limits causal inferences despite providing informa-

tive insights, and self-report measures may succumb to response biases. Longitudinal designs and objective digital use metrics will help establish temporal relations in future research. Nonetheless, the findings underscore the urgency of targeted interventions for male students, incorporating a combination of cognitive-behavioral approaches within digital literacy training. Educational institutions would do well to incorporate these approaches into their student support services to avoid this dual phenomenon having a broader impact on academic and mental health outcomes.

Conclusions

This study explored the relationship between internet addiction and academic procrastination among university students in Kerala, India, with a particular focus on gender differences. Utilizing validated psychometric instruments — the Internet Addiction Test (IAT) and the Academic Procrastination Scale (APS) — and analyzing responses from 315 students aged 17–27, the research yielded several key findings.

First, the results revealed a strong positive correlation between internet addiction and academic procrastination ($r = 0,859$; $p < 0,01$), affirming the study's primary hypothesis and aligning with established psychological models such as the cognitive-behavioral framework and the Temporal Motivation Theory. This finding underscores how excessive internet use, particularly for non-academic purposes, may reinforce procrastinatory behaviors by offering immediate gratification that undermines long-term academic goals.

Second, significant gender differences in the *levels* of both constructs were identified, indicating that male students in this context report greater severity. This finding justifies the development of gender-sensitive (rather than gender-specific) intervention programs that consider different risk levels and potential motivational drivers (e.g., gaming vs. social media use). Future research must build upon this foundational study by employing moderation analyses or multi-group structural equation modeling to empirically test whether gender alters the strength of the relationship between internet addiction

and procrastination — a theoretically compelling but as yet unverified proposition.

The research problem addressed is of increasing urgency in educational psychology and digital behavior research, especially in non-Western contexts where empirical data remain limited. The findings contribute to a deeper understanding of how technology shapes student productivity and well-being, highlighting the need for targeted interventions within academic institutions. These might include gender-respon-

sive digital literacy programs, mental health support initiatives, and pedagogical reforms that address motivational and behavioral deficits.

Beyond the immediate domain of academic performance, the results speak to broader public health concerns about behavioral addictions in digitally saturated environments. As internet connectivity continues to permeate learning spaces, recognizing and mitigating its potential harms becomes critical for educators, psychologists, and policymakers alike.

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Elizabeth Sajeev — co-author; contributed to data collection, conducted the experiment, participated in data analysis and visualization, and supported the writing and refinement of the manuscript.

Sneha Suresh — co-author; contributed to data collection, conducted the experiment, participated in data analysis and visualization, and supported the writing and refinement of the manuscript.

Sona Moorkkathuparambil Sivadasan — co-author; contributed to data collection, conducted the experiment, participated in data analysis and visualization, and supported the writing and refinement of the manuscript.

All authors actively participated in the discussion of the results and approved the final version of the manuscript.

Вклад авторов

Джорджкутти Кочучаккалаккал Куриала — основной автор; разработал исходную идею и дизайн рукописи, спланировал исследование, руководил исследовательским процессом, участвовал в аннотировании (составлении примечаний/комментариев), написании текста и визуализации результатов, а также применил статистические и аналитические методы для интерпретации данных.

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Все авторы принимали активное участие в обсуждении результатов и одобрили финальную версию рукописи.

Conflict of interest

The authors declare no conflict of interest.

Конфликт интересов

Авторы заявляют об отсутствии конфликта интересов.

Ethics statement

The study was reviewed and approved by the Ethics Committee of Manila Med Ethical Review Committee (report no. 2025/02/10).

Декларация об этике

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