International Journal of Applied Home Science **RESEARCH PAPER**
(An International Double Blind Peer Reviewed / Refereed Research Journal of Home Science) ISSN : 2394-1413 (Print)
Volume 13 (9 & 10), September & October (2026) : 540-546 ***Website :*** www.scientificresearchjournal.com
Received : 15.08.2026; Revised : 01.09.2026; Accepted : 15.09.2026 **DOI:** https://doi-ds.org/doilink/11.2026-64798792/ IJAHS/13.9&10/540-546

A Study on the Assessment of the Association between ICT Usage and Internet Addiction among Students

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ABSTRACT

Information and Communication Technology (ICT) has become an integral part of academic and personal lives of university students. The widespread use of smartphones, computers, social networking sites, online educational platforms and internet-based applications has facilitated access to educational resources and communication. However, excessive or uncontrolled internet use may lead to internet addiction, potentially affecting students' academic performance, psychological well-being, and social relationships. The aim of study was to assess the ICT use among university students and determine its association with internet addiction. A descriptive cross-sectional study was conducted among university students using a structured questionnaire to collect information regarding socio-demographic characteristics, patterns of ICT use, purposes of internet access, duration of internet use, and internet addiction. Internet addiction was assessed using a validated assessment tool, such as Young's Internet Addiction Test. Appropriate descriptive and inferential statistical methods was used to examine the association between ICT use and internet addiction and found significant association between them ($p < 0.05$).The study will provide useful insights into ICT utilization and internet addiction among university students. The findings could help identify students at risk of problematic internet use and inform the development of awareness programmes promoting responsible ICT use and healthy digital habits.

Keywords: Information and Communication Technology, ICT use, Internet addiction, University students, Problematic internet use

INTRODUCTION

Information and communication technology (ICT) tools, such as smartphones, laptops, learning management systems, social media, messaging apps, video platforms and search engines has become an integral component of higher education University students use smartphones, laptops, tablets, internet-enabled learning platforms, search engines, digital libraries, video-conferencing applications, and social networking sites for academic and personal purposes. These technologies facilitate access to information, communication with teachers and peers, collaborative learning, and independent study.

University students may be particularly exposed to problematic internet use because academic activities increasingly require digital access, while entertainment, gaming, and social networking are available through the same devices. Nevertheless, frequent ICT use should not automatically be considered internet addiction: educational use, recreational use, duration of exposure, loss of control, and functional impairment must be distinguished.

Despite these benefits, extensive internet use may become problematic when students experience difficulty controlling their online activities or continue using the internet despite negative consequences. Problematic internet use is a broad term encompassing maladaptive patterns of internet engagement, and the terminology and assessment instruments used to study it vary considerably across published research (Sánchez-Fernández *et al.*,

How to cite this Article: Priya, Akanksha and Katare, Charu (2026). A Study on the Assessment of the Association between ICT Usage and Internet Addiction among Students. *Internat. J. Appl. Home Sci.,* **13** (9 & 10) : 540-546.

2023).

The idea that Internet use can become pathological dates to the late 1990s. Young (1998b) modelled addictive Internet use on pathological gambling and described it as an impulse-control disorder without an intoxicant, comparing 396 dependent and 100 non-dependent users. In the same year, Kandell (1998) argued that college students are especially vulnerable, because they have ample unstructured time, easy campus network access, and are at a developmental stage of identity formation and social change. Since then, researchers have used many labels for the problem, including Internet addiction, problematic Internet use and pathological Internet use. This paper uses "internet addiction" (IA) to mean a pattern of excessive, poorly controlled Internet use that impairs study, health, sleep or relationships.

IA is not rare. A meta-analysis of 80 reports covering 89,281 participants in 31 nations estimated a global prevalence of 6.0% (95% CI 5.1–6.9), ranging from 2.6% in Northern and Western Europe to 10.9% in the Middle East (Cheng and Li, 2014). Estimates for Asian samples tend to be higher, for example 11.3% among Chinese university students (Li *et al.*, 2018) and 20.0% across Southeast Asian studies (Chia *et al.,* 2020), which makes university students an important group to monitor.

A systematic review of 76 studies on university students found that reported prevalence estimates of problematic internet use varied from 4% to 51%. Time spent online, online gaming, depression, negative affect, life stress, impulsivity, and poor sleep quality were among the identified risk factors (Sánchez-Fernández *et al.*, 2023).

Evidence from India also indicates that estimates depend substantially on the screening threshold employed. Joseph *et al.* (2021), in a systematic review and meta-analysis of 50 studies conducted across 19 Indian states, estimated pooled prevalence at 19.9% using a Young Internet Addiction Test cutoff of 50 and 40.7% using a cutoff of 40. These figures represent different screening thresholds and should not be interpreted as a single definitive prevalence estimate.

Therefore, assessing how university students use ICT tools and examining the relationship between their usage patterns and internet addiction scores may help universities promote effective educational technology use while identifying students who could benefit from additional support.

Review of Literature

Concept and theoretical frameworks

Young (1998b) proposed that excessive Internet use can be diagnosed with criteria adapted from pathological gambling. Later work distinguished two forms. Davis (2001) described generalised pathological Internet use, a broad pattern of overuse across the Internet, and specific pathological Internet use, in which a person is pathologically drawn to one function such as gambling or sexual content. His cognitive-behavioural model gives a central role to maladaptive thoughts, such as believing one is only worthwhile online, in how the problem develops and persists.

A more recent framework is the I-PACE model (Brand *et al.,* 2016). It treats addictive use of specific applications as the outcome of interactions between predisposing factors (personality, psychopathology, neurobiology), affective and cognitive responses to triggers, and weakened executive control.

Internet addiction is not an official diagnosis in the DSM-5. Only Internet gaming disorder appears there, in the section on conditions needing further study (American Psychiatric Association, 2013). Researchers therefore rely on screening scales and cut-off scores, not clinical diagnosis, which is the approach taken in this study.

Prevalence among students

Prevalence estimates depend heavily on the instrument, cut-off and population. Kuss *et al.* (2014) reviewed 68 large epidemiological studies and found 21 different assessment instruments, with prevalence ranging from 0.8% in Italy to 26.7% in Hong Kong. Cheng and Li (2014) pooled 164 estimates and reported a global figure of 6.0%. Estimates for Asian samples tend to be higher. Li *et al.* (2018) pooled 70 studies of Chinese university students (n = 122,454) and found 11.3%, with the figure varying by instrument (8.4% to 14.0%). Chia *et al.* (2020) estimated 20.0% across Southeast Asian studies. Pan *et al.* (2020) concluded that the prevalence of generalised internet addiction has been rising over time and varies with the assessment used.

Indian studies using Young's Internet Addiction Test (IAT) report a wide range, partly because they count "mild" cases differently.

Cheng and Li (2014) found in Meta-analysis across 31 nations that 89,281 participants were prone to internet addiction as 6.0% (95% CI 5.1–6.9). Li *et al.* (2018) observed in meta-analysis conducted in Chinese university

122,454 students with IAT subgroup 11.3% overall; 11.2% with IAT. Chia *et al.* (2020) reported in the meta-analysis held at Southeast Asia; students having I.A. as 20.0% (95% CI 14.5–27.0). Krishnamurthy and Chetlapalli (2015) highlighted that College students in Bengaluru, ages 16–26 were affected with IAT as 34% mild, 8% moderate. Chaudhari *et al.* (2015) examined Medical students at Western Maharashtra, n = 282 with presence of IAT 58.87% (mild 51.42%, moderate 7.45%). Kumar *et al.* (2023) Identified Students and professionals across India, n = 772 having IAT as 53.6%.

The Indian figures above are much higher than the global pooled estimate. A likely reason is that the IAT yields severity bands (commonly 0–30 normal, 31–49 mild, 50–79 moderate, 80–100 severe; Young, 1998a), and the proportion labelled "addicted" depends on whether mild cases are counted. Comparisons across studies should therefore be made band by band, not on a single headline percentage.

ICT use patterns and internet addiction

The evidence suggests that the purpose of ICT use matters more than access alone. Cheng and Li (2014) found no support for the idea that higher Internet penetration by itself raises prevalence, and instead found a link with lower quality of offline life. Among Indian medical students, Chaudhari *et al.* (2015) found that addiction was associated with longer time online, mobile phone access, higher spending on Internet use and use for social networking and online videos. Kumar *et al.* (2023) found that restlessness when unable to log in (adjusted OR 4.88) and going to bed late because of Internet or social media use (adjusted OR 3.01) were associated with higher risk.

Social networking sites are a frequent focus. Kuss and Griffiths (2011) reviewed the psychological literature on online social networking and addiction and noted that motivations, personality and comorbidity all shape problematic use. They also summarise Young's view that some people become addicted to specific online activities, not to the medium as a whole, which fits Davis's distinction between specific and generalised problematic use.

Studies of university students rarely separate academic ICT use (learning management systems, online research, video lectures) from recreational use. Because both happen on the same devices and often in the same sessions, total hours online can hide the pattern that matters. This is the gap the present study addresses.

Measurement

The 20-item IAT (Young, 1998b) is the most widely used screening scale in this field and has been tested in many languages and student samples. Widyanto and McMurran (2004) examined its psychometric properties and identified six factors, although factor solutions vary across samples. Because the IAT is a screening tool, scores indicate risk of problematic use and not a clinical diagnosis.

Statement of the problem

The increasing integration of ICT tools into university education has created opportunities for academic development, communication, and information access. However, the same technologies can facilitate prolonged recreational internet use and potentially problematic online behaviours. Although problematic internet use has been studied among university students, differences in assessment tools, definitions, and study populations limit direct comparisons between findings. Furthermore, overall internet-use duration alone may not adequately distinguish productive academic engagement from problematic use. The present study assessed that ICT use and internet addiction scores are associated among university students.

Significance of the study

The study is important for the following reasons:

- *Educational relevance*: It may help institutions understand how students use digital technologies for learning and non-academic activities.
- *Student well-being*: It may identify patterns of internet use associated with sleep difficulties, perceived academic interference, or impaired daily functioning.
- *Evidence-based planning*: Its findings may guide digital-literacy and responsible internet-use initiatives.
- *Research contribution*: It may provide institution-specific evidence to complement existing systematic reviews and prevalence studies.

Objectives of the study

To assess the use of ICT tools and examine their association with internet addiction among university students

Research Hypothesis

Null hypothesis (H_0): There is no statistically significant association between ICT-use and internet addiction among university students

METHODOLOGY

Study design and setting

This is a descriptive, analytical cross-sectional survey of students enrolled at educational institutes in Jiwaji University, Gwalior. A cross-sectional design suits the objectives because it estimates prevalence and tests association at one point in time. It cannot show that ICT use causes addiction, and the paper treats results as associations only.

Study Population

The study population is full-time undergraduate and postgraduate students aged 18 years -25 years. Students who have used the Internet for at least six months.

Sample size and sampling technique

Students were selected by stratified random sampling across faculties as 250 boy and 250 girl university students.

Variables

- Independent variable : ICT Use
- Dependent variable : Internet Addiction

Data collection instruments

Data were collected through survey work from the following questionnaires.

1. *ICT use questionnaire* : Items asking how often (never to several times a day) and for how many hours students use ICT tools in three categories: academic (learning management systems, online research, video lectures, e-library), social and communication (messaging, social networking), and entertainment (streaming, gaming, short video).
2. *Internet Addiction Test (IAT)*: The 20-item scale developed by Young (1998b), scored 0–5 per item (total 0–100 in the scoring used here). Widyanto and McMurran (2004) provide psychometric support. Severity is classed as normal (0–30), mild (31–49), moderate (50–79) or severe (80–100), the bands commonly used in Indian studies (Young, 1998a). Internet addiction is defined for analysis as an IAT score of 50 or above, and a secondary definition of 31 or above is also reported so results can be compared with studies that count mild cases.

RESULTS AND DISCUSSION

Data were entered in a spreadsheet and analysed in Microsoft excel. Categorical variables are summarised as frequencies and percentages. Chi square test was used for finding the association at statistical significance set at $p < 0.05$.

The tables showing the findings are given below :

Percentage = (Frequency ÷ Total of that group) × 100

- Boys in Arts: 60 ÷ 250 x 100 = 24%
- Girls in Arts: 85 ÷ 250 x 100 = 34%
- All students in Arts: 145 ÷ 500 x 100 = 29%

Interpretation

- Science is the most popular stream overall (32%).
- Boys prefer Science (36%), while girls prefer Arts (34%).
- "Other degree" is the smallest group for both boys and girls.

Young's Internet Addiction Test (IAT) categories

- Normal: 0-30
- Mild: 31-49
- Moderate: 50-79
- Severe: 80-100

Percentages are row percentages: (cell frequency ÷ row total) x 100.

Table 1 : Distribution of students according to their educational stream (Boys and Girls)

Stream	Boys	Boys (%)	Girls	Girls (%)	Total	Total (%)
Arts	60	24	85	34	145	29
Science	90	36	70	28	160	32
Commerce	70	28	60	24	130	26
Other degree	30	12	35	14	65	13
Total	250	100	250	100	500	100

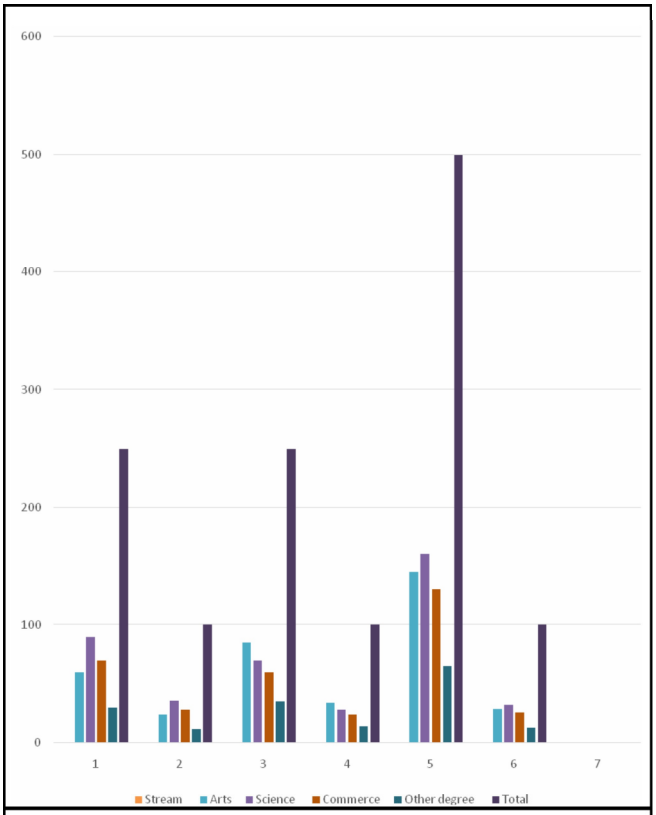

Fig. 1 :

Expected frequency E = (Row total × Column total) ÷ N

Chi-square calculation

$\chi^2 = \Sigma (O - E)^2 \div E = 47.93$

Sum of all $\chi^2 = \Sigma (O - E)^2 / E = 60.05$

Chi square table

ICT usage	Normal I.A.	Mild I.A.	Moderate I A.	Severe I.A.
High user	12.554	0.414	6.544	5.989
Moderate user	0.007	1.327	0.221	0.978
Low user	20.619	0.212	7.254	3.933

Example: High user and Normal = (104 × 70) ÷ 250 = 29.12.

Result

Degrees of freedom, df= (3 – 1)(4 – 1) = 6

Critical value (α = 0.05), 12.59

Critical value (α = 0.01), 16.81

Calculated $\chi^2 = 60.05$

p-value < 0.001

Cramer's V | √(60.05 ÷ (250 × 2)) = 0.35

Interpretation

Since the calculated χ^2 (60.05) is greater than the critical value (12.59 at 0.05, 16.81 at 0.01), the null hypothesis is rejected. There is a significant association between ICT usage and internet addiction ($\chi^2 = 60.05$, df = 6, $p < 0.05$). Cramér's V of 0.35 indicates a moderate-to-strong association.

Expected frequency

E = (Row total × Column total) ÷ Grand total

Example: High user and Normal = (118 × 62) ÷ 250 = 29.26.

Chi-square table

ICT usage	Normal I.A.	Mild I.A.	Moderate I A.	Severe I.A.
High user	10.185	0.166	4.721	3.930
Moderate user	0.105	0.684	0.494	0.672
Low user	17.803	0.132	5.383	3.655

$\chi^2 = \Sigma (O - E)^2 \div E = 47.93$

Test result

Degrees of freedom

(3 – 1) × (4 – 1) = 6

Critical value at 0.05,12.592

Critical value at 0.01,16.812

Calculated χ^2=47.93

p-value< 0.001

Table 2 : Association between ICT usage and internet addiction among university students (N = 250 girls)

ICT usage	Normal I.A.	Expected Frequency	Mild I.A.(%)	Expected Frequency	Moderate I A.	Expected Frequency	Severe I.A.	Expected Frequency	Total (%)
High user	10 (9.6%)	29.12	28 (26.9%)	31.62	46 (44.2%)	31.62	20 (19.2%)	11.65	104 (41.6%)
Moderate user	22 (27.5%)	22.40	30 (37.5%)	24.32	22 (27.5%)	24.32	6 (7.5%)	8.96	80 (32%)
Low user	38 (57.6%)	18.48	18 (27.3%)	20.06	8 (12.1%)	20.06	2 (3.0%)	7.39	66 (26.4%)
Total	70 (28.0%)	70	76 (30.4%)	76	76 (30.4%)	76	28 (11.2%)	28	250 (100)

Table 3: Association between ICT usage and internet addiction among university students (N = 250 Boys)

ICT usage	Normal I.A.(%)	Expected Frequency	Mild I.A.(%)	Expected Frequency	Moderate I A.(%)	Expected Frequency	Severe I.A.(%)	Expected Frequency	Total (%)
High user	12 (10.2%)	29.26	38 (32.2%)	40.59	50 (42.4%)	36.82	18(15.3%)	11.33	118 (47.2%)
Moderate user	20 (26.7%)	18.60	30 (40.0%)	25.80	20 (26.7%)	23.40	5(6.7%)	7.20	75 (30%)
Low user	30 (52.6%)	14.14	18 (31.6%)	19.61	8 (14.0%)	17.78	1(1.8)	5.47	57 (22.8%)
Total	62 (24.8%)	62	86 (34.4%)	86	78 (31.2%)	78	24(9.6%)	24	250 (100)

Cramér's V= $\sqrt{(47.93 \div (250 \times 2))} = 0.31$ (moderate association)

- Decision: The calculated χ^2 (47.93) is greater than the table value (12.592 at df = 6, $p < 0.05$), so H_0 is rejected.

Interpretation

There is a statistically significant association between ICT usage and internet addiction among the students. Addiction rises with ICT use.

The results of the study indicated the positive association between ICT use and internet addiction among girls, suggesting that greater ICT use was associated with higher internet addiction scores. This finding demonstrated that problematic internet use may be relevant to girls as well as boys. Increased engagement with online communication, social networking, educational platforms, and digital entertainment may be associated with greater internet involvement. Joseph *et al.* (2022), in their systematic review and meta-analysis of school-going adolescents, reported a higher pooled prevalence of problematic internet use among males (19.4%) than females (12.9%). Furthermore, Baloglu *et al.* (2020) emphasized that gender-related patterns of problematic internet use differ across studies and cultural settings and highlighted that males were more vulnerable to problematic internet use. Existing evidence shows that internet addiction is common among university students, especially in Asian samples, but estimates are hard to compare because instruments and cut-offs differ (Kuss *et al.,* 2014; Li *et al.*, 2018). Evidence on which ICT activities carry the most risk is thinner, and Indian studies point mainly to social networking, online video, long hours and late-night use (Chaudhari *et al.*, 2015; Kumar *et al.,* 2023). Therefore, the positive association identified among girls and boys in the present study is consistent with the broader evidence that problematic internet use is relevant across genders.

Conclusion

In conclusion, understanding the relationship between ICT use and internet addiction is essential for developing appropriate strategies to support students in the digital age. Further research involving diverse student populations and longitudinal approaches is recommended to examine the nature of this association and identify the factors that may contribute to problematic internet use. Such efforts can help maximize the educational benefits of ICT while minimizing its potential negative consequences for students' overall development.

Recommendations for universities

Results would help institutions decide whether to focus on awareness of recreational use, learning-platform design that limits distration.Interventions should be tested separately, since this study cannot show that reducing a given type of use lowers addiction scores.

1. Build digital-wellbeing content into orientation, covering recreational use and sleep.
2. Offer confidential screening and counselling access through student health services.
3. Design learning platforms to reduce distraction, such as fewer push notifications.
4. Train hostel wardens and mentors to recognise late-night overuse and withdrawal-like restlessness.

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