

When the Virtual World Becomes an Escape: The Link Between Loneliness and Problematic Internet Use Among Late Adolescents

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Abstract. Emerging from the digital landscape of Indonesia, late adolescents have emerged as the most frequent users of the internet. Nevertheless, several issues linked to internet usage can precipitate a maladaptive behavior called *Problematic Internet Use* (PIU). Individuals plagued by loneliness appear to be predisposed to engaging in excessive internet access. This study aims to investigate the role of loneliness in *Problematic Internet Use* among late adolescents. The total sample size for this research comprises 309 participants, selected via the accidental sampling method. The assessment tools employed include the UCLA *Loneliness Scale Version 3* and the *Generalized Problematic Internet Use Scale 2* (GPIUS2). Data analysis entails the application of a linear regression test using SPSS version 26. The findings reveal that loneliness exerts a substantial 19.9% influence on *Problematic Internet Use* among late adolescents in Jakarta. Internet usage activities are demographic factors that differentiate PIU among late adolescents. This study highlights the importance of involving adolescents in positive academic and social activities and the need for intervention for wise internet usage.

Keywords: late adolescents, loneliness, problematic internet use

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Introduction

In the ever-evolving digital era, technological advancements have fundamentally transformed the landscape of human life. Interaction and the formation of social relationships are now increasingly facilitated through the internet. In line with the perspective of Wellman and Rainie (2020), who view digital networks as a new social infrastructure, a crucial question arises: how do individuals' internet-related competencies influence their social and economic participation? (Van Deursen & Van Dijk, 2013). Data from the Indonesian Internet Service Providers Association (APJII)

consistently show a rising trend in internet users in Indonesia (APJII, 2024). At the end of 2017, there were 143.26 million users, 50% of whom were aged 19–34. This number significantly increased to 215 million in 2023 and further to 221 million in 2024. A large portion of this age group falls into the category of late adolescence (18–21 years), which, according to Arnett (2020), is characterized by a high need for social interaction. Within this context, how do online platforms and social media, which also offer entertainment features, as noted by LaRose (2011) now influence the dynamics of forming and maintaining social relationships among late adolescents? Furthermore, with the deepening penetration of digital technology into adolescent life, the question of negative consequences, such as social isolation amidst digital connectedness (Primack et al., 2017), becomes increasingly relevant to explore.

Communication among late adolescents frequently occurs through social media platforms (Rideout, 2021). A previous study by Ayun (2015) highlighted the importance of social media for this age group to interact with peers, express self-identity, build a positive image in the eyes of followers, and even as a space to share personal complaints in order to maintain social presence. In the internet age, the ability of late adolescents to construct and project their desired identity has become increasingly effortless, but it also holds the potential to lead to excessive internet use (Griffiths & Kuss, 2015).

Moreover, problematic and prolonged internet use has been associated with various negative psychological consequences and mental health issues, including stress, anxiety, and depression (Cai et al., 2023). Considering that late adolescence (approximately ages 18–25) is a crucial transitional developmental period, excessive internet use during this stage can hinder the formation of a healthy identity, social relationships, and independence (Pontes et al., 2021). It may also result in negative social and academic or work-related outcomes, disrupt face-to-face interactions, and reduce academic performance (Li et al., 2016).

Spending too much time online can make it difficult for adolescents to adapt socially due to minimal direct interaction, making it hard for them to read others' facial

expressions (Kowdley, 2020). If left unaddressed, this behavior may become maladaptive and is referred to as Problematic Internet Use (PIU) (Caplan, 2010). PIU is a maladaptive pattern of internet use that negatively impacts social, academic, and professional domains. Symptoms include: (1) Preference for Online Social Interaction (POSI), (2) mood regulation, (3) deficient self-regulation, and (4) negative outcomes. PIU can serve as a threat to mental health (LaRose, 2011). Davis (2001) also described the phenomenon of "extreme generalization," where individuals develop distorted thoughts about themselves and how they are perceived by others. Examples include thoughts like "I only feel better when I'm online" or "I'm worthless when I'm not using the internet," and perceptions such as "Nobody likes me unless I'm online" or "People treat me poorly unless I'm online." Consequently, individuals may increasingly use the internet to form interpersonal relationships without fear of rejection or disapproval (Stieger & Burger, 2010). Lonely individuals are particularly vulnerable and more likely to engage in excessive internet use (Song et al., 2014).

According to Russell (1996), loneliness is a subjective emotional state arising from the loss of intimacy in a relationship. It is a temporary condition influenced by drastic changes in one's social life. Loneliness is considered a negative psychological response to a mismatch between desired and actual relationships. This is often due to a lack of quality in social contact, as the individual either has fewer social interactions than desired or lacks adequate intimacy in relationships (Yanguas et al., 2018).

Weiss, as cited in Santrock (2003), stated that loneliness does not necessarily mean being physically alone; rather, it is a response to the failure to establish meaningful relationships. According to Weiss, loneliness cannot be resolved merely by the presence of others—it requires a specific type of relationship involving emotional involvement. Loneliness has the potential to become more severe, putting individuals at risk of self-harm and even death (Holt-Lunstad et al., 2015).

A qualitative meta-synthesis on Problematic Internet Use over the past 10 years reported that feelings of loneliness and social isolation can facilitate heavy internet use with negative effects across all aspects of life (Douglas, 2008). For late

adolescents, maintaining interactions with peers, affirming one's identity, constructing a positive image, and having an outlet for personal problems are crucial to maintaining social existence (Ayun, 2015). The significance of identity in adolescence, coupled with the unregulated vastness of the internet, poses psychosocial challenges that may lead to Problematic Internet Use. The internet offers comfort and expressive freedom, which can cause individuals to neglect their offline social activities (Spada, 2014).

Rini et al. (2020) found a positive relationship between loneliness and PIU, with a correlation coefficient of 0.52 and loneliness contributing 52% to PIU. Similarly, Luthfiyyah and Qodariah (2021) reported a significant positive effect of loneliness on PIU at 61.7%. Andangsari and Dhowi (2016) found that emotional loneliness was a cause of PIU. Maulida & Kusumaningrum (2023) also found a moderate correlation between these two variables among university students.

Previous studies have consistently demonstrated a low-to-moderate correlation between loneliness and problematic internet use across various contexts (Moretta & Buodo, 2020). To further enrich existing literature, this study aims to examine the contribution of loneliness to PIU among late adolescents (ages 18–21) in Jakarta, along with the demographic factors that may influence this relationship. Based on the background outlined above, the main research question formulated by the researcher is:

"Does loneliness influence Problematic Internet Use among late adolescents in Jakarta?"

Method

This study employed a quantitative correlational approach aimed at examining the influence between the investigated variables. A regression test was used to determine the effect of loneliness on Problematic Internet Use among late adolescents in Jakarta. The research sample consisted of male and female late adolescents aged 18–21 years in Jakarta who were active internet users. The sample was selected using an accidental sampling technique, and participants completed a

Google Form questionnaire distributed through social media. The total number of respondents was 309.

Two measurement instruments were utilized in this study. The first was the **UCLA Loneliness Scale** by Russell (1996), which was previously adapted into Indonesian by Hudiyana (2021). This scale is unidimensional, meaning that it measures only one latent attribute underlying the participants' responses to the items (Hambleton, Swaminathan, & Rogers, 1991). The validity of the instrument was tested using Confirmatory Factor Analysis (CFA), and the results showed that the instrument is valid and fits well, with the following values: $p = 0.008 (< 0.05)$, $CFI = 0.922 (> 0.90)$, $TLI = 0.904 (> 0.90)$, and $RMSEA = 0.694 (< 0.08)$. Reliability was tested using Cronbach's Alpha, yielding a score above 0.7, specifically .921, indicating that the instrument is reliable. Favorable items were scored from 1 to 4 (from "never" to "often"), while unfavorable items were reverse-scored from 4 to 1 (also from "never" to "often").

The second instrument was the **Generalized Problematic Internet Use Scale 2 (GPIUS2)** developed by Scott E. Caplan (2010), which underwent expert judgment by a clinical psychology lecturer. The validity of this instrument was also assessed using Confirmatory Factor Analysis, and the results confirmed that the instrument is valid and fits well, with the following indices: $p = 0.010 (< 0.05)$, $CFI = 0.921 (> 0.90)$, $TLI = 0.904 (> 0.90)$, and $RMSEA = 0.685 (< 0.08)$. Reliability testing using Cronbach's Alpha showed a score of .912, indicating high reliability. The instrument consists of 20 items structured across four dimensions: **Preference for Online Social Interaction (POSI)**, **mood regulation**, **deficient self-regulation** (with two subscales: cognitive preoccupation and compulsive internet use), and **negative outcomes**. All items are favorable and rated on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree).

Result

Demographic Characteristics of Research Subjects

Table 1.
Demographic Characteristics of Research Subjects

Description		Number of Respondents	Percentage
Gender	Male	75	24,27%
	Female	234	75.73%
Age	18years	9	2,91%
	19years	12	3,88%
	20years	31	10,03%
	21years	257	83,17%
Activity	University Student	207	69,99%
	Employed	74	23,95%
	High School	25	8.09%
	Not in School	3	0,97%
Internet Usage Duration	<5 hours	37	11,97%
	5-10 hours	165	53,40%
	>10 hours	107	34,63%
Internet Activity	Accessing Social Media	276	89,32%
	Working or Studying from Home	22	7,12%
	Online Transaction	7	2,27%
	Accessing News or Information	4	0,97%

The table above describes the demographic profile of 309 respondents. The majority of the respondents were female (75.73%) compared to male (24.27%). The most common age among respondents was 21 years old (83.17%). Most participants were university students (69.99%). Additionally, most respondents reported using the internet for more than 10 hours per day (53.80%). The most common online activity was accessing social media platforms such as WhatsApp, Instagram, Twitter, TikTok, YouTube, and others (89.44%).

Table 2.
Categorization of Loneliness

Category	Range	F	%
Low	17 – 39	165	53.4%
High	40 – 68	144	46.6%
Total		309	100%

From the table above, the variable *loneliness* had the highest number of scores in the **low category**, with 165 respondents representing **53.4%** of the total.

Table 3.
Categorization of Problematic Internet Use

Category	Range	F	%
Low	23 – 33	12	3.88%
High	34 – 80	297	96.12%
Total		309	100%

The table above shows that the *Problematic Internet Use* variable had the highest number of scores in the **high category**, with 297 respondents, accounting for **96.12%** of the total.

Table 4.
Simple Linear Regression Test Results

Model	<i>Unstandardized Coefficient</i>		<i>Standardized Coefficients</i>		Sig.
	B	Std. Error	Beta	t	
(Constant)	31.173	2.92		10.676	.000
Loneliness	.640	.073	.446	8.725	.000

Based on the regression analysis above, the t-value for the **loneliness** variable is **8.725**. To determine the t-table value, the researcher referred to the degrees of freedom formula as described by Ghozali (2018)

$$df = (\alpha/2 ; n - k)$$

Using the values:

- $\alpha = 0.05$
- $n = 309$

- $k = 2$

Thus,

$$t\text{-table} = (0.025 ; 307) = 1.967$$

Since **t-count (8.725) > t-table (1.967)** and the significance value for the loneliness variable is $.000 < 0.05$, the conclusion of the linear regression analysis is that **H₀ is rejected and H_a is accepted**. This means that **loneliness has a significant positive effect** on Problematic Internet Use.

From Table 4, the simple linear regression equation for the tested hypothesis is:

$$Y = a + bX_1$$

$$Y = 31.173 + 0.640X$$

This equation indicates the following:

- The **constant (a)** has a value of **31.173** and is positive, meaning that if the loneliness variable is absent or has a value of 0, the value of the Problematic Internet Use variable (Y) would be 31.173.
- The **regression coefficient (b)** for the loneliness variable is **0.640**, meaning that for each one-unit increase in loneliness, there is a corresponding increase of 0.640 in Problematic Internet Use. The positive value confirms that the alternative hypothesis (H_a) is accepted.

Table 5
Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.446	.199	.196	10.906

Table 5 presents the **coefficient of determination (R Square)**, which is **0.199**. This indicates that the independent variable **loneliness** contributes **19.9%** to the variance in the dependent variable **Problematic Internet Use** among late adolescents in Jakarta. The remaining **80.1%** is influenced by other factors not examined in this study.

Furthermore, the regression coefficient value for the loneliness variable is **0.640**, which means that for every one-unit increase in loneliness, the level of Problematic Internet Use increases by 0.640 units.

Table 6
Demographic Difference Test of Variables

Demographic	PIU		Loneliness	
	Sig	Conclusion	Sig	Conclusion
Gender	0.367	No Significant Difference	0.797	No Significant Difference
Age	0.767	No Significant Difference	0.703	No Significant Difference
Current Activity	0.051	No Significant Difference	0.006	No Significant Difference
Internet Usage Duration	0.477	No Significant Difference	0.294	No Significant Difference
Internet Activity	0.002*	Significant Difference	0.182	No Significant Difference

*p=0.00

Based on Table 6, it can be concluded that only the **internet activity** category shows a significance value **below 0.05**, indicating a **significant difference** in **Problematic Internet Use** based on the type of activity conducted on the internet. Meanwhile, variables such as **age**, **gender**, **current activity**, and **internet usage duration** have significance values **above 0.05**, which means there is **no significant difference** in either **Problematic Internet Use** or **loneliness** based on those demographic factors.

Discussion

The primary objective of this study was to examine the influence of loneliness on Problematic Internet Use (PIU) among late adolescents in Jakarta. The results revealed a significant and positive effect of 19.9%, indicating that the level of loneliness contributes to 19.9% of the variance in PIU among late adolescents in Jakarta, while the remaining 80.1% is influenced by other factors. The regression coefficient for the loneliness variable was 0.640, meaning that for every one-point increase in loneliness,

PIU increases by 0.640 points. The novelty of this study lies in its use of regression analysis to test the effect of loneliness specifically among late adolescents in Jakarta.

These findings are consistent with the previous research conducted by Luthfiyyah and Qodariah (2021), which also found a positive and significant influence of loneliness on PIU among social media users in Bandung, with a higher effect size of 61.7%. The difference in effect size between their study and the present one may be attributed to differences in respondent characteristics and internet usage duration. Luthfiyyah and Qodariah surveyed final-year university students aged 20–24, already entering early adulthood, while this study focused on late adolescents aged 18–21. According to Luhmann and Hawkley (2016), older individuals tend to experience higher levels of loneliness than younger individuals, partly due to a decline in social ties and interactions.

Ayun (2015) emphasized that social media is crucial for late adolescents, as it helps them maintain peer relationships, assert their identity, build a positive self-image in the eyes of followers, and serves as a platform to express personal struggles and sustain their social presence. Identity is an essential aspect of cultural communication, defined as the emotional significance attached to a characteristic that allows a person to be recognized and distinguished from others (Gudykunst, 2002). The importance of identity in adolescence, combined with the unregulated vastness of the internet, poses a psychosocial challenge that can lead to PIU. Constructing identity to interact comfortably with others online motivates individuals to share personal problems (mood regulation), and fosters a Preference for Online Social Interaction (POSI)

Another key finding of this study was that loneliness among late adolescents was predominantly in the low category (53.4%), although a substantial portion (46.6%) also fell into the high category. This aligns with Cohen-Mansfield et al. (2016), who noted that older adults are more prone to loneliness compared to younger individuals. Contributing factors include lower income, functional limitations, and solitude due to the absence of a partner. Loneliness tends to increase with age. While late adolescents may experience loneliness due to a need for meaningful social interactions, factors

commonly associated with older adults are not yet primary concerns for this age group.

The broader impact of loneliness on late adolescents includes social anxiety, driven by a desire for high-quality relationships. This anxiety often leads to a reduced willingness to participate in social environments, aligning with the core characteristics of Problematic Internet Use. However, loneliness is most strongly associated with depression, followed by social anxiety, external locus of control, and lower levels of happiness and life satisfaction (Moore & Schultz, 1983). In severe cases, this can escalate to suicidal ideation (Cacioppo et al., 2003).

The demographic difference analysis indicated that gender, age, current activity (e.g., schooling or employment), and internet usage duration did not significantly differentiate levels of either PIU or loneliness. These findings are consistent with prior studies by Laconi & Chabrol (2015) and Ioannidis et al. (2018) regarding PIU, and by Barreto et al. (2021) and Weiss (as cited in Santrock, 2003) regarding loneliness. While some studies suggest the need for further investigation into gender differences in PIU (Laconi & Chabrol, 2015), and although loneliness may be more common among youth (Barreto et al., 2021), demographic variables and internet usage duration do not appear to be the primary predictors of these phenomena.

In contrast, the analysis found that **specific types of internet activity** significantly differentiated levels of PIU. Individuals who spent more time accessing social media exhibited higher levels of PIU compared to those who used the internet for work/school, online transactions, or information consumption. This finding supports the study by Ayar et al. (2018), which identified social media dependence as a dominant contributing factor to PIU.

Regarding loneliness, variables such as gender, age, current activity, and internet usage duration did not result in significant differences. This may be explained by the understanding that loneliness is more influenced by the **quality of interpersonal relationships and emotional engagement** (Weiss in Santrock, 2003), as

well as unmet expectations in relationship intimacy (Brehm et al., 2002). Thus, **physical presence** or **online time** alone is insufficient to reduce feelings of loneliness if the need for meaningful relationships remains unfulfilled

Conclusion

This study found that loneliness has a positive and significant effect on Problematic Internet Use (PIU) among late adolescents in Jakarta, with a contribution of 19.9%. This indicates that the higher the level of loneliness experienced by late adolescents, the greater their tendency to engage in PIU. However, other factors beyond loneliness also play a role in influencing PIU, accounting for the remaining 80.1%. Additionally, the type of internet activity was identified as a demographic factor that differentiates levels of PIU among late adolescents.

Given the significant influence of loneliness on PIU, it is important to develop intervention programs focused on reducing loneliness and enhancing social skills among late adolescents. Such programs may include communication skills training, increased participation in real-world social activities, and counseling to address feelings of loneliness. Furthermore, education on healthy and responsible internet use is essential, emphasizing the importance of balancing online and offline activities, as well as identifying and managing the risks associated with PIU.

Future research is recommended to employ longitudinal or experimental designs to better understand the direction and causality of the relationship between loneliness and PIU. Qualitative studies may also provide deeper insights into the subjective experiences of late adolescents regarding loneliness and their internet use. In addition, future research may explore the role of other factors such as social support, emotional regulation, and personality traits as potential moderators or mediators in the relationship between loneliness and PIU. Continued research is also needed to develop and evaluate the effectiveness of targeted interventions aimed at reducing both PIU and loneliness among late adolescents.

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