Social Disconnection and Online Immersion: A Correlational Study of Internet Gaming Disorder and Loneliness among Adolescents in Enugu Metropolis

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Abstract

In an era where artificial intelligence-driven algorithms are designed to maximise user engagement, the boundary between digital recreation and problematic use has become increasingly blurred. As online games adapt to users' emotions and behaviours, many adolescents are forming social connections in virtual environments rather than through face-to-face interactions. This study examined the relationship between loneliness and Internet Gaming Disorder (IGD) among secondary school adolescents in Enugu Metropolis. Guided by four objectives, the study adopted a descriptive correlational survey design. Using Taro Yamane's formula, a sample of 404 respondents was drawn from a population of 16,500 through a multistage sampling procedure. Data were collected using a structured, self-administered questionnaire comprising the UCLA Loneliness Scale (Version 3), the Internet Gaming Disorder Scale–Short Form (IGDS9-SF), and items assessing socio-demographic characteristics and coping strategies. Data were analysed using frequencies, percentages, means, standard deviations, Chi-square and Pearson tests. Results showed that 68.1% of respondents experienced moderate to high loneliness, while 56.9% exhibited symptoms consistent with IGD. Pearson correlation revealed a strong, statistically significant positive relationship between loneliness and IGD severity ($r = 0.62$, $p = .020$). Categorically, adolescents with high loneliness were nearly five times more likely to report moderate to severe IGD (46.4%) than those with low loneliness (9.6%) ($p = 0.001$). Although many adolescents recognised the value of social support and alternative activities, structured coping strategies were seldom used. The study concludes that loneliness is a significant risk factor for IGD and recommends collaborative efforts by schools and parents to regulate gaming time and promote offline activities.

Keywords: Problematic online gaming, Loneliness, Adolescents, Social isolation, Artificial intelligence

Introduction

In today's digital world, Artificial Intelligence-driven algorithms and immersive technology tap into the psychological vulnerabilities of young people, creating new and addictive behavioural patterns. As AI-powered technologies personalise and mediate social interactions, they may alter adolescents' perceptions of social connection, potentially heightening experiences of loneliness. Loneliness is defined as a subjective psychological experience that occurs when individuals perceive a discrepancy between the social relationships they desire and those they actually have (Banerjee & Kohli, 2023; Igbokwe et al., 2020; Xu & Takai, 2020). Loneliness is a prevalent issue for adolescents and is distinct from social isolation, which refers to an objective lack of social contact (Banerjee & Kohli, 2023; Qualter et al., 2015). In this study, loneliness is conceptualised as a profound form of social disconnection, characterised by subjective distress arising from a perceived lack of meaningful relational bonds.

During adolescence, loneliness is particularly salient due to developmental changes marked by heightened sensitivity to peer relationships, identity exploration, and increasing social expectations (Qualter et al., 2015; Odgers & Jensen, 2020). When these expectations are unmet, adolescents may experience feelings of exclusion or inadequacy, which can influence behavioural choices and coping strategies. Loneliness can be transient or chronic; however, prolonged loneliness has been consistently associated with adverse mental and physical health outcomes, including depression, anxiety, reduced self-esteem, impaired social functioning, and reliance on maladaptive coping mechanisms (Holt-Lunstad, 2015; Vaarala et al., 2022). This persistent sense of social deficit often acts as a catalyst for withdrawal from tangible social environments, potentially leading to the development of problematic digital behaviours such as Internet Gaming Disorder (IGD).

Internet Gaming Disorder (IGD) is a behavioural condition characterised by persistent and recurrent engagement in online or digital gaming that results in significant impairment or distress in personal, social, educational, or occupational functioning (Brand et al., 2016; Núñez-Rodríguez, 2025). According to the Diagnostic and Statistical Manual of Mental Disorders (DSM-5), IGD is defined through symptoms such as preoccupation with gaming, impaired control, tolerance, withdrawal-like experiences, and continued gaming despite negative consequences (American Psychiatric Association, 2013; American Psychiatric Association, 2022). Similarly, the World Health Organisation [WHO] (2019) described symptoms, emphasising loss of control over gaming, prioritising gaming over other activities, and persistence despite harm.

Although gaming is a common recreational activity among adolescents, IGD represents a maladaptive pattern associated with adverse outcomes, including poor academic performance,

disrupted sleep, strained family relationships, and increased risk of mental health problems such as anxiety and depression (Kuss & Griffiths, 2012; King & Delfabbro, 2014). Contemporary theoretical models suggest that IGD may function as a coping mechanism, whereby individuals use gaming to regulate negative emotions or compensate for psychosocial difficulties, including loneliness and social stress (Kardefelt-Winther, 2014; Brand et al., 2016). As such, IGD is increasingly seen as a condition influenced by personal vulnerabilities, developmental changes, and the highly engaging nature of modern online games, especially during adolescence. Consequently, this study characterises IGD as a state of intense online immersion, in which the digital environment becomes an obsessive retreat for adolescents seeking to substitute for missing real-world connections.

An adolescent is an individual in the developmental stage between childhood and adulthood, typically spanning ages 10 to 19, during which they undergo significant physical, emotional, social, and psychological changes (WHO, 2025; UNICEF, 2025; Mastorci et al., 2024). Socio-emotionally, they experience heightened emotional sensitivity and explore identity through peer influence, making the quality of their relationships central to their well-being. Consequently, adolescents are particularly vulnerable to the interplay of loneliness and IGD due to the developmental challenges they face during this critical period of growth. During this period, the need for belonging is paramount; however, the transition also brings a unique vulnerability to social disconnection. In this state of flux, lonely adolescents may utilise online gaming as a primary tool for escapism or as a surrogate for traditional social connection (Hansen et al., 2025). Adolescents engaging in problematic online gaming may prioritise gaming over other responsibilities and activities, leading to further neglect of essential tasks and deeper social isolation (Kuss & Griffiths, 2012). This cycle of isolation and immersion is deeply rooted in the unique developmental vulnerabilities of adolescence. This intersection of developmental need and digital availability creates a critical problem within local contexts such as the Enugu East Local Government Area.

Current global data suggest a prevalence of IGD ranging from 0.7% to 15.6% (Stevens et al., 2021; Zhou et al., 2024), with a meta-analytical average of 3.05% (Fam, 2018). While global studies have highlighted the negative impact of excessive online gaming on academic performance and social relationships (Petry, 2014; Kuss & Griffiths, 2012), there remains a lack of comprehensive research examining these factors specifically in the context of loneliness within the Enugu Metropolis. This research gap is significant because loneliness is a documented issue among Nigerian adolescents (Ugwu et al., 2017; Okwaraji et al., 2018; Jegede et al., 2024), likely increasing their susceptibility to gaming addiction as a primary coping mechanism to alleviate social isolation (Qualter et al., 2015). The situation is further complicated by limited access to mental health support and a pervasive societal stigma that prevents early intervention (Pontes et al., 2014). Moreover,

the high levels of digital connectivity in Enugu may exacerbate these addictive behaviours (Griffiths et al., 2016), emphasising the need for localised empirical data. The urgency of investigating digital pathologies in Southeast Nigeria is underscored by recent findings in neighbouring regions. For example, Umennuihe et al. (2026) documented a high prevalence of Internet addiction (52.8%) among secondary school adolescents in Nsukka. However, without empirical data linking social disconnection to gaming habits in Enugu, healthcare professionals and policymakers lack the evidence-based tools needed to mitigate these risks. This study addresses this literature gap by examining the correlational relationship between loneliness and IGD, aiming to provide insights that foster healthier digital habits and more effective adolescent support systems.

Objectives of the study

The specific objectives of the study were to:

1. determine the prevalence and levels of loneliness among adolescents in Enugu East urban area;
2. determine the prevalence and level of internet gaming disorder (IGD) among adolescents;
3. explore the relationship between loneliness and IGD among adolescents; and
4. identify strategies used by adolescents in mitigating loneliness and IGD.

Theoretical background of the study

The relationship between loneliness and Internet Gaming Disorder (IGD) among adolescents in the Enugu Metropolis is best understood through the Compensatory Internet Use (CIU) Theory (Kardefelt-Winther, 2014). This theory posits that individuals turn to online activities, such as gaming, as a functional yet potentially maladaptive strategy to alleviate negative emotions or fulfil unmet social needs in their offline lives. For a lonely adolescent, the digital environment offers a "social surrogate" in which AI-driven algorithms and interactive mechanics provide immediate feedback and a sense of achievement that masks the distress caused by the discrepancy between their desired and actual social connections (Qualter et al., 2015). In this context, IGD is not merely a by-product of technological availability but a compensatory response to the psychological "void" created by social disconnection (Hansen et al., 2025). Based on these, the following hypotheses was tested at a $p < 0.05$ level of significance.

Hypotheses

1. Adolescents with higher levels of subjective loneliness will demonstrate significantly higher levels of online gaming disorder.
2. Subjective loneliness will have significant positive correlation with the severity of Internet Gaming Disorder (IGD) symptoms among adolescents.

Methodology

Study design: The study employed a descriptive correlational survey design, which involves gathering data through questionnaires to describe and examine relationships among variables within a population (Ponto, 2015). This design was chosen because it allows for the collection of self-reported data from a large sample of

adolescents, providing a detailed snapshot of the prevalence and correlates of internet gaming disorder (IGD) in Enugu East Local Government Area.

Study population: The study population comprises 16,500 adolescents from 75 secondary schools in the Enugu East Local Government Area, Enugu State (Ministry of Education, 2020).

Sampling technique: The study employed a multi-staged sampling technique to select a representative sample of adolescents from secondary schools in Enugu East Local Government Area. In the first stage, the sample size of 427 (final sample size was 404) was determined using Cochran's formula.

$$n = \frac{(z^2 \times p\,(1-p)) / e^2}{1 + (z^2 \times p\,(1-p)) / e^2 N}$$

Where: n = sample size; z = standard normal variant (1.96 for 95% confidence level); p = estimated proportion of adolescents with IGD (assumed to be 0.5); e = margin of error (0.05); N = Population. The second stage involved calculating 20% (6) of the 30 public secondary schools and 10% (5) of the 45 private secondary schools, which were subsequently selected from the list of schools using systematic random sampling. The third stage involved using proportionate sampling to determine the sample size for each selected school. In the final stage, simple random sampling was used to select students from each participating school.

Inclusion and exclusion criteria: Participants were adolescents aged 10-19 years who provided consent and were enrolled in secondary schools in the urban areas of Enugu East. Those outside the age range, those not enrolled in schools in the study area, and those without consent were excluded from this study.

Instrument for data collection: Data were collected using a four-section structured questionnaire. Section A obtained information on respondents' socio-demographic characteristics. Section B comprised the UCLA Loneliness Scale (Version 3) (Russell, 1996), a widely used 20-item self-report measure assessing subjective feelings of loneliness and social isolation. Items (e.g., "*I feel like I belong in my group of friends*" and "*I usually have a lot in common with the people around me*") were rated on a 4-point scale ranging from 1 (Never) to 4 (Often). Section C consisted of the Internet Gaming Disorder Scale–Short Form (IGDS-SF9) (Pontes & Griffiths, 2015), a 9-item self-report instrument assessing symptoms of internet gaming disorder. Sample items include "*I often think about gaming, even when I am not playing*" and "*I feel upset, anxious, or moody when I try to cut down or stop gaming*." Responses were rated on a 5-point Likert scale from 1 (Never) to 5 (Very often). Section D elicited information on the strategies respondents employed to mitigate loneliness and internet gaming disorder.

Validation and reliability of the instrument: Face and content validation were conducted by three experts in psychology. The standardised instruments employed in this study have been shown to possess strong psychometric properties among adolescent populations across

diverse cross-cultural settings (Xu et al., 2018; Poon et al., 2021). To ensure reliability within the current population, Cronbach's alpha was used, yielding coefficients of 0.82 for the UCLA Loneliness scale and 0.71 for the IGDS-SF9. These values indicate good internal consistency among the test items.

Ethical considerations: An ethical approval certificate was obtained from the Directorate of Strategic Contacts, Ethics and Publications at the University of Nigeria, Nsukka with the research code UNN/EC/NSTA/FAG-HMS-STR/41/3-June/2026. Parental informed consent and adolescent assent were secured prior to participation. Participation was voluntary, and anonymity and confidentiality were ensured through non-identifiable data and secure storage.

Method of data collection: The researchers, with the help of two trained postgraduate research assistants, distributed the surveys, which take approximately 10-15 minutes to complete, to the respondents at their respective schools. The completed questionnaires were then collected on an agreed day, two to three days apart. A total of 427 physical copies of the questionnaire were distributed, and 404 were returned, yielding a 96% response rate.

Data and statistical analysis: The total score on the UCLA Loneliness Scale ranges from 20 to 80, with higher scores indicating greater levels of loneliness. For analysis, scores were classified into three categories: low (20–40), moderate (41–60), and high (61–80), with a score of 41 serving as the threshold for the presence of loneliness symptoms. Similarly, the Internet Gaming Disorder Scale (IGDS-SF9) yields scores ranging from 9 to 45, where higher values indicate more severe IGD symptoms. Scores were grouped based on symptom endorsement as follows: 9–16 (no IGD; 0–4 symptoms), 17–24 (mild IGD; 5–6 symptoms), and 25–45 (moderate to severe IGD; 7–9 symptoms). A cutoff score of 17 was also used to distinguish between non-disordered and at-risk gamers, with scores equal to or above this threshold indicating susceptibility to IGD. All collected data were entered into IBM SPSS Statistics version 23.0 for analysis. Both descriptive and inferential statistics were applied to address the study objectives. Frequencies and percentages were used to summarise respondents' sociodemographic characteristics and levels of loneliness and IGD, while means and standard deviations were calculated to evaluate strategies for mitigating loneliness and excessive gaming. A mean score of 2.50 or above was interpreted as "adopted", whereas a mean score below 2.50 indicated "not adopted". Chi-square analysis was conducted to examine the relationship between loneliness and Internet Gaming Disorder. In addition, a Pearson product–moment correlation was performed to assess the strength and direction of the linear relationship between the continuous total scores of loneliness and IGD. The level of significance was set at $p < 0.05$.

Results

Demographic characteristics of respondents

The socio-demographic profile of the respondents indicated that nearly half (46.6%) were aged 14–16 years, while 30.2%

were aged 10–13 years and 23.2% were aged 17–19 years. The gender distribution showed 50.3% males and 49.7% females. The majority were Christians (94.2%), followed by Muslims (4.5%). Most respondents were of Igbo ethnicity (96.3%), with small proportions of Hausa (1.8%), Yoruba (1.1%), and other ethnic groups (0.8%). Over half of the respondents (55.0%) were in junior secondary school, while 45.0% were in senior secondary school. Regarding household size, 59.2% had a large size (2-4 siblings), and 6.9% had a small size (no siblings). Most adolescents lived with both parents (70.5%), and half (50.3%) reported average household monthly incomes (₦70,000 to ₦200,000). In terms of birth order, 37.3% were firstborns, 31.9% were middle children, 23.9% were last-borns, and 6.9% were only children.

Prevalence and levels of loneliness among adolescents

Figure 1 shows that 68.1% of adolescents reported symptoms of subjective loneliness.

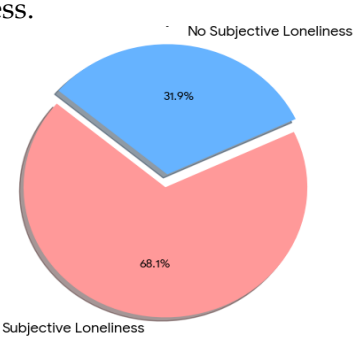

Figure 1: Prevalence of subjective loneliness among adolescents

Table 1 shows that most adolescents (68.1%) experienced moderate to high levels of loneliness. Specifically, 50.3% reported moderate loneliness, representing half of the study population, while 17.8% reported high loneliness. Only 31.9% reported low levels of loneliness.

Table 1: Loneliness levels based on UCLA loneliness scale scores

Loneliness Category	Score Range	Frequency	Percentage
Low loneliness	20-40	129	31.9
Moderate loneliness	41-60	203	50.3
High loneliness	61-80	72	17.8
Total	**20-80**	**404**	**100.0**

Prevalence and levels of Internet Gaming Disorder

Figure 2 shows that the prevalence of IGD among adolescents is 56.9%.

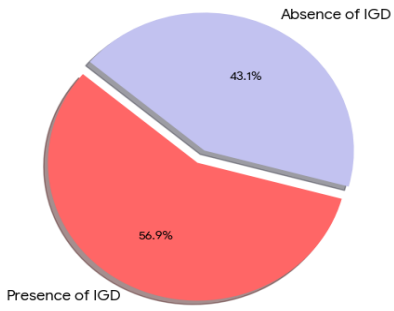

Figure 2: Prevalence of IGD

Table 2 shows the level of internet gaming disorder among the respondents. Findings indicate that 56.9% of adolescents showed signs of IGD. Specifically, 31.9% were classified as having mild IGD, representing the largest group among those with IGD symptoms, while 25.0% had moderate to severe IGD, indicating more serious gaming problems. Only 43.1% showed no signs of IGD.

Table 2: Levels of internet gaming disorder among adolescents

IGD Status	Score Range	Frequency	Percentage
No IGD (0-4 symptoms)	9-16	174	43.1
Mild IGD (5-6 symptoms)	17-24	129	31.9
Moderate to Severe IGD (7-9 symptoms)	25-45	101	25.0
Total	**9-45**	**404**	**100.0**

Relationship between Loneliness and IGD

Table 3 shows a significant graded association between loneliness and Internet Gaming Disorder (IGD) severity ($p < 0.05$). Adolescents with low loneliness were predominantly in the IGD group (62.0%), with fewer exhibiting mild (28.7%) or moderate-to-severe IGD (9.3%). In contrast, moderate loneliness was associated with a marked increase in IGD severity, as over one-quarter (27.6%) of respondents reported moderate-to-severe IGD. The strongest association was observed among adolescents with high loneliness: nearly half (47.2%) exhibited moderate-to-severe IGD, compared with fewer than 1 in 10 among those with low loneliness. Consequently, the hypothesis, which predicted that adolescents with higher levels of subjective loneliness would demonstrate significantly higher levels of internet gaming disorder, is accepted. These findings demonstrate a clear dose-response relationship, indicating that increasing loneliness is strongly associated with both the likelihood and severity of IGD among adolescents.

Table 3: Chi-square analysis of the relationship between loneliness and IGD

Loneliness Level	No IGD	Mild IGD	Moderate-Severe IGD	Total
Low loneliness	80 (62.0)	37 (28.7)	12 (9.3)	129 (100)
Moderate loneliness	77 (37.9)	70 (34.5)	56 (27.6)	203 (100)
High loneliness	16 (22.2)	22 (30.6)	34 (47.2)	72 (100)
	$X^2 = 43.21$; df = 4; P=0.001*			

χ^2 = Chi-square value; p = Level of significance; df = degree of freedom; *Correlation is significant at $p<0.05$

To further examine the linear relationship between the variables, a bivariate Pearson correlation was conducted (Table 4), which revealed a strong, statistically significant positive correlation between subjective loneliness and the severity of Internet Gaming Disorder. This suggests that higher levels of loneliness are closely associated with increased IGD symptom severity. The finding is consistent with the results of the Chi-square analysis and provides robust support for the acceptance of Hypothesis one.

Table 4: Pearson analysis of the correlation between loneliness and IGD

		Loneliness	Internet Gaming Disorder
Loneliness	Pearson Correlation	1	0.602**
	Sig. (2-tailed)		0.002
	N	404	404
Internet Gaming Disorder	Pearson Correlation	0.602**	1
	Sig. (2-tailed)	0.002	
	N	404	404

**. Correlation is significant at the 0.05 level (2-tailed).

Strategies for mitigating loneliness and excessive gaming

Table 5 shows that adolescents reported using various strategies to mitigate loneliness and excessive gaming. These strategies included relying on family, friends, or mentors for support, with the highest mean of 2.79. They are also actively building friendships by engaging in social or community activities and investing time in developing close, supportive relationships. Being aware of how gaming affects mood, relationships, and responsibilities (2.65) and engaging in physical activities (2.59) were also commonly adopted. Moderately used strategies included participating in hobbies or creative activities (2.54), setting realistic goals and prioritising school or family responsibilities (2.54), and adopting coping strategies such as journaling or talking with friends (2.52). In contrast, practising self-care strategies such as relaxation, mindfulness, or positive self-talk (2.44) was among the least frequently adopted approaches.

Table 5: Strategies used by adolescents to mitigate loneliness and excessive gaming

Strategy	Mean	Standard deviation	Decision
Building friendships and social involvement	2.74	0.89	Adopted
Engaging in hobbies and creative activities	2.54	0.92	Adopted
Joining socially active gaming groups	2.17	0.98	Not Adopted
Prioritising school, family, and other hobbies	2.54	0.97	Adopted
Developing supportive relationships	2.74	0.92	Adopted

Strategy	Mean	Standard deviation	Decision
Limiting gaming time	2.34	0.98	Not Adopted
Using self-care (e.g. relaxation) to cope with loneliness	2.44	0.95	Not Adopted
Seeking professional help when overwhelmed	1.88	0.94	Adopted
Engaging in physical or sports activities	2.59	0.93	Adopted
Balancing gaming with offline recreational activities	2.42	0.97	Not Adopted
Using healthy coping strategies (e.g. journaling or talking to friends) when lonely	2.52	0.95	Adopted
Recognising gaming's impact on mood and relationships	2.65	0.92	Adopted
Seeking support from family or friends	2.79	0.89	Adopted

Discussion of Findings

The study assessed the relationship between subjective feelings of loneliness and internet gaming disorder among secondary school adolescents in the Enugu East urban area. The findings of this study indicate that a substantial proportion of adolescents experienced moderate to high levels of loneliness, with moderate loneliness being the most prevalent. Common experiences, as captured by the UCLA Loneliness Scale (Russell, 1996), included feelings of being left out, perceptions that others did not truly understand them, and a sense of isolation even when in the presence of others. The high prevalence of loneliness observed in this study may be explained by normative developmental characteristics of adolescence. This stage is marked by heightened sensitivity to peer evaluation, identity exploration, and changing social dynamics, all of which can increase susceptibility to loneliness (Qualter et al., 2015). These results are consistent with a growing body of international research identifying adolescent loneliness as an emerging public health concern. For instance, Twenge et al. (2019) reported increasing trends in loneliness among adolescents in the United States, while Barreto et al. (2021) highlighted adolescence as a particularly vulnerable developmental stage due to the far-reaching consequences of loneliness for both mental and physical health. Matthews et al. (2019) further emphasise the centrality of peer acceptance and belonging during adolescence, suggesting that perceived social disconnection may be particularly distressing at this age. The finding that many adolescents felt lonely despite being physically surrounded by others supports the conceptualisation of loneliness as a subjective experience rather than an objective lack of social contact, as described by Cacioppo and Cacioppo (2018). Beyond developmental factors, the elevated levels of loneliness among adolescents may also be attributable to contextual influences such as family structure and socio-economic status (Schinka et al., 2013; van den Berg et al., 2021) as well as broader societal changes, including increasing urbanisation and weakened community

cohesion in Nigerian cities (Govender et al., 2017).

The findings indicate that more than half of the adolescents exhibited symptoms of IGD, with a substantial proportion reporting moderate to severe levels. The most reported symptoms included using gaming as a means of escaping negative emotions such as stress or worry, persistent preoccupation with gaming, and repeated unsuccessful attempts to reduce gaming time. This high prevalence rate of IGD suggests that excessive gaming is a common behavioural concern among adolescents in the study area. This pattern mirrors broader regional trends in adolescent digital behaviour. For instance, Umennuihe et al. (2026) similarly found a high prevalence of general Internet Addiction (IA) among adolescents in the study area, with 52.8% of their sample exhibiting addiction symptoms driven by risk factors like low self-esteem and poor social skills. The predominance of mild IGD may reflect early-stage problematic gaming behaviours that, while not yet severe, could escalate if left unaddressed (King & Delfabbro, 2016). The sizeable proportion with moderate to severe IGD is particularly concerning, as this level of severity has been associated with greater psychosocial impairment, including poorer academic performance, strained family relationships (Müller et al., 2015), and heightened risk for mental health difficulties (Tsui & Cheng, 2021). Overall, the high prevalence observed underscores the growing relevance of IGD as a behavioural health issue among adolescents, highlighting a need for early identification and preventive interventions to promote healthy gaming habits before symptoms progress to more severe levels.

Lonely individuals use gaming to escape, manage emotions, and seek social gratification, often experiencing weaker self-control, leading to IGD, especially among younger, socially isolated populations (Yu et al., 2023). Findings of this study showed that increasing loneliness is strongly associated with both the likelihood and severity of IGD among adolescents. The rise in IGD severity across loneliness levels provides strong empirical support for the study's hypothesis and theoretical framework, indicating that greater social disconnection corresponds with progressively more problematic gaming (Kardefelt-Winther, 2014). For adolescents in the Enugu Metropolis, these results suggest that gaming serves as a tool for bridging the psychological gap between their desired and actual social connections. As loneliness intensifies, the digital environment is likely to evolve from a leisure activity into a primary maladaptive strategy for escaping the void of social disconnection (Hansen et al., 2025). The strength of this relationship is reinforced by the Pearson correlation, which indicates a consistent linear link between social disconnection and online immersion, suggesting that, among adolescents in the Enugu Metropolis, loneliness acts as a key driver of pathological online gaming. This pattern supports the Compensatory Internet Use (CIU) Theory and implies that adolescents may increasingly replace physical relationships with digital ones to cope with social deficits, thereby perpetuating a cycle of escalating gaming behaviour. By providing immediate

feedback and a sense of achievement, online gaming offers a temporary but potent relief from the distress of isolation, ultimately reinforcing a cycle where higher subjective loneliness drives more severe disordered gaming behaviour.

Efforts to reduce loneliness have been implemented through a range of approaches that differ in structure, content, and delivery mode (Chafouleas, 2026). The findings indicate that adolescents in the Enugu Metropolis primarily gravitate toward interpersonal and externally focused coping mechanisms to mitigate loneliness and excessive gaming, prioritising social support from family and friends and active community engagement. This preference for social integration aligns with the work of Rezaei and Ghodsi (2014), who suggest that addressing the underlying social deficits is a more natural "compensatory" correction than simply limiting screen time. The relatively high frequency of mood and relationship awareness suggests an increasing level of cognitive insight among adolescents, a protective factor noted by Dong and Potenza (2014) as essential for preventing the transition from casual gaming to IGD. Furthermore, reliance on physical activities and creative hobbies supports the displacement hypothesis, which holds that healthy offline alternatives successfully compete with the dopamine rewards of gaming (Billieux et al., 2015). However, the finding that internal self-care strategies, such as mindfulness and positive self-talk, were the least utilised suggests a gap in emotional self-regulation skills. This lack of bottom-up emotional regulation aligns with Odgers and Jensen's (2020) observations, which found that while adolescents are often aware of their social needs, they frequently lack the specialised psychological tools to manage the internal distress that drives digital escapism.

Conclusions

This study confirms that loneliness and Internet Gaming Disorder (IGD) are not isolated issues but are deeply intertwined psychological challenges facing secondary school adolescents in the Enugu East urban area. The high prevalence rates observed, with over two-thirds of students experiencing significant loneliness and more than half exhibiting symptoms of IGD, highlight a rising public health concern in the Nigerian context. Critically, the strong positive correlation identified between these two variables validates the Compensatory Internet Use (CIU) Theory, suggesting that gaming serves as a primary, albeit maladaptive, social surrogate for lonely youth. While adolescents naturally seek peer and family support, the lack of structured self-regulation and professional help-seeking behaviours indicates a significant gap in functional coping mechanisms. Ultimately, these findings shift the perspective of IGD from a mere technology addiction to a symptomatic response to a deeper social and emotional void, necessitating a holistic approach to adolescent mental health.

Recommendations

Based on the findings, the following recommendations were made.

1. The Ministry of Education, school administrators and local governments

should implement programs that focus on enhancing offline social skills and emotional regulation to reduce the reliance on digital environments for social fulfilment.

2. School authorities should organise workshops to teach students practical digital hygiene, such as setting time-management goals and using bottom-up regulation techniques like mindfulness.
3. Community outreach should empower parents to recognise IGD signs and the role of loneliness, fostering open communication and domestic social connection as a primary preventive measure.

References

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Washington, DC. https://doi.org/10.1176/appi.books.9780890425596

American Psychiatric Association. (2022). *Diagnostic and statistical manual of mental disorders* (5th ed., text rev.). Washington, DC.

Banerjee, A., & Kohli, N. (2023). Theoretical approach to loneliness: A cognitive perspective. *European Academic Research*, *10*(11), 4090–4097. https://euacademic.org/UploadArticle/5745.pdf

Barreto, M., Victor, C., Hammond, C., Eccles, A., Richins, M. T., & Qualter, P. (2021). Loneliness around the world: Age, gender, and cultural differences in loneliness. *Personality and Individual Differences, 169*, Article 110066. https://doi.org/10.1016/j.paid.2020.110066

Billieux, J., Maurage, P., Lopez-Fernandez, O., Kuss, D. J., & Griffiths, M. D. (2015). Can disordered mobile phone use be considered a behavioural addiction? An update on current evidence and a comprehensive model for future research. *Current Addiction Reports*, *2*(2), 156–162. https://doi.org/10.1007/s40429-015-0054-y

Brand, M., Young, K. S., & Laier, C. (2016). Integrating psychological and neurobiological considerations regarding the development and maintenance of specific internet-use disorders: An interaction of Person-Affect-Cognition-Execution (I-PACE) model. *Neuroscience & Biobehavioral Reviews*, *71*, 252-266. https://doi.org/10.1016/j.neubiorev.2016.08.033

Cacioppo, J. T., & Cacioppo, S. (2018). The growing problem of loneliness. *The Lancet, 391*(10119), 426. https://doi.org/10.1016/S0140-6736(18)30142-9

Chafouleas, S. M. (2026, February 19). *Solving the youth loneliness epidemic: New research synthesis offers guidance on solutions that work*. Psychology Today. https://www.psychologytoday.com/nz/blog/promoting-student-well-being/202602/solving-the-youth-loneliness-epidemic

Dong, G., & Potenza, M. N. (2014). A cognitive-behavioural model of Internet gaming disorder: Theoretical underpinnings and clinical implications. *Journal of Psychiatric Research*, 58, 7–11. https://doi.org/10.1016/j.jpsychires.2014.07.005

Govender, K., Cowden, R. G., Oppong Asante, K., George, G., & Quaicoe, T. (2017). Validation of the Child and Youth Resilience Measure among South African adolescents. *South African Journal of Psychology, 47*(4), 508–520. https://doi.org/10.1177/0081246317707148

Griffiths, M. D., Kuss, D. J., & Ortiz de Gortari, A. B. (2016). Videogame addiction: The past, present and future. *Revista Argentina de Ciencias del Comportamiento, 8*(2), 1–11.

Hansen, T., Johansen, R., Kirkøen, B., Stene-Larsen, K., Straiton, M., Tornes, R. A., &

Reneflot, A. (2025). Digital bridges to social connection: A systematic review and meta-analysis of digital interventions for loneliness and social isolation. *Internet Interventions*, *41*, 100856. https://doi.org/10.1016/j.invent.2025.100856

Holt-Lunstad, J., Smith, T. B., Baker, M., Harris, T., & Stephenson, D. (2015). Loneliness and social isolation as risk factors for mortality: a meta-analytic review. *Perspectives on Psychological Science: A Journal of the Association for Psychological Science*, *10*(2), 227–237. https://doi.org/10.1177/1745691614568352

Igbokwe, C. C., Ejeh, V. J., Agbaje, O. S., Umoke, P. I. C., Iweama, C. N., & Ozoemena, E. L. (2020). Prevalence of loneliness and association with depressive and anxiety symptoms among retirees in Northcentral Nigeria: A cross-sectional study. *BMC Geriatrics*, *20*, 156. https://doi.org/10.1186/s12877-020-01561-4

Jegede, T. O., Jegede, T. O., Omoaregba, J. O., & Arigbede, O. O. (2024). Suicide attempts and correlates among in-school adolescents in Benin City, Nigeria. *Discover Psychology*, *4*, Article 81. https://doi.org/10.1007/s44202-024-00196-5

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

King, D. L., & Delfabbro, P. H. (2014). Internet gaming disorder treatment: a review of definitions of diagnosis and treatment outcome. *Journal of Clinical Psychology*, *70*(10), 942–955. https://doi.org/ 10.1002/jclp.22097

King, D. L., & Delfabbro, P. H. (2016). Defining tolerance in Internet Gaming disorder: Isn't it time?. *Addiction (Abingdon, England)*, *111*(11), 2064–2065. https://doi.org/10.1111/add.13448

Kuss, D. J., & Griffiths, M. D. (2012). Internet gaming addiction: A systematic review of empirical research. *International Journal of Mental Health and Addiction, 10*(2), 278–296. https://doi.org/10.1007/s11469-011-9318-5

Mastorci, F., Lazzeri, M. F. L., Vassalle, C., & Pingitore, A. (2024). The transition from childhood to adolescence: Between health and vulnerability. *Children*, *11*(8), 989. https://doi.org/10.3390/children11080989

Matthews, T., Danese, A., Caspi, A., Fisher, H. L., Goldman-Mellor, S., Kepa, A., Moffitt, T. E., & Arseneault, L. (2019). Lonely young adults in modern Britain: Findings from an epidemiological cohort study. *Psychological Medicine, 49*(2), 268–277. https://doi.org/10.1017/S0033291718000788

Ministry of Education (2020). Student population in Enugu East Local Government Area. Enugu State Ministry of Education

Müller, K. W., Janikian, M., Dreier, M., Wölfling, K., Beutel, M. E., Tzavara, C., Richardson, C., & Tsitsika, A. (2015). Regular gaming behaviour and internet gaming disorder in European adolescents: results from a cross-national representative survey of prevalence, predictors, and psychopathological correlates. *European Child & Adolescent Psychiatry*, *24*(5), 565–574. https://doi.org/10.1007/s00787-014-0611-2

Núñez-Rodríguez, S., Burgos-González, D., Mínguez-Mínguez, L. A., Menéndez-Vega, F., Antoñanzas-Laborda, J. L., González-Bernal, J. J., & González-Santos, J. (2025). Effectiveness of therapeutic interventions in the treatment of internet gaming disorder: A systematic review. *European journal of investigation in health, psychology and education*, *15*(4), 49. https://doi.org/10.3390/ejihpe15040049

Odgers, C. L., & Jensen, M. R. (2020). Annual Research Review: Adolescent mental health in the digital age: facts, fears, and future

directions. *Journal of Child Psychology and Psychiatry, and Allied Disciplines*, *61*(3), 336–348. https://doi.org/10.1111/jcpp.13190

Petry, N. M., Rehbein, F., Gentile, D. A., Lemmens, J. S., Rumpf, H. J., Mößle, T., Bischof, G., Tao, R., Fung, D. S., Borges, G., Auriacombe, M., González Ibáñez, A., Tam, P., & O'Brien, C. P. (2014). An international consensus for assessing internet gaming disorder using the new DSM-5 approach. *Addiction (Abingdon, England)*, *109*(9), 1399–1406. https://doi.org/10.1111/add.12457

Pontes, H. M., & Griffiths, M. D. (2015). Measuring DSM-5 Internet Gaming Disorder: Development and validation of a short psychometric scale. *Computers in Human Behaviour, 45,* 137–143. https://doi.org/10.1016/j.chb.2014.12.006

Pontes, H. M., Király, O., Demetrovics, Z., & Griffiths, M. D. (2014). The conceptualisation and measurement of DSM-5 Internet Gaming Disorder: the development of the IGD-20 Test. *PloS one*, *9*(10), e110137. https://doi.org/10.1371/journal.pone.0110137

Ponto J. (2015). Understanding and evaluating survey research. *Journal of the Advanced Practitioner in Oncology*, *6*(2), 168–171. https://pmc.ncbi.nlm.nih.gov/articles/PMC4601897/pdf/jadp-06-168.pdf

Poon, L. Y. J., Tsang, H. W. H., Chan, T. Y. J., Man, S. W. T., Ng, L. Y., Wong, Y. L. E., Lin, C. Y., Chien, C. W., Griffiths, M. D., Pontes, H. M., & Pakpour, A. H. (2021). Psychometric properties of the Internet Gaming Disorder Scale-Short Form (IGDS9-SF): A systematic review. *Journal of Medical Internet Research*, *23*(10), e26821. https://doi.org/10.2196/26821

Qualter, P., Vanhalst, J., Harris, R., Van Roekel, E., Lodder, G., Bangee, M., Maes, M., & Verhagen, M. (2015). Loneliness across the life span. *Perspectives on Psychological Science, 10*(2), 250–264. https://doi.org/10.1177/1745691615568999

Rezaei, S., & Ghodsi, S. S. (2014). Does value matter in playing online games? An empirical study among massively multiplayer online role-playing games (MMORPGs). *Computers in Human Behaviour, 35*, 252–266. https://doi.org/10.1016/j.chb.2014.03.002

Russell D. W. (1996). UCLA Loneliness Scale (Version 3): Reliability, validity, and factor structure. *Journal of Personality Assessment*, *66*(1), 20–40. https://doi.org/10.1207/s15327752jpa6601_2

Schinka, K. C., van Dulmen, M. H. M., Mata, A. D., Bossarte, R., & Swahn, M. (2013). Psychosocial predictors and outcomes of loneliness in young adulthood. *Journal of Social Development, 22*(3), 506–521. https://doi.org/10.1111/sode.12016

Stevens, M. W., Dorstyn, D., Delfabbro, P. H., & King, D. L. (2021). Global prevalence of gaming disorder: A systematic review and meta-analysis. *The Australian and New Zealand Journal of Psychiatry*, *55*(6), 553–568. https://doi.org/10.1177/0004867420962851

Tsui, Y. Y., & Cheng, C. (2021). Internet gaming disorder, risky online behaviour, and mental health in Hong Kong adolescents: The beneficial role of psychological resilience. *Frontiers in Psychiatry*, *12*, 722353. https://doi.org/10.3389/fpsyt.2021.722353

Twenge, J. M., Spitzberg, B. H., & Campbell, W. K. (2019). Less in-person social interaction with peers among U.S. adolescents in the 21st century and links to loneliness. *Journal of Social and Personal Relationships, 36*(6), 1897–1916. https://doi.org/10.1177/0265407519836170

Ugwu, C., Ogba, K. T. U., Nwonyi, S. K., Ugwuegede, P. N., & Iorfa, S. K. (2017). Personality, loneliness and mental health in a Nigerian sample of students. *Nigerian*

Journal of Psychological Research, 13, 14–21. https://njpsyresearch.com/

Okwaraji, F. E., Obiechina, K. I., Onyebueke, G. C., Udegbunam, O. N., & Nnadum, G. S. (2018). Loneliness, life satisfaction and psychological distress among out-of-school adolescents in a Nigerian urban city. *Psychology, Health & Medicine, 23*(9), 1106–1112. https://doi.org/10.1080/13548506.2018.1476726

Umennuihe, C. L., Okechukwu, F. O., Umennuihe, A. E., & Damian, A. C. (2026). Prevalence and socio-demographic determinants of Internet addiction among secondary school adolescents in Nsukka local government area, Enugu State. *Ikenga: International Journal of the Institute of African Studies*, *27*(1), 264–290. https://doi.org/10.53836/ijia/2026/27/1/010

United Nations Children's Fund. (2025). *Adolescents overview*. UNICEF. https://data.unicef.org/topic/adolescents/overview/

Vaarala, S., Ruotsalainen, H., Hylkilä, K., Kääriäinen, M., Konttila, J., Männistö, & Männikkö, N. (2022). The association of problematic gaming characteristics with dietary habits among Finnish vocational school students. *Scientific Reports, 12,* 21381. https://doi.org/10.1038/s41598-022-25343-7

van den Berg, P., Monden, C. W. S., & Kraaykamp, G. (2021). Family structure and children's loneliness: A cross-national comparison. *Social Science Research, 94*, Article 102501. https://doi.org/10.1016/j.ssresearch.2020.102501

World Health Organisation. (2019). *International classification of diseases (11th rev.)*. Geneva: WHO.

World Health Organisation. (2025). *Adolescent health*. WHO. https://www.who.int/health-topics/adolescent-health/

Xu, S., Qiu, D., Hahne, J., Zhao, M., & Hu, M. (2018). Psychometric properties of the short-form UCLA Loneliness Scale (ULS-8) among Chinese adolescents. *Medicine*, *97*(38), e12373. https://doi.org/10.1097/MD.0000000000012373

Xu, W., & Takai, J. (2020). Why do people experience loneliness while using social media? *Intercultural Communications Studies*, *29*(2), 99–116. https://www.sciltp.com/journals/ics/articles/2504000385

Yu, Y., Fong, V. W. I., Ng, J. H. Y., Wang, Z., Tian, X., & Lau, J. T. F. (2023). The associations between loneliness, hopelessness, and self-control and Internet gaming disorder among university students who were men who have sex with men: Cross-sectional mediation study. *Journal of Medical Internet Research, 25*, e43532. https://doi.org/10.2196/43532

Zhou, R., Morita, N., Ogai, Y., Saito, T., Zhang, X., Yang, W., & Yang, F. (2024). Meta-analysis of internet gaming disorder prevalence: Assessing the impacts of DSM-5 and ICD-11 diagnostic criteria. *International Journal of Environmental Research and Public Health*, *21*(6), 700. https://doi.org/10.3390/ijerph21060700