

An investigation on chinese college students' intensity of cyber addiction

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Abstract: With the rapid advancement of Internet technology, cyberspace has emerged as an indispensable component of modern society, profoundly altering the lifestyles, work patterns, and social interactions of Chinese college students. However, according to scholarly investigations, there exists an issue of excessive dependency on cyberspace and cyber addiction among this group. This study investigated the intensity of cyber addiction and associated psychological concerns among Chinese college students, employing a mixed-methods research design that integrated both questionnaire surveys and interviews. The findings revealed that Chinese college students exhibited a moderate level of cyber addiction, particularly in terms of psychological dimensions where the intensity was higher. Conversely, the intensity of cyber addiction was relatively lower in terms of socialization. Interviews further substantiated the survey results, shedding light on the students' complex attitudes and concerns regarding cyber addiction. This study serves to enhance awareness among both students and educators regarding the problem of cyber addiction and provides a scientific basis for formulating effective intervention strategies.

Keywords: cyber addiction; college students; mixed-methods research

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1 Introduction

With the rapid advancement of the Internet era, cyberspace has become an indispensable component of modern society, profoundly altering people's lifestyles, work patterns, and social interactions. The widespread adoption of cyber activities, such as online socializing, e-commerce, and entertainment gaming, brought unprecedented convenience and enjoyment to individuals' lives. However, concurrently, the excessive use and dependence on cyberspace also triggered a series of social issues, among which cyber addiction garnered particular attention (Chen, Li, Duan, et al., 2021). Cyber addiction, as a pathological internet use behavior without the influence of external addictive substances, was gradually emerging as a significant topic in the field of global public health (Jiang, 2021).

Cyber addiction, in brief, referred to a state where individuals struggled to control their online behavior, resulting in impairments in physiological, psychological, and social functioning due to excessive engagement with cyberspace (Xiao, Liu, 2020). This concept emphasized two core characteristics of cyber addiction: one was the uncontrollable internet use behavior, and the other was the resultant individual functional impairment. Cyber addiction was not only related to individual mental health but also closely linked to a range of social issues, such as academic failure, interpersonal relationship breakdown, and career setbacks. Therefore, in-depth research and effective intervention on cyber addiction appeared particularly important.

2 The statement of Cyber Addiction among Chinese College Students

College students, as one of the primary user groups of the

Internet in China, exhibit a particularly prominent issue of cyber addiction. According to relevant data, the global number of Internet users has surpassed 3.5 billion (Zhang, Dong, 2017) with the proportion of Chinese adolescents excessively dependent on the Internet reaching as high as 10%, significantly surpassing the global average of 6% (Dong, Zhang, 2016). This statistic undeniably reveals the grave situation regarding cyber addiction in China. Further analysis indicates that within the composition of Chinese Internet users, the age group of 20 to 29 years old accounts for 27.9%, and the student population, especially college students, occupies a substantial proportion, becoming a high-risk group for cyber addiction (Li, Zhang, 2015).

The high incidence of cyber addiction among college students is not only related to their high dependence on the Internet but also closely associated with the unique lifestyle, learning environment, and psychological development characteristics of the college stage. College students possess relatively autonomous time management and can freely arrange their studies and lives. Meanwhile, with the continuous advancement of information technology, the dependence on the Internet in college learning activities, such as online courses and online resource searches, has also increased, providing conditions for college students to overuse the Internet (Lu, Liu, Liu, et al. 2024). However, excessive dependence on the Internet or cyber addiction not only leads to increased sedentary behavior and prolonged screen time but may also interfere with their physical activity during college by significantly encroaching upon leisure time (Li, Yang, 2012), thereby seriously affecting the physical and mental health of college students.

The impact of cyber addiction on college students was multidimensional. In the academic realm, cyber addiction significantly impaired students' learning efficiency and performance, potentially leading to academic failure (Wei, Hong,

& Lu, 2023). Prolonged immersion in the cyber world distracted students from their studies, preventing them from concentrating on academic tasks, which subsequently affected their future career development. In terms of physical and mental health, cyber addiction was associated with an increased incidence of brain dysfunction, attention deficits (Dong, Zhang, Zhu, et al., 2013), and emotional issues such as mania, depression, and anxiety (Wan, Liu, & Fang, 2012), posing a substantial threat to students' psychological well-being. Furthermore, cyber addiction disrupted students' interpersonal communication skills, resulting in social disorders (Shen, Chen, & Song, 2023) and subsequently impacting their social adaptability. More severely, cyber addiction could also precipitate criminal behavior (Wei, Tang, & Li, 2024) and elevate the risk of suicide (Xu & Zuo, 2022). These grave consequences not only inflicted irreparable damage on individuals but also imposed a significant burden on families and society.

It is noteworthy that in recent years, research on cyber addiction among college students has been abundant, including numerous investigations into the prevalence of cyber addiction. For instance, a study by Li Song et al. in 2020 revealed that the prevalence of cyber addiction among college students was as high as 12% (Xiong & Qi, 2022), a figure that demands our utmost attention. More alarmingly, studies indicated that nearly 80% of college students who discontinued their education for various reasons, including withdrawal or suspension, were grappling with cyber addiction (Wei, Hong, Zhang, et al., 2022). This finding profoundly underscores the devastating impact of cyber addiction on the academic careers of college students.

3 The extent of Chinese college students' intensity on cyber addition

Since cyber addiction among college students had become a social issue that could not be overlooked, the question arose: To what extent were Chinese college students affected by cyber addiction? This study adopted a mixed-methods approach, conducting both questionnaires and interviews with Chinese college students.

4 Research Methods, Tools, and Participants

To conduct this study more effectively, a mixed-methods approach was employed, integrating both quantitative and qualitative research designs. The mixed-methods paradigm, which emerged in the United State, advocates for combining the strengths

of qualitative and quantitative research within the same study to enhance cross-cutting advantages. This approach is considered a third research path, distinct from purely quantitative and qualitative research (An & Lilly, 2010). As a research methodology, the mixed-methods approach aligns with the evolving concepts and methods of educational scientific research and the trend towards multidisciplinary research, increasingly highlighting its significant role in educational science research.

This study utilized the "Information Addiction Measurement Scale" developed by Wang Wentao, Tang Sijie, and three other scholars in 2023. The scale measures the degree of cyber addiction across four primary indicators: social performance, physiological responses, psychological state, and behavioral patterns, with a total of 16 secondary indicators under these primary indicators. The initial survey population for the scale was concentrated in the 18-30 age range, primarily comprising college students, indicating the scale's applicability. The questionnaire posed the question, "Do you exhibit the following behaviors after using the internet?" along with the measurement indicators, for Chinese college students to respond to.

The study was conducted at three selected higher education institutions in China, with a total of 1,217 college students participating in the questionnaire survey. The questionnaire employed a Likert scale with a five-point rating for each question. Higher scores on the forward questions indicated a greater extent of behavioral compliance. The questionnaire results were statistically analyzed using SPSS software, presenting the mean, standard deviation (SD), rank of mean, and interpretation results.

Furthermore, interviews were conducted with the college students who participated in the questionnaire survey. These interviews aimed to validate the questionnaire results and understand the students' perspectives on cyber addiction. A total of 52 college students who participated in the questionnaire survey were interviewed. The interview questions included, "How intense is your cyber addiction from the dimensions of behavioral patterns, socialization, physiological responses, and psychological state?" and "What are your concerns about your cyber behavior that lead to addiction?"

5 An Empirical Research on the intensity of cyber addition

5.1 Intensity of Behavioral patterns

Table 1 showcases the Mean, SD, Rank of Mean and Interpretation results of the scale to illustrate the students' intensity of behavioral patterns.

Table 1 Intensity of Behavioral patterns

Behavioral patterns	M&SD	Rank of M	Interpretation
Influence the frequency of participation in offline activities	M=2.60 SD=1.04	3	Less intensity
Affects study or work efficiency.	M=2.77 SD=1.02	2	Moderate intensity
Lead to higher frequency of online communication	M=3.02 SD=1.05	1	Moderate intensity
Total	M=2.80 SD=0.92	-	Moderate intensity

Legend:Very Great intensity:4.21-5.00, Great intensity:3.41-4.20,

Moderate intensity:2.61-3.40, Less intensity:1.81-2.60, No intensity:1.00-1.80.

The results displayed that Students behaved highest intensely on “Lead to higher frequency of online communication”(Mean=3.02, SD=1.05, Rank of Mean=1, Interpretation=“Moderate intensity”) , lowest intensely on Influence the frequency of participation in offline activities(Mean=2.60, SD=1.04, Rank of Mean=3, Interpretation=“Less intensity”). The overall assessment of

students’ intensity of behavioral patterns was at the moderate level. (Mean=2.80, SD=0.92, Interpretation= “Moderate intensity”)

5.2 Intensity of Socialization

Table 2 indicates the Mean, SD, Rank of Mean and Interpretation results of the scale to illustrate students’ intensity of socialization.

Table 2 Intensity of Socialization

Socialization	M&SD	Rank of M	Interpretation
Affects harmonious relationships with family, friends, classmates, etc.	M=2.25 SD=1.01	3	Less intensity
Reduced willingness to communicate with others in the real world	M=2.31 SD=1.02	2	Less intensity
Affects ability to socialize in the real world	M=2.32 SD=1.02	1	Less intensity
Total	M=2.29 SD=0.93	-	Less intensity

Legend:Very Great intensity:4.21-5.00, Great intensity:3.41-4.20, Moderate intensity:2.61-3.40, Less intensity:1.81-2.60, No intensity:1.00-1.80.

The results signify that students socialized highest intensely on “Affects ability to socialize in the real world”(Mean=2.32, SD=1.02, Rank of Mean=1, Interpretation=“Less intensity”), lowest intensely on “Affects harmonious relationships with family, friends, classmates, etc.”(Mean=2.25, SD=1.01, Rank of Mean=3, Interpretation=“Less intensity”). The overall assessment of

students’ intensity of socialization was at the less level. (Mean=2.29, SD=0.93, Interpretation= “Less intensity”)

5.3 Intensity of Physiological Responses

Table 3 depicts the Mean, SD, Rank of Mean and Interpretation results of the scale to illustrate students’ intensity of physiological responses.

Table 3 Intensity of Physiological Responses

Physiological Responses	M&SD	Rank of M	Interpretation
Full concentration online and mental recall at the end of use	M=2.63 SD=0.98	5	Moderate intensity
Loss of eyesight, shoulder and neck pain, and other physical complaints.	M=2.77 SD=1.06	2.5	Moderate intensity
Reduced sleep time, irregular sleep	M=2.77 SD=1.07	2.5	Moderate intensity
Gradual increase in hours of use	M=2.79 SD=1.03	1	Moderate intensity
The brain is in an excited state after online communication	M=2.76 SD=1.00	4	Moderate intensity
Memory loss after online social media	M=2.62 SD=1.01	6	Moderate intensity
Total	M=2.72 SD=0.89	-	Moderate intensity

Legend:Very Great intensity:4.21-5.00, Great intensity:3.41-4.20, Moderate intensity:2.61-3.40, Less intensity:1.81-2.60, No intensity:1.00-1.80.

The results displays that students physiological responded highest intensely on “Gradual increase in hours of use” (Mean=2.79, SD=1.03, Rank of Mean=1, Interpretation= “Moderate intensity”), lowest intensely on “Memory loss after online social media” (Mean=2.62, SD=1.01, Rank of Mean=6, Interpretation=“Moderate intensity”). The overall assessment of students’ intensity of physiological responses was at the moderate level. (Mean=2.72,

SD=0.89, Interpretation= “Moderate intensity”).

5.4 Intensity of Psychological State

Table 4 demonstrates the Mean, SD, Rank of Mean and Interpretation results of the scale to illustrate students’ intensity of psychological state.

Table 4 Intensity of Psychological State

Psychological state	M&SD	Rank of M	Interpretation
worry about missing information if failed to access to the internet	M=2.95 SD=1.11	1	Moderate intensity
Always want to turn on mobile device to search information	M=2.95 SD=1.10	1	Moderate intensity
Always want to get more information from the internet	M=2.95 SD=1.13	1	Moderate intensity
Distracted when failed to access information through the internet	M=2.65 SD=1.12	4	Moderate intensity
Total	M=2.88 SD=1.01	-	Moderate intensity

Legend: Very Great intensity:4.21-5.00, Great intensity:3.41-4.20,

Moderate intensity:2.61-3.40, Less intensity:1.81-2.60, No intensity:1.00-1.80.

The results disclose that within the indicators of students' psychological state, "worry about missing information if failed to access to the internet"(Mean=2.95, SD=1.11, Rank of Mean=1, Interpretation="Moderate intensity"), "Always want to turn on mobile device to search information"(Mean=2.95, SD=1.10, Rank of Mean=1, Interpretation="Moderate intensity") and "Always want to get more information from the internet" (Mean=2.95, SD=1.13, Rank of Mean=1, Interpretation="Moderate intensity") tied for first place in the ranking. "Distracted when failed to

access information through the internet" got the lowest score in all indicators (Mean=2.65, SD=1.12, Rank of Mean=4, Interpretation="Moderate intensity"). The overall assessment of students' intensity of psychological state was at the moderate level (Mean=2.88, SD=1.01, Interpretation="Moderate intensity").

5.5 Overall Intensity of Cyber Addiction

Table 5 specifies the Mean, SD, Rank of Mean and Interpretation results of the scale to illustrate students' overall intensity in the use of social media.

Table 5 Students' Intensity in the use of social media

Intensity dimensions	M&SD	Rank of M	Interpretation
Behavioral patterns	M=2.80 SD=0.92	2	Moderate intensity
Socialization	M=2.29 SD=0.93	4	Less intensity
Physiological responses	M=2.72 SD=0.89	3	Moderate intensity
Psychological state	M=2.88 SD=1.01	1	Moderate intensity
Total	M=2.69 SD=0.80	-	Moderate intensity

Legend:Very Great intensity:4.21-5.00, Great intensity:3.41-4.20,

Moderate intensity:2.61-3.40, Less intensity:1.81-2.60, No intensity:1.00-1.80.

According to the results, student respondents showed highest extent on the dimension "psychological state" (Mean=2.88, SD=1.01, Interpretation="Moderate intensity"), while showed lowest extent on the dimension "Socialization"(Mean=2.29, SD=0.93, Interpretation="Less intensity"). Overall, the student respondents illustrated a moderate intensity of using online social media (Mean=2.69, SD=0.80, Interpretation="Moderate intensity") which indicated that students were more psychologically influenced by and were dependent on online social medias, and were less influenced in social life.

Yong, Li & Pan (2023) considered that the college students were in a complex cyber environment. The problem of cyber addiction was becoming more and more prominent, and the psychological disorder and other problems triggered by cyber dependence were all typical features of the research on the mental

health of college students at this stage (p. 34). Gong & Gong (2023) were worried that the mental health of college students had been widely affected by social media, and college students often showed psychological dependence phenomena such as virtual self-modeling and pan-entertainment pursuits in the Internet (pp.46-50).

For socialization, Huang & Xie (2020) investigated the 285 vocational education students. It presented that the more frequently students used social software, the worse their interpersonal communication skills were (p.8). Zhu, Fang & Wang (2017) argued that Chinese college students developed social dependencies on WeChat, including the three categories of expectation, comparison, and development, and these dependencies led to real-world social anxiety among college students (p.17). However, a few research studies indicate which is the lesser of the two whether it is the degree of psychological dependence or the sociality.

5.6 Validation of the assessment results

To further validate students' intensity of the use of social media, the study obtained feedback from the 52 student respondents who participated through the Focus Group Discussion. Similar

concepts and related subjects in the student interview texts were summarized and the central idea was extracted. Then, the themes were further identified. Table 6 reveals the thematic analysis based on the students' answers.

Table 6 Themes of Validation for Intensity

Themes	Sub-themes	Theme interpretation
Strong psychological intensity	Significant psychological dependence	Students reported a greater level of dependence on social media at a psychological level compared to other factors such as behavior, physiology, and social interactions.
	Multiple psychological expressions	Students judged that the psychological manifestations that arose after using social media were richer. These include feelings of anxiety and anticipation of information, the uncontrollability of individuals going to participate in information interactions, and also the emotions of inability to part with and the unwillingness to part with the information picture.
Influences to other dimensions	Influence on behavior	Students acknowledged that the use of social media brings some behavioral dependence. This includes increased frequency of use, decreased study and work efficiency, reduced time for exercise, and the tendency to develop behavioral inertia.
	Influence on physiology	Students recognized that the use of social media brings some physical dependence. Examples include decreased vision, decreased sleep, cervical stress, elbow pain, and impact on physical health.
	Affects social interactions	Students are able to recognize that the use of social media brings certain social interaction dependence. The main thing is that the way of interaction has changed, from online to offline, and there are some differences in communication and language expression.
	Differences in dependence cannot be judged	Students agree that behavioral, physical, and social interactions are affected by the use of social media and that dependence exists, but the difference in dependence cannot be determined.

5.7 Strong psychological intensity

Student respondents generally believed that the use of social media could lead to psychological dependence, which could negatively impact their mental health. Additionally, there were various forms of dependence that could manifest psychologically.

If you don't understand what you're hearing in class, you'll be tempted to check your cell phone for new messages. (SI-07)

After using social media for a long time, it is easy to feel addicted to it.(SI-18)

We always want to get information from the Internet and are afraid of missing out on information. (SI-02)

Psychological dependence is quite strong, and when you want to know something, you can't wait to search for it.(SI-14)

Both behavioral, physiological, and social dependence are actually caused by psychological dependence on social media (SI-24)

5.8 Influences to other dimensions

The students admitted that social media use can lead to dependence in behavioral, social, and physical dimensions. However, it was unclear which of these dimensions is more intense.

It will increasingly use social media(SI-17)

It has some impact on life and learning.(SI-10)

We becomes less focused and less patient.(SI-07)

It doesn't affect emotional connection very deeply. But it does use of text and facial expressions for tension relief. (SI-06)

I used to watch short videos at night before going to bed, and sleep was affected. (SI-21)

Playing games for too long can cause blurred vision, hand and shoulder pain.(SI-22)

Except for the psychological effects, it is impossible to identify which is stronger or weaker. (SI-23)

In other words, through the Focus Group Discussion, student respondents revealed that students' psychological intensity was more significant. This was also consistent with the result of the statistical analysis that Psychological state got the highest score. Students agreed with the existence of intensity on Behavioral patterns, Socialization, and Physiological responses after using social media. But the extent of influences was hard to measure.

Students' Concerns on Cyber Addiction

The interview further explored the students' concerns regarding cyber addiction. Similar concepts and related subjects mentioned in the student interview texts were summarized, and the central idea was extracted. The table 7 presents the thematic analysis based on the students' responses.

Table 7 Themes of Students' Concerns

Themes	Sub-themes	Theme interpretation
Developing bad habits	Developing bad habits on study	Inappropriate use of online social media can easily lead to bad habits in studying such as, inability to concentrate in class, to focus on studying, to study without the help of the Internet, direct copy and skipping classes.

Developing bad habits	Developing bad habits on life	Inappropriate use of online social media can lead to bad habits in life such as, constantly swiping the cell phone, cyber addiction, images in the mind, poor mental health, dirty dormitory environment, poor personal self-care ability.
	Developing bad habits on socialization	Excessive use of online social media may lead to bad habits in socializing as reducing face-to-face interactions, becoming inexpressive, and having a contrast between the online image and the real image.
Cyber psychological problems	Increased emotional stress	Using too much online social media can easily lead to emotional stress. It may result in hyperactivity, impulsivity, emotional irritation, and inability to detach.
	Internet addiction	Excessive use of online social media may lead to Internet addiction such as, the inability to control the desire to use the Internet, the inability to insist on doing other things, the loss of self-restraint.

5.9 Developing bad habits

Student and interviewees believed that the higher regularity of using the social mean signifies the higher intensity of social media that can be developed leading to having bad habits on study, life, and socialization.

First, the developing bad habits on study.

Frequent use of online social media.(SI-01)

Unable to concentrate on other things.(SI-12)

Dependent on the use of social media, can't do homework or papers without it.(SI-17)

Sometimes skipping classes to access the internet.(SI-22)

Students rely on the Internet for their studies, copying text directly from the Internet for their assignments.(SI-09)

In the classroom, they are not interested in learning, and after class, they are addicted to the fragmented information on social media.(SI-45)

Second, the developing bad habits on life.

Except for sleeping and eating, spend all time on the internet, and you can't help it even in class.(SI-38)

When you put down your cell phone, there are still a lot of images floating in your mind.(SI-23)

Too much looking at the cell phone can not lift the spirit, reduce the participation in sports.(SI-52)

Too much Internet access, physical and mental state will deteriorate.(SI-13)

Some students are so addicted to the Internet that their dormitories are very dirty, with clothes and books scattered around.(SI-19)

Third, the developing bad habits on socialization.

Communicates a lot on the Internet and is quiet in private (SI-26;)

There is a contrast between the image on the Internet and in reality.(SI-29)

Habitual use of words or symbols, decreased ability to express themselves verbally(SI-14)

Students are normal on the Internet and show confusion and uneasiness when communicating face-to-face.(TI-15)

Prone to negative impact on mental health and social resilience.(TI-47).

5.10 Cyber psychological problems

Student interviewees believed that the higher intensity of social media and the over interaction online would possibly cause cyber psychological problems.

First, the increased emotional stress.

Negative feelings when reading discouraging words on the

internet.(SI-20)

Feeling anxious and uneasy and doing impulsive things. (SI-22)

Easily get excited by emotionally provocative content.(SI-18)

Negative emotions are easily brought up by small conflicts on the Internet.(SI-29)

Excessive using of the Internet is prone to emotional stress and outbursts in speech and behavior.(SI)

Second, Internet addiction.

Worrying about missing information and wanting to open your phone to read it.(SI-11)

Wanting to use social media to search for information, whether it's in assignments, papers, doing programs, or life chores.(SI-06)

Some of us are unable to discipline themselves, weakening confidence and willpower. (SI-03,06,15)

Excessive internet access can distract concentration and lack determination when doing other things.(TI-11,12)

In other words, Chinese college students have indeed been influenced by the internet and have developed a certain level of cyber addiction. They themselves have expressed concerns about excessive internet use. While they find it hard to resist the temptation of the internet, they are also worried about the bad habits and psychological effects that come with overusing it.

Chinese college students demonstrated an ambivalent attitude towards cyberspace. Han X. (2022), after investigating the cyber addiction behaviors of Chinese college students in relation to online games, posited that the ambivalence towards online games encompassed coexisting and conflicting motivations. Individuals addicted to online games found themselves in a constant state of indecision, oscillating between the desire to change and the reluctance to do so, caught in a perpetual tug-of-war within themselves regarding whether to alter their current status of excessive engagement with online games. This internal conflict and contradictory psychological state were evident. Similarly, Song K. Y. (2017) also pointed out that adolescent cyber addicts harbored ambivalent feelings towards their own addictive behaviors; while they often recognized the harms of excessive internet use, they were frequently unwilling to voluntarily disconnect from the internet.

6 Conclusion and Outlook

In summary, cyber addiction among college students has emerged as a significant societal issue that cannot be overlooked. It not only impacts individuals' physical and mental health as well as their academic development but also has the potential to trigger a series of social problems. Based on the research findings, the level of cyber addiction among Chinese college students was found to be

moderate, accompanied by an ambivalent psychology where they desired to break free yet struggled to resist the temptations of the internet. Collectively, this study was conducive to assisting students in identifying their own issues of cyber addiction, thereby enabling them to fully recognize the problem. It also guided teachers to gain a deeper understanding of the intensity of students' cyber addiction, allowing them to tailor their counseling and educational management efforts to the students' current situation. Furthermore, the results of this study provided another researchable endeavor beneficial to addressing the needs of the educational community.

Nonetheless, the existing research outcomes remain limited. It is imperative to delve deeper into the causes, consequences, and intervention measures of cyber addiction among college students from multiple perspectives, providing a scientific basis

for effectively preventing and reducing the incidence of cyber addiction. Concurrently, universities, families, and all sectors of society should collaborate to create a healthy and positive cyber environment for college students, fostering their healthy growth and the harmonious development of society.

In future research, attention will be further directed towards the dynamic changes and trends in cyber addiction issues, promptly adjusting and optimizing intervention strategies to address emerging challenges and problems. Additionally, strengthening interdisciplinary cooperation and exchange, integrating resources and strengths from various parties, will jointly promote the research and resolution of cyber addiction issues, contributing to the construction of a healthy and harmonious cyber society.

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