

Physical and Mental Development of College Students in the Digital Age

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Abstract: In the context of the digital age, the internet has essentially become a part of college students' lives. Through a comprehensive review, this study systematically summarizes the psychological issues such as anxiety, depression, and feelings of loneliness, as well as physical health problems like neck and back pain, caused by digital technology among college students. It also proposes several positive measures generated by digital technology, such as virtual tourism, online yoga, and digital mindfulness interventions, to enhance college students' digital well-being and promote their physical and mental health development. Future research needs to further adopt human-centered, longitudinal, and follow-up research methods to explore the bidirectional impacts of the internet and clarify measures to balance the advantages and disadvantages of digital technology.

Keywords: digital technology, physical and mental health of college students, VR virtual tourism, online yoga, digital mindfulness interventions

1. Introduction

The China Internet Network Information Center (CNNIC) released the 53rd "Statistical Report on Internet Development in China" in Beijing on the 22nd. The report shows that as of December 2023, the number of internet users in China reached 1.092 billion, an increase of 24.8 million from December 2022, with an internet penetration rate of 77.5%. Among these users, the 20-29 age group accounts for the highest proportion. College students are generally considered a psychologically vulnerable group with low stress tolerance and a heavy dependence on the internet, making them prone to escapism tendencies [1]. Research indicates that electronic devices (e.g., mobile phones, computers) and social media negatively impact the physical and mental health development of college students [2]. For instance, addiction to these devices leads to a lack of social interaction and exercise, dependence on electronic devices, and anxiety and discomfort when away from them [3].

However, in the digital age, the internet can also positively impact the physical and mental health of college students. Based on a literature review, it is evident that research on the positive aspects is currently lacking. Some studies suggest that we can enhance college students' digital well-being through digital psychological education [4], thereby promoting their psychological health development. Examples include VR virtual tourism [5], online yoga [6], and digital mindfulness interventions [7]. Furthermore, big data analysis and social media dynamics [8] can help understand

the physical and mental development of college students. Improving electronic devices to remind students of correct usage posture can also protect and promote their physical health [9].

Although existing researchers have preliminarily explored various factors affecting the physical and mental development of college students in the digital age, there is a lack of systematic review of these research findings. This limitation somewhat restricts progress in this field. Therefore, this paper systematically reviews the literature and research on the physical and mental development of college students in the digital age, aiming to provide insights and references for future research and practice.

2. Literature Review

2.1. Negative Aspects of the Internet on College Students

The internet exacerbates social anxiety among college students. In the virtual world, they can present themselves through carefully edited texts and images, which makes them worry that their real-life status cannot match the “perfect image” in others’ minds. This leads to increased reliance on social media, causing unnecessary anxiety and feelings of inferiority. The internet can also cause college students to become addicted to the virtual world, spending a significant amount of time and money, thereby neglecting their studies and real life. This addiction not only affects their academic performance but also adversely impacts their physical and mental development.

Studies have found that excessive internet use negatively affects the physical and mental health of college students. Most college students rely on electronic devices [2][3] and social media for information and communication, making them prone to escaping reality by indulging in the virtual world or venting their dissatisfaction with real life in virtual environments. This behavior not only disrupts the normal social atmosphere online but also potentially affects others’ psychological states, leading to the hidden issue of cyberbullying [10]. Moreover, improper posture and excessive use of electronic devices can severely impact college students’ physical health [11].

A quantitative study conducted by Gao Yiwen, Liu Chenhui, and Chen Ye on 782 college students from different universities using the Self-rated Health Measurement Scale (SRHMS) and a mobile phone usage questionnaire indicates that schools, parents, and society should advocate healthy mobile phone usage. They should guide college students to control their phone usage time to effectively reduce the negative impact of mobile phones on their physical and mental health [2]. Additionally, a qualitative study by Cheng Dai, Zixue Tai, and Shan Ni involving semi-structured in-depth virtual interviews via WeChat with 70 students from seven universities in different regions of China in November and December 2020 found that college students’ dependency on smartphones is not only functional but also emotional, manifesting as anxiety, discomfort, and distress when separated from their devices [3]. Data collected by Chang’an Zhang, Lingjie Tang, and Zhifang Liu from 1,004 college students across 135 universities in China show that cyberbullying can undermine the positive effects typically gained from social media, leading to increased psychological distress, reduced life satisfaction, and heightened symptoms of depression and anxiety [10]. A cross-sectional survey using a semi-structured questionnaire conducted by Muhammad Daniyal, Syed Fahad Javaid, Ali Hassan, and Moien A. B. Khan on 400 participants with an average age of 24.45 ± 3.45 years found that high-frequency mobile phone users reported higher levels of eye strain, neck pain, and back pain compared to low-frequency users [11].

In summary, excessive use of the internet and electronic devices not only causes physical health issues like eye strain and neck pain but also exacerbates psychological distress and cyberbullying, undermining the positive effects of social media. Therefore, promoting healthy device usage habits and optimizing the online environment is crucial for safeguarding the physical and mental health of college students.

2.2. Positive Aspects of the Internet on College Students

In today's information and network era, the internet has become an indispensable part of college students' daily lives. Despite some negative impacts, the positive effects of internet use on college students cannot be overlooked. The internet has not only changed the way college students learn and relax but also enriched their social lives and provided social resources such as innovation and entrepreneurship platforms and mental health support.

Research has found that online social support significantly enhances college students' self-esteem and life satisfaction, effectively reducing depression and feelings of loneliness [12][14]. Additionally, VR virtual tourism has been proven to effectively reduce stress and anxiety, thereby enhancing mental health [5][13]. Digital mindfulness interventions [7], mobile mindfulness meditation (MMM) [15], and online yoga [6] have also been found to significantly reduce anxiety and depression symptoms, improving psychological health levels. Big data analysis and social media dynamic monitoring facilitate timely understanding and intervention in the physical and mental development of college students, helping provide personalized mental health support [8]. Improved design of electronic products, such as adding posture reminder functions [9], can help college students maintain correct posture, thereby alleviating physical discomfort caused by improper use.

Afiya Ali's research, which conducted a quantitative cross-sectional survey on random community samples in New Zealand and the Maldives, found that while online social support did not significantly improve mental health levels, it also did not detract from this relationship. This finding suggests that the impact of the internet on college students is complex and multidimensional, with both negative and positive aspects [12]. Additionally, Paolo, Jerome, and Arianne tested two mediation models with psychological health and distress as outcome variables on a sample of 247 Filipino college students. They found that the internet not only promotes social activities and the expansion of social capital among college students but also enhances their psychological health, reduces psychological distress, and further improves their self-esteem and life satisfaction through online social support and social benefits [14].

Virtual reality (VR) technologies, such as 3D environment navigation, have been shown to induce positive emotions, flow, and emotional engagement, thereby positively influencing behavioral intentions [13]. But Qiang, Chen Qiaoying, and Deng Yinchun conducted a study on the impact of VR technology on the physical and psychological aspects of college students in several universities in Sichuan Province. They found that VR tourism can significantly reduce college students' physical and mental stress. Consequently, they proposed that combining 3D environments with VR technology to form virtual tourism is necessary, advocating for the promotion and application of virtual tourism among college students [5].

Additionally, Li Sun used a multi-stage research method and found that treatment based on mindfulness mobile applications could reduce college students' anxiety. This method proved effective in alleviating their psychological stress and continued to be effective over time, providing students with ongoing motivation to enhance their well-being. Participants also held positive views about these applications [7]. At the same time, mobile mindfulness meditation (MMM) can implement mindfulness meditation interventions through mobile devices such as smartphones and apps to reduce stress and anxiety among college students and improve their well-being [15].

To improve college students' physical fitness and help them experience the benefits of exercise on mental health, Hao Qian and Gao Yanpeng focused on the benefits of yoga and proposed the novel concept of online yoga. Between January 13, 2021, and January 18, 2021, they distributed a survey titled "Changes in College Students' Physical and Mental Health in the Online Environment" via "Questionnaire Star," collecting a total of 302 responses. Data analysis revealed that 90.37% of students had myopia, 42.3% spent more than three hours online daily during weekdays, and 41.6%

spent more than five hours online during holidays. This excessive internet use not only harmed their physical health but also misled them with mixed-quality information, causing frustration and self-denial, which adversely affected their mental health. Yoga, with its rich cultural background and unique practice characteristics, helps college students maintain good physical, mental, and spiritual health, enriching their extracurricular cultural life. The introduction of online yoga allows students to practice yoga anytime and anywhere, maximizing its educational function, promoting physical and mental health, and alleviating psychological pressure [6].

Researchers Haidt and Allen conducted an experiment where they randomly assigned some school districts to prohibit students from using smartphones and social media accounts until around the age of 14. They found that using internet-connected devices for social media and data collection in a proper way could better improve adolescents' mental health and happiness [8]. Similarly, collecting and analyzing data from college students' internet-connected devices and social media can help prevent and address their psychological issues, enhancing their ability to achieve happiness. Analyzing data from fitness apps like KEEP can also provide insights into students' physical health, promoting healthier physical development.

Benden, Mehta, and Pickens conducted a 35-minute online survey of 515 students, analyzing the data to find that their average smartphone usage exceeded 4.4 hours, and they often adopted non-traditional postures while using smartphones. Therefore, using the same devices that college students use to prompt, encourage, and promote correct usage postures is the most likely way to achieve better health outcomes for them.

In conclusion, the proper use of the internet and electronic devices not only promotes the physical and mental health development of college students, such as enhancing happiness through online social support and social benefits but also alleviates psychological anxiety, thereby enhancing the positive effects of the internet.

2.3. Theoretical Analysis of the Internet

In exploring the impact of the internet and electronic products on the mental health of college students, various research theories provide different perspectives to understand and analyze psychological issues, explaining the different psychological mechanisms behind the internet.

Chang'an Zhang et al. used social cognitive theory to investigate how social media affects college students' psychology and subjective well-being. Their research analyzed how college students, without direct experience, mimic behaviors observed on social media, such as comparing their lives with others, leading to feelings of inferiority and reduced life satisfaction [10]. The study also utilized dependency theory to discover that college students' reliance on smartphones satisfies their psychological needs for socialization, entertainment, and information, but it can also lead to psychological dependency, such as separation anxiety [3].

The above two theoretical studies examined the negative impacts of the internet and electronic products on the physical and mental health of college students. However, everything has two sides. In research, self-determination theory has been used to explain the relationship between social media use and mental health, particularly how mindfulness interventions can enhance college students' autonomy, competence, and intrinsic motivation, thereby increasing their sense of belonging and happiness, reducing social anxiety and loneliness, and promoting mental health and personal growth [7]. Meanwhile, the technology acceptance model emphasizes the core role of perceived usefulness and ease of use in technology acceptance. This study analyzed how the acceptance and perceived usefulness and ease of use of mobile mindfulness meditation applications influence the willingness of nurses and other health professionals to use them [15]. College students, being the most receptive to new things [1], are highly sensitive to the usefulness and ease of use of applications. Therefore,

college students can quickly accept new stress-relief methods such as virtual tourism and online yoga, promoting their physical and mental health development.

3. Conclusion

The impact of the internet on the physical and mental health of college students is complex and multifaceted. The internet has long been an integral part of students' lives, encompassing a wide range of technologies such as smartphones, social media, and VR virtual tourism. With deeper research, it is evident that while digital technology does have some negative effects on the health of college students, it also fulfills their needs for socialization, entertainment, and learning.

Yiwen Gao, Chenhui Liu, and Ye Chen [2] conducted research from the perspective of smartphone usage frequency, revealing a correlation between the frequency of smartphone use and the physical and mental health of college students. Higher smartphone usage frequency is more likely to result in dependency, such as separation anxiety [3]. Therefore, students should reduce screen time to promote mental health development. On the other hand, Abad Santos [14] and others provided another perspective, suggesting that online social support and interaction can enhance students' social skills and self-esteem, offering a new direction for the positive development of existing social media. Additionally, VR virtual tourism [5] and online yoga [6] are not merely means of escaping reality but also effective ways to relieve stress, offering a new approach to modern mental health education. At the same time, the introduction of mindfulness mobile applications [7] and mobile mindfulness meditation (MMM) [15] proves effective in intervening in students' psychological issues and serves as a low-cost preventive measure. These applications can mitigate the negative effects of the internet on students' mental health while promoting their psychological well-being.

In conclusion, digital technology provides numerous conveniences and opportunities for college students, but it also presents several challenges. Despite the high potential risks associated with the internet, carefully designed applications and proper management of students' usage can balance the pros and cons of digital technology. The positive effects and cost-effectiveness of digital interventions [7][15] on college students' mental health will become essential measures and resources in mental health education.

4. Existing Limitations and Future Research Directions

Upon reviewing the literature, it becomes apparent that the majority of these studies focus on college students from specific regions or with similar cultural backgrounds, lacking a certain degree of generalizability. Future research should adopt more longitudinal and follow-up study methods, expanding the geographic and cultural scope and extending the timeline to explore the relationship between the internet, electronic devices, and the psychological dynamics of college students. For instance, a long-term experiment could analyze data on the psychological changes of participants over different periods to draw conclusions. Given the rapid development of information technology, the technological applications used in existing research may quickly become outdated. Therefore, research methods also need continuous updates, incorporating emerging technological tools and platforms to study college students' mental health issues. Additionally, interviews with different populations, especially in-depth interviews, can supplement existing research by capturing subtle expressions and deeper information that self-assessment scales might miss. Interview methods can enhance participants' perceptual abilities, clearly showcasing emotional experiences interacting with the internet, particularly in the context of health applications. Considering the high attention modern society pays to the physical and mental health of college students and the rapid development of internet technology, which has become a part of students' lives, further exploration of the positive impacts of online activities such as VR virtual tourism and online yoga on college students is

warranted. Interviews can reveal how VR virtual tourism, fitness technologies like fitness trackers, and online fitness courses specifically enhance students' psychological well-being and happiness.

In conclusion, future research needs to broaden the cultural and geographical scope of studies, adopt more rigorous research designs, and consider the characteristics of emerging technologies to examine the impact of the internet on the psychological health of college students. Through these measures, research can more comprehensively analyze the effects of digital technology on students' mental health and design more effective intervention measures and policy recommendations to help students better manage their technology usage, promoting their psychological well-being and overall development.

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