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The Impact of Leisure Time Allocation on Human Capital Accumulation in High School Students: A Study on Health and Academic Performance

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ABSTRACT

Human capital is a critical resource for economic development, and its accumulation depends not only on academic performance but also on physical and mental health. Therefore, understanding how leisure time allocation influences human capital accumulation is essential. This study, based on a survey of 51 high school students, examines the effects of online and offline leisure activities on their health and academic performance. The results indicate that excessive online leisure time is associated with lower physical activity levels, higher BMI, and increased risk of myopia, all of which have significant negative impacts. Although the sample size is relatively small and there is little variation in academic performance, some students may have overestimated their academic achievements in the questionnaire, making it difficult to clearly reflect the effect of leisure time on academic outcomes. Overall, a balanced allocation of leisure time, integrating both online and offline activities, contributes to better physical and mental health, thus promoting comprehensive human capital development. The study suggests that schools encourage students to balance their leisure time, make reasonable use of the internet, and engage in physical activities to improve both health and academic outcomes.

KEYWORDS

Leisure Time Allocation; Human Capital; Health; Academic Performance; High School Students

1. INTRODUCTION

In contemporary economic and educational frameworks, the development of human capital is increasingly recognized as a key driver of economic growth and social progress (Barro, 2001). Human capital, which encompasses the knowledge, skills, and health of individuals, directly influences productivity and economic potential. Therefore, enhancing human capital is essential not only for individual success but also for fostering a competitive economy. Education plays a crucial role in this process by equipping students with the necessary tools to succeed academically and professionally. However, human capital accumulation is not limited to academic achievement; it is also shaped by students' physical and mental health (Schultz, 2002), both of which are heavily influenced by how they allocate their time, particularly in leisure activities.

In this context, leisure activities are emerging as an important factor in shaping students' overall well-being, a shift from the traditional focus on academic achievement alone. Research suggests that thoughtfully chosen leisure activities can promote mental and physical health, enhance social skills, and foster creativity (Sivan, 2017). As a result, many educational institutions are beginning to emphasize improving students' quality of life by encouraging participation in recreational activities beyond the classroom. Education is not solely about imparting knowledge; it is about preparing students to become productive members of society's human capital. In a rapidly changing social and

technological environment, traditional education methods are becoming less effective, which necessitates a reassessment of current educational practices.

Arnold (1989) highlights the positive relationship between education and leisure, particularly in fostering personal development and social interaction. Increasingly, educational systems recognize that leisure activities not only support mental and physical health but also contribute to the development of creativity and social skills, which have broader societal and economic implications. A balanced allocation of time between study and leisure is essential for high school students, who are in a critical phase of human capital accumulation. This balance directly impacts their physical and mental well-being, ultimately influencing their future productivity and social competitiveness.

Leisure activities can generally be categorized into two types: outdoor physical activities and indoor recreational activities. Outdoor activities, such as running, basketball, and soccer, are typically associated with improvements in physical fitness and mental health. In contrast, indoor recreation includes traditional activities like reading and listening to music, as well as the rapidly expanding domain of online entertainment. With the proliferation of digital technologies, especially the widespread use of smartphones and tablets, online leisure has become a dominant form of recreation for high school students. Online platforms, driven by Web 2.0 and advanced technologies such as social media, have gained significant popularity. Social media platforms like YouTube, Instagram, and TikTok offer user-generated content (UGC), allowing students to engage with peers in new and interactive ways (Kaplan & Haenlein, 2009). According to Pew Research Center on 2023, these platforms are among the most frequently used by high school students. Moreover, the shift towards digital learning during the COVID-19 pandemic accelerated students' adoption of digital tools, which has profoundly influenced their learning habits, lifestyle, and leisure activities.

The allocation of time between study and leisure, particularly balancing online and offline leisure activities, has significant implications for high school students' physical and mental health. This balance is critical for human capital development as leisure activities directly impact both academic performance and overall well-being. Outdoor activities enhance physical fitness, improve cardiovascular health, and promote bone and muscle development, all of which contribute to better learning efficiency and concentration. Moreover, physical activity can help mitigate the health risks associated with sedentary behaviors, such as obesity and cardiovascular disease, leading to long-term health benefits. On the other hand, excessive time spent in online leisure may result in negative health outcomes such as higher BMI and myopia, thus hindering students' physical development and academic performance.

From a social perspective, leisure activities, especially those involving peer interaction through social media, can improve interpersonal skills, which are critical for future career success. Social skills influence communication effectiveness and cooperation, both of which are essential for success in a modern economy. Additionally, appropriate leisure time distribution can alleviate academic pressure, improve emotional management, and enhance psychological resilience. Students who balance leisure with study are better equipped to manage stress, which helps them maintain stable mental health and perform well academically when faced with challenges.

In summary, a well-balanced approach to leisure not only optimizes academic performance but also lays the foundation for physical and mental health, which are essential components of human capital development. Given the relatively limited research in this field, this paper will examine the impact of leisure time distribution—particularly internet-based activities—on high school students' psychological and physical health. The study aims to provide insights into how online and offline leisure activities can be better utilized to support human capital development within modern educational contexts.

2. LITERATURE REVIEW

High school students' leisure activities are relatively limited, primarily comprising traditional outdoor sports and emerging internet-based recreational activities. As the internet becomes increasingly integrated into daily life, its impact on students has received growing attention. Researchers have begun investigating the distinct effects of internet use and outdoor leisure activities on students' academic performance and mental health. While the internet offers students a convenient way to access information, its use is often shaped by social media algorithms, which can lead to the creation of information bubbles. This, in turn, may exacerbate path dependence, potentially resulting in heightened anxiety or, conversely, increased relaxation.

Studies suggest that internet use can positively affect academic performance. For example, engaging in information-seeking behaviors through project-based learning activities can improve academic outcomes (ChanLin, 2008). However, internet use related to social and entertainment activities may have adverse effects. Activities such as instant messaging and social entertainment can extend the time needed to complete academic tasks, reduce reading comprehension, and even lower students' GPAs (Bowman et al., 2010; Fox et al., 2009; Jacobsen & Forste, 2011). Interruptions caused by online social activities during reading tasks not only increase the time required to complete these tasks but may also lead to poorer academic performance (Fox et al., 2009; Jacobsen & Forste, 2011). Additionally, frequent use of instant messaging tools can result in greater distraction, increasing the likelihood of procrastination on assignments (Levine et al., 2007; Junco & Cotten, 2011).

That said, the internet does not solely negatively affect academic performance. Selwyn (2009) analyzed education-related interactions on Facebook and found that the platform serves multiple functions beyond socializing, such as sharing university experiences, exchanging practical information, engaging in academic discussions, and expressing opinions, in addition to casual conversations. The widespread use of Facebook has spurred further research into how it might be effectively utilized for educational purposes.

In contrast, the positive effects of outdoor leisure activities are well-documented in numerous studies. Outdoor sports, such as running, basketball, and other team sports, not only help improve physical fitness but also promote mental health and social skills (Eime et al., 2013). Research indicates that students who participate in outdoor activities tend to exhibit lower levels of anxiety and better emotional management skills (Hartig et al., 2014). Moreover, outdoor activities provide social opportunities that help build and strengthen friendships and enhance teamwork skills, which are critical for both academic achievement and future career success (Bailey, 2006). Compared to internet use, outdoor leisure activities generally reduce students' screen time, helping to prevent myopia and other health issues.

In conclusion, the impact of internet use and outdoor leisure activities on students is complex and multifaceted. While information-seeking behaviors online can lead to positive academic outcomes, social and entertainment activities may hinder academic performance. Meanwhile, outdoor leisure activities have been shown to have predominantly positive effects on students' physical and mental health. Social media algorithms may intensify the "information bubble" effect, making students more susceptible to path dependence and leading to polarized psychological responses. Therefore, future research should continue to explore ways to balance the positive and negative effects of internet use and outdoor leisure activities to maximize their beneficial contributions to students' health and academic performance.

3. METHOD

3.1. Research Purpose and Content

This study aims to investigate the impact of online and offline leisure activities on the physical and mental health of high school students, focusing on how these activities influence their future human capital development. A questionnaire was developed based on existing academic research and real-world contexts. Using high school students in Jiangsu province Wuxi city as a case study, the research seeks to identify the factors that shape their future human capital development. The specific objectives of this study are as follows:

(1) To analyze the types, frequency, and preferences of high school students' online and offline leisure activities;

(2) To examine the impact of these leisure activities on students' physical health (e.g., weight, exercise habits) and mental health (e.g., emotional state, anxiety levels);

(3) To compare the effects of online and offline leisure activities on students' overall health.

In summary, this study explores the relationship between leisure activities and health status among high school students, providing valuable insights for schools, parents, and policymakers to guide students toward healthier development.

3.2. Questionnaire Design

The questionnaire was designed following an in-depth analysis of relevant literature and discussions with high school students. After multiple revisions and a pre-survey, the final version comprises four sections:

(1) Basic information (e.g., age, gender, grade);

(2) Online leisure activities (e.g., most commonly used apps, daily online time, most frequent online activities);

(3) Offline leisure activities (e.g., frequency of physical exercise, participation in offline social activities);

(4) Health status (e.g., weight, height, self-assessment of mental health).

3.3. Survey Method

The survey will be administered through an electronic questionnaire. Platforms like "Wenjuanxing" will be used to create and distribute the survey to qualified participants via social media platforms (such as WeChat, QQ, etc.). Additionally, researchers will conduct intercept surveys at randomly selected schools to ensure sample diversity and representativeness.

3.4. Survey Participants and Scope

The study will focus on high school students in Jiangsu province, primarily targeting regular high schools in major cities. A random sampling method will be employed to select schools and students, ensuring the scientific rigor and breadth of the study.

4. RESULTS

To explore the relationship between leisure time and the physical and mental health and performance of high school students, we conducted a questionnaire survey with a sample of 51 participants. The survey included 21 male students (41.2%) and 30 female students (58.8%) from different grade levels:

22 students in Grade 10 (43.2%), 20 students in Grade 11 (39.2%), and 9 students in Grade 12 (17.6%). Among the respondents, 62.8% were the only child in their family, while 37.2% had siblings.

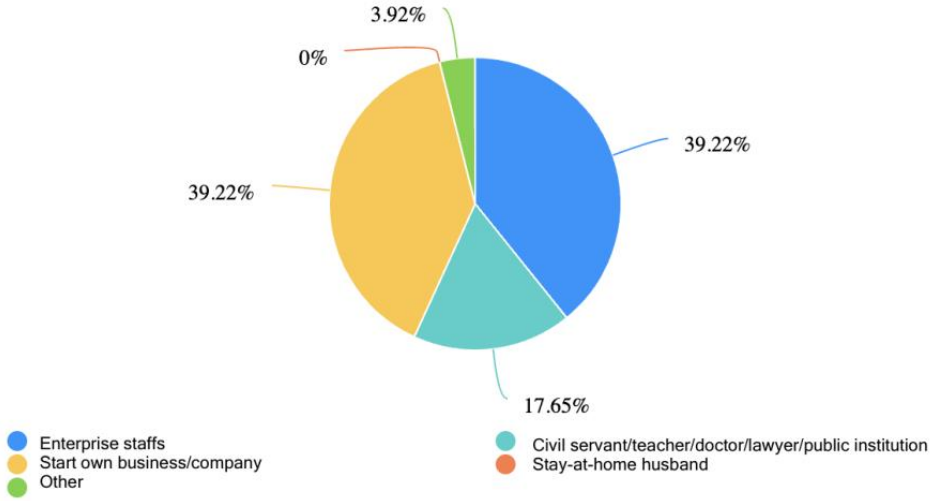

Figure 1. The occupation of the participant's fathers

Given that high school students are greatly influenced by their family environment, the occupations of their parents play a crucial role in this context. Among the participants' fathers, the majority are either businessmen (39.22%) or enterprise employees (39.22%). A smaller proportion work in public institutions (17.65%), while the remainder are employed in various other occupations (Figure 1). Regarding the participants' mothers, most are enterprise employees (29.41%), full-time housewives (25.49%), or employed in public institutions (25.49%). A smaller percentage are self-employed (13.73%), while the remainder are engaged in various other occupations (Figure 2).

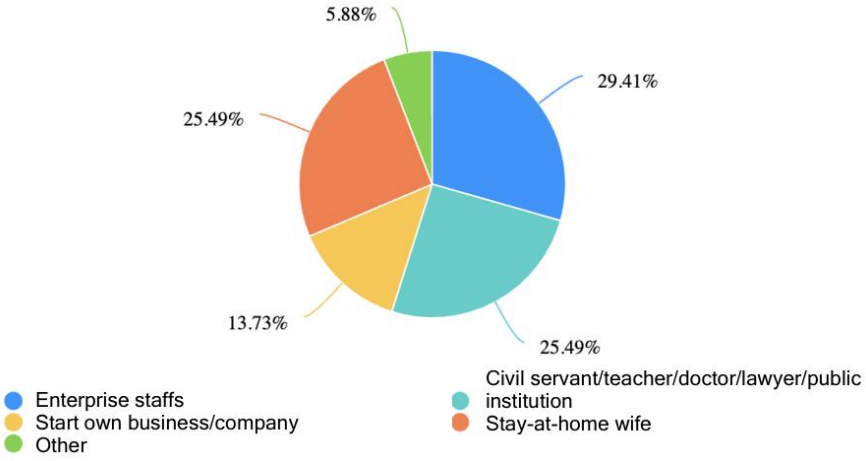

Figure 2. The occupation of the participant's mothers

Body Mass Index (BMI) was used to assess the health status of the students based on their weight and height. After calculating the BMI values from the collected data and comparing them to the standard range ($18.5 < BMI < 24.9$), it was found that 19 participants fell outside the normal range: 12 were undernourished, 6 were overweight, and 1 was obese. Among the female students, 11 were undernourished and 2 were overweight. Among the male students, 1 was undernourished, 4 were overweight, and 1 was obese.

Table 1. Distribution of Students' BMI

BMI category	Female students	Male students	Total students
Underweight: BMI < 18.5	11	1	12
Normal weight: BMI 18.5–24.9	17	15	32
Overweight: BMI 25.0–29.9	2	4	6
Obese : BMI ≥ 30.0	0	1	1
Total	30	21	51

Note: Based on WHO Classification

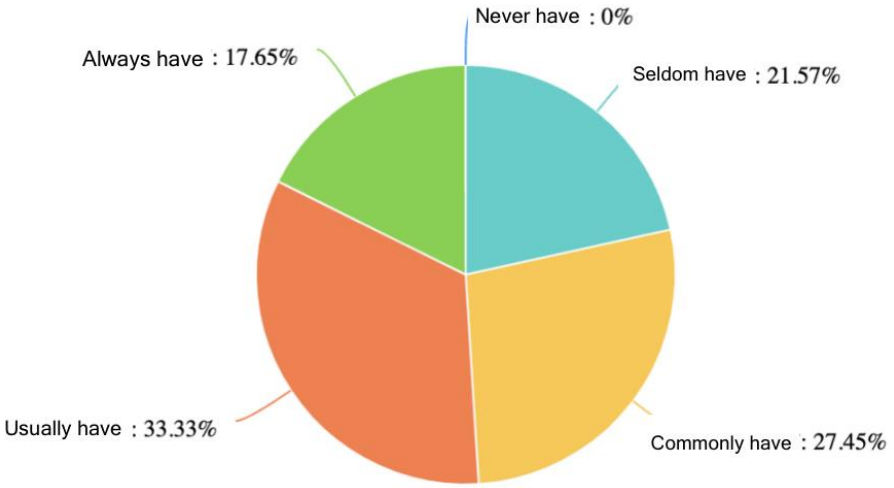

Figure 3. The percentage of students who have good sleep

Recognizing that quality sleep is a vital component of health, we also analyzed the sleep patterns of the participants. Among all participants, 17.64% reported always having good sleep, 33.33% often had good sleep, 27.45% experienced an average level of sleep quality, and 21.57% seldom had good sleep (Figure 3).

For participants' physical health at school, almost half of them seldom feel uncomfortable (54.9%), same level of them always and often feel uncomfortable (13.73%), some of them (11.76%) have normal feeling and few of them (5.88%) have good feelings (Figure 4).

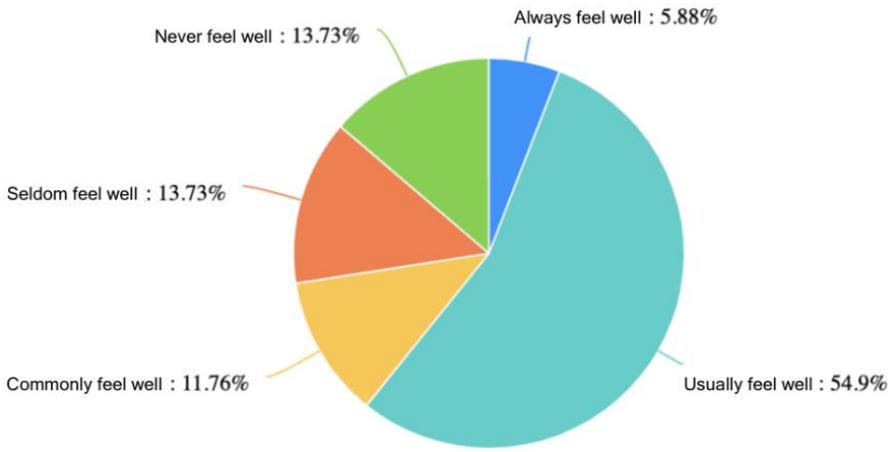

Figure 4. The percentage of students' feeling of physical health at school

To evaluate the mental health of the participants, this study included questions designed to assess the students' mental states and calculate a psychological index. The questions used a Likert scale (with 1 indicating the most negative and 5 the most positive emotions). On average, the psychological index

of all participants was 3.6, with only 7 participants scoring below 3, indicating a negative attitude. The average psychological index of female students is 3.53, while the average psychological index of male students is 3.7. The range of psychological index of female students is 3.6, while the range of psychological index of male students is 2.4. Thus, female students' psychological index is more extreme compared to male students' (Figure 5, 6).

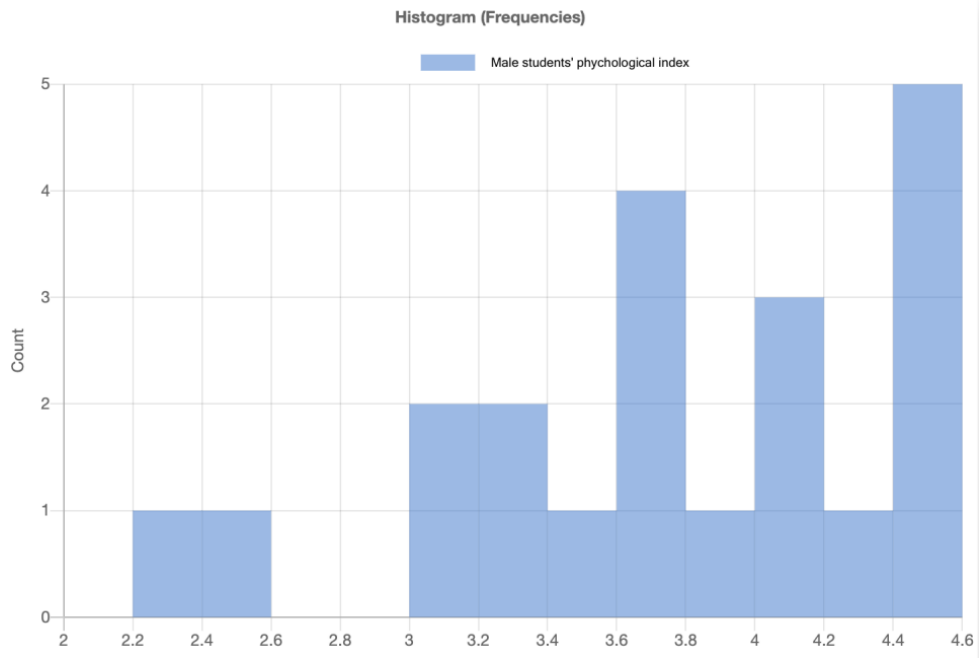

Figure 5. The distribution of male students' psychological index

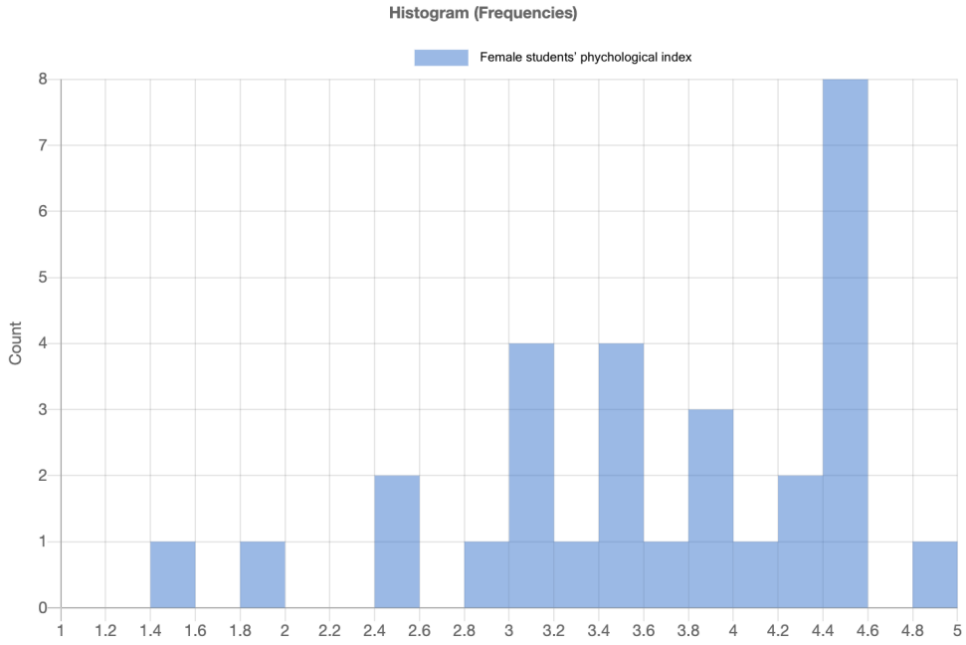

Figure 6. The distribution of female students' psychological index

The study next examines leisure activities, focusing on both outdoor and internet-based leisure. Regarding physical activities, the majority of participants (37.25%) engage in a moderate level of sports each week. Among those who are more active, 17.65% strongly agree that they frequently

exercise, and 21.57% agree that they regularly participate in sports. Conversely, a total of 23.53% of participants reported seldom taking part in these activities (Figure 7).

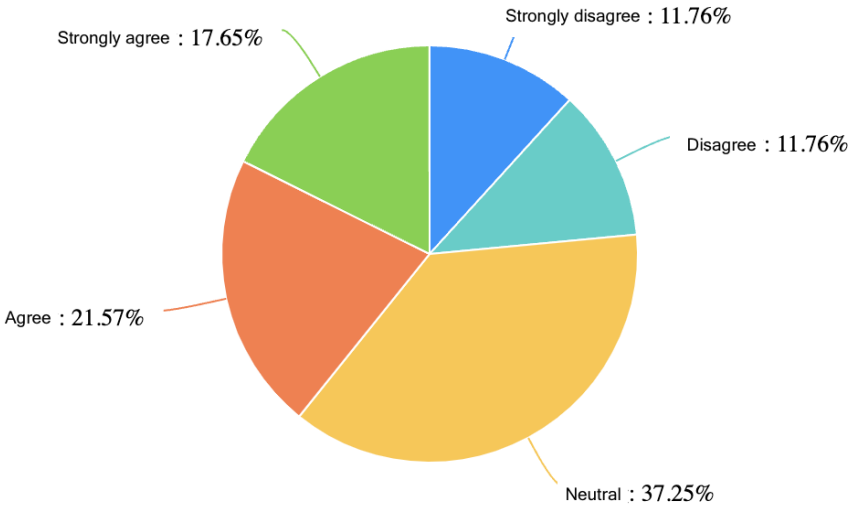

Figure 7. The percentage of students' agreement on having sport activities every week

Regarding internet-based leisure, one-third of the participants spend an extended amount of time online each day (3 hours or more). Meanwhile, an equal proportion of participants (19.61%) spend around 1-2 hours and 2-3 hours online daily (Figure 8).

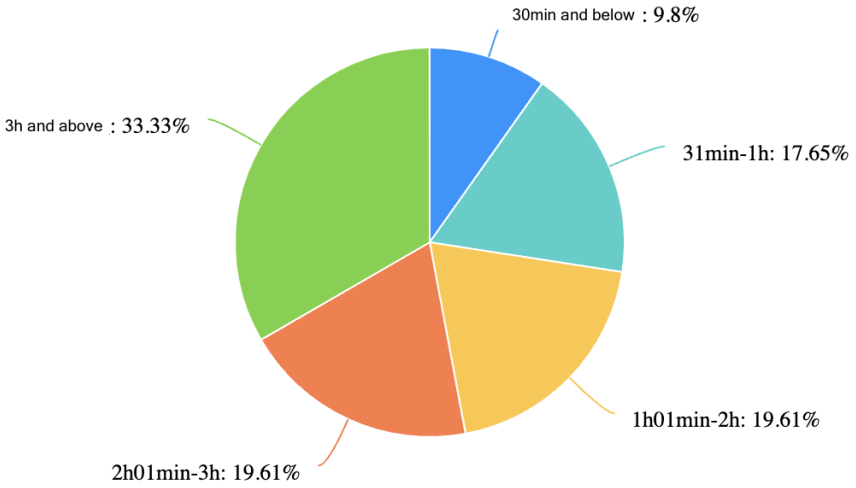

Figure 8. The percentage of students' average time online every day

Among students who spend more than 1h online every day, only 2 out of 37 students do not have myopia (5.4%). Most of the students have myopia less than 300 degrees (37.8%) and myopia between 300 to 500 degrees (40.5%). The rest of them have high degrees of myopia between 500 degrees to 800 degrees (16.2%).

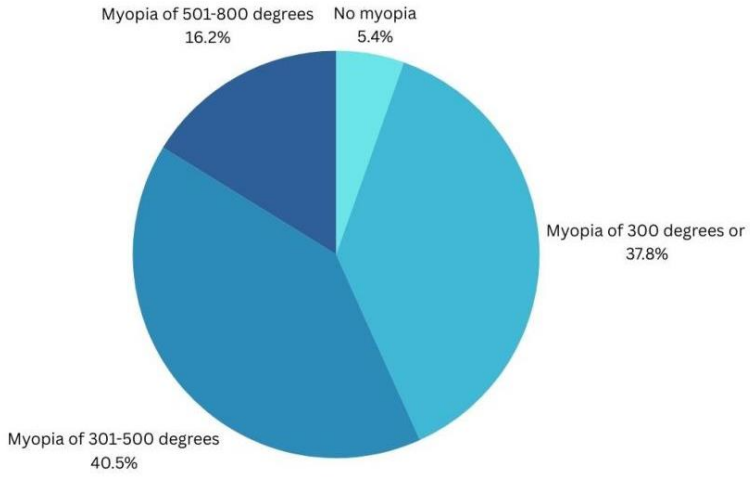

Figure 9. Percentage of nearsightedness among students who spend more than 1h online every day

Further analysis of the types of internet-based leisure activities shows that the majority of participants prefer spending their time on social media platforms (86.27%) and video platforms (66.67%). Nearly half reported watching short videos on applications like TikTok (45.1%), while some engage in online gaming (37.25%) or online shopping (23.53%) during their spare time (Figure 10).

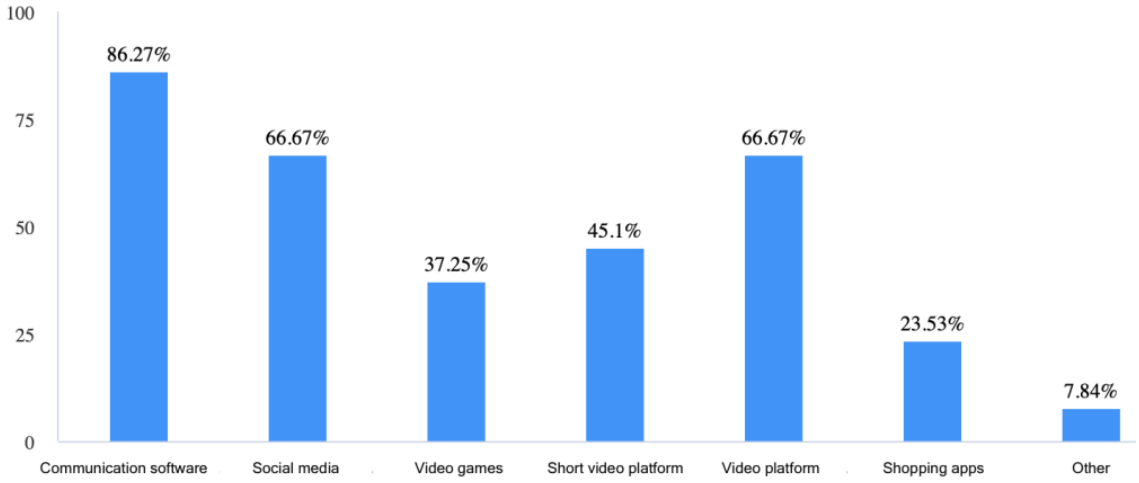

Figure 10. Participants' frequently use of online applications

Among all the students, most of them do well in academic study. Nearly half of them have high GPA over 4.2 (49%) and most of them have GPA of 4 to 4.19 (31.4%). Few of them have GPA of 3.8 to 3.99 (13.7%) and GPA below 3.8 (5.9%) (Figure 11).

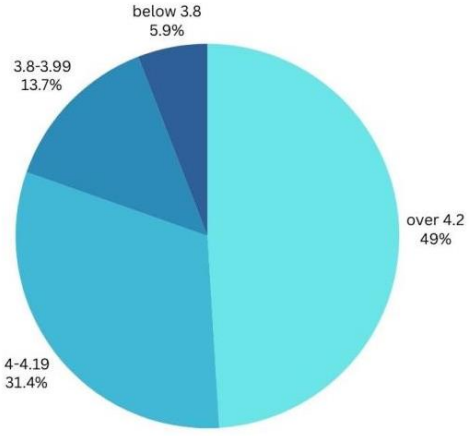

Figure 11. The percentage of students' GPA this year at school

5. DISCUSSION

5.1. Physical Health

Analysis of the BMI data among the high school students surveyed revealed that 19 students fell outside the normal BMI range: 12 were undernourished, 6 were overweight, and 1 was classified as obese. These students reported spending an average of two to three hours per day online and were less likely to engage in regular physical activity each week. This finding suggests that excessive time spent on the internet may contribute to a lack of physical exercise, potentially leading to negative health outcomes.

In contrast, students who regularly engaged in physical activities during their leisure time spent less time online, averaging about one to two hours per day, and most maintained BMIs within the normal range. This indicates that a balanced distribution of leisure time, combining physical activity with moderate internet use, is advantageous for the health of high school students.

Furthermore, a significant proportion of students who spent more than two hours online daily were diagnosed with myopia, with the majority of these cases being high myopia (16 out of 27 students). This correlation suggests that excessive online leisure time may also be linked to the deterioration of students' eyesight.

5.2. Mental Health

Calculation of the psychological index revealed that 7 students scored below the normal level (index = 3), indicating a negative psychological state. The average psychological index among the surveyed students was 3.6. Those with below-average scores showed extreme patterns in their internet usage, spending either less than half an hour or more than three hours online per day. Insufficient leisure time may lead to inadequate relaxation, resulting in mental stress and negatively affecting mental health. Conversely, excessive leisure time may cause students to become overly engrossed in entertainment, leading to a lack of focus on real-life responsibilities and exposure to an overwhelming amount of online information, which can also harm their mental well-being.

Overall, the primary reason for using the internet among all students was stress relief. Online leisure activities provide high school students with more opportunities to alleviate daily stress, helping them relax and maintain their mental health.

5.3. Gender Comparison

This study categorizes high school students' leisure activities from a gender perspective, as differences in preferences for sports and internet use between genders may lead to varying leisure outcomes. Overall, the physical fitness of female students is generally lower than that of male students, with a higher proportion of females having a BMI below the normal range (11 out of 30). Factors such as appearance anxiety and body image concerns may encourage female students to engage in weight-loss behaviors, resulting in lower BMI, which can be detrimental to their health. Additionally, most female students do not frequently participate in physical exercise, leading to a decline in physical fitness. From the perspective of available physical activities on campus, most are focused on large-ball sports (such as basketball, soccer, and volleyball), while there are fewer opportunities for small-ball sports (such as badminton and tennis), which may be more suitable for female students. Furthermore, male students often dominate access to sports facilities, reducing opportunities for females to engage in physical exercise. It is recommended that schools provide more venues for small-scale sports activities that better accommodate female students.

While male students generally have better physical fitness, their BMIs tend to be higher, with a greater proportion being overweight (5 out of 21). Males typically have larger appetites than females, and

although they engage in more physical activities, their caloric intake often exceeds the amount burned through exercise. This imbalance in nutrition can lead to higher BMI levels, increasing the risk of overweight and obesity.

Additionally, the average psychological index of female students is lower than that of male students, suggesting that females may be more sensitive to their surroundings and the information they receive, which could result in greater psychological stress and a higher risk of mental health issues. Compared to male students, females are more inclined to use leisure time as a means of alleviating stress.

5.4. Impact on Academic Performance

The sample size of this survey is relatively small, and the academic performance of the students surveyed is generally high, resulting in minimal differences in scores. Additionally, high school students tend to have a strong sense of self-esteem, which may lead them to overestimate their performance when completing the questionnaire, potentially reporting higher scores than their actual results. As a result, the impact of leisure time on academic performance is not clearly reflected in the data from this survey.

6. CONCLUSION

This study highlights the critical role of leisure time allocation in the accumulation of human capital among high school students, with a particular focus on physical and psychological health as key components. The findings demonstrate that excessive online leisure negatively impacts physical activity, leading to higher BMI, increased risk of myopia, and mental health issues. Students who spend more than three hours online per day are more prone to psychological stress, while those with very limited online leisure time also experience mental strain, indicating that both excessive and insufficient internet use can detrimentally affect students' well-being.

In contrast, students who balance their leisure time between moderate online use and regular physical activities show better physical health, with healthier BMI and improved psychological outcomes. Gender differences are notable: female students tend to have lower physical fitness and a higher incidence of low BMI, which may stem from appearance-related anxiety and limited access to suitable physical activities. Male students, while generally more physically active, often exhibit higher BMI due to imbalances between caloric intake and energy expenditure. These gender-specific leisure preferences—females favoring social media and males preferring gaming—contribute to variations in health outcomes.

The study underscores the importance of a balanced approach to leisure time for supporting both physical and mental health, which are essential for human capital development. Schools should offer diverse opportunities for physical activities that cater to different gender preferences and promote balanced leisure time distribution, integrating both online and offline activities. By fostering this balance, educational institutions can help students improve their overall well-being, academic performance, and long-term human capital accumulation, ultimately benefiting their future competitiveness in the economy.

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