

An Overview of Online Games and Their Effects on Adolescents

Ximei Qu

Information Department, Zhejiang Open University, Hangzhou, China

Email: natasha210@126.com

How to cite this paper: Qu, X. M. (2023). An Overview of Online Games and Their Effects on Adolescents. *Open Journal of Social Sciences*, 11, 310-320. <https://doi.org/10.4236/jss.2023.1111021>

Received: October 26, 2023

Accepted: November 24, 2023

Published: November 27, 2023

Copyright © 2023 by author(s) and Scientific Research Publishing Inc.

This work is licensed under the Creative Commons Attribution International License (CC BY 4.0).

<http://creativecommons.org/licenses/by/4.0/>



Open Access

Abstract

This paper reviews the definition and characteristics of online games, discusses the negative and positive effects of Internet on teenagers, and summarizes the negative and positive effects of online games on teenagers from three dimensions of physiological development, cognitive development, social development and personality development. Online games are a double-edged sword, which may make teenagers addicted and even psychologically unbalanced, but they can also gain more role experience, enhance self-awareness and teamwork consciousness, and expand the scope of interpersonal communication.

Keywords

Online Games, Adolescents, Positive Impact, Negative Impact

1. Definition of Online Games

With the continuous advancement of technology and the widespread adoption of the Internet, online games have become an indispensable part of modern teenagers' entertainment lives. As a new form of entertainment, online games possess unique characteristics and influence, attracting significant attention regarding their positive and negative effects on teenagers. The rich and diverse content, exquisite visual design and strong interactivity of online games make them highly appealing to adolescents. However, this has brought about a series of debates and concerns: Will online games have negative impacts on the psychological and physical health of teenagers? Will they lead to declines in academic performance, social problems, and an exacerbation of addiction phenomena?

Usually, online games refer to online games. China Internet Network Information Center defines an online game as “a game product that takes the com-

puter as the client and the Internet as the data transmission medium. It must realize the participation of multiple users at the same time through TCP/IP protocol, and users can realize the purpose of entertainment communication through the operation of tasks, roles or scenes in the game”.

According to Gao Yingtong and Liu Yanshu, online games refer to the games that can be played by many people at the same time by using transmission control/network protocol (TCP/IP) and relying on the Internet. It takes the computer and its attached equipment as the material carrier, takes the culture selected by the game maker as the background, takes the game player as the receptor, and relies on digitalization and other means to spread the specific way of thinking and behavior in the virtual space. At present, a typical online game is multi-player role-playing game (MUD). Network game is the organic combination of network as technology and game as entertainment, both network and game dual characteristics (Gao & Liu, 2007).

Lei Li believes that, as a new form of entertainment combined with electronic games and the Internet, online games use the Internet as an advanced communication tool to reproduce or imagine real life, which is essentially a concrete form of games (Lei et al., 2018: pp. 28-29).

Cai Yuanyuan defines online games at two levels. Broadly understood, it refers to the electronic games that need networking, including PC online games, video console online games and interactive TV online games. The narrow sense of network game is the client/server mode, that is, the user installs the client software on the computer, logs in to a game server through the client software, and interacts with more players (Cai, 2007).

However, some scholars believe that in today's world, as massively multiplayer online role-playing games (MMORPGs) have become the mainstream of online games with a large number of players and rich game connotations, scholars believe that only massively multiplayer online corner role-playing games are the standard online games (Zhu & Huang, 2021). Huang Shaohua combed and analyzed foreign scholars' research results on MMORPGs (massively multiplayer online role-playing games), and found that foreign scholars' research on MMORPGs is characterized by a wide range of topics but relatively concentrated focus, comprehensive application of multiple methods, and prominent research-oriented trend.

2. The Characteristics of Online Games

Lei Li introduces the characteristics of online games through the technical and psychological aspects (Lei et al., 2018: pp. 30-31). First, from the technical point of view, online games use the most advanced technical means, presenting magic, realistic situation, make people linger. In online games, the use of 3D technology can deduce a very beautiful and spectacular picture, a strong sense of substitution. The space created by online games provides players with a more intuitive and fine way of cognition that is closer to the real world, making players have a

more intuitive and real feeling in the game world.

Second, from the level of psychological needs, Maslow believes that human needs include physiological needs, safety needs, belonging and love needs, respect needs and self-realization needs. Zheng Hongming and Sun Yanjun believe that online games combine the Internet with traditional video games, and have the characteristics of interpersonal interaction, openness of plot and greater emotional involvement that single-player games do not have in the past (Zheng et al., 2006).

Similar to the above characteristics, Zhang Yinan summarized the three characteristics of online games: First, online games are beautifully produced, realistic and fine pictures and sound effects. The United States Air Force once used computer games to simulate flight and combat training, and some technical data in the games were even directly provided by the military. The second feature is the strong interactivity. This kind of interactivity between people beyond the realm of games will be the eternal charm of online games. The third feature is the ability to build virtual reality models. In online games, players no longer execute game programs, but create game life. Players freely interpret the story, and the content plot is constantly updated, which increases the participation and challenge of the game (Zhang, 2003).

3. Research on the Negative and Positive Effects of Online Games on Teenagers

Since the emergence of online games, they have spread and promoted among young people rapidly, and have also produced far-reaching and complex influences. On the one hand, online games provide a virtual stage for young people to explore themselves, expand the channels for young people to interact with society, and bring some positive and positive influences to young people's study and life; on the other hand, online games do bring a series of new social problems worthy of attention, bringing negative consequences such as online game addiction, online game violence, interpersonal communication barriers and escapism (Huang & Zhu, 2017).

In recent years, with the deepening of research, researchers have realized that online games have gradually become a normal thing, which cannot be blindly stressed to resist, and the research perspective has changed to a positive situation, in order to guide teenagers to use them healthily (Yan, 2021). Cao Dianzhen's views on the influence of online games on teenagers are two-sided. He believes that long-term immersion in online games can prevent teenagers from forming correct ideas, but online games can also help game participants improve their concept of self-awareness and improve their ability to work in teams (Cao, 2007).

In the current virtual online games, many teenagers experience the real world experience of pleasure and fun, many teenagers will appear online game addiction phenomenon. In order to better introduce the influence of online games on

teenagers, the research group studied the stage characteristics of the development of teenagers, from the three dimensions of human physiological development, cognitive development, social development and personality development.

3.1. Physiological Development

Sorensen examined the group characteristics of boys aged 11 to 15 who play online games and found that verbal and physical conflicts often occur between groups playing online games (Sorensen, 2003). Wierm-hastings, a researcher at the University of Cambridge, has shown that prolonged online gaming can lead to physical impairments in participants, such as insomnia, vision loss and headaches. However, some scholars believe that the actual functional damage caused by Internet Gaming Disorder (IGD) is small, and that the concept of online gaming addiction may be more rooted in moral panic (Jin et al., 2019). Zhang Zhanbo summed up the negative effects of online games on physical health, for example, the head for a long time in one position is prone to muscle stiffness, cervical pain; spend a lot of time playing online games, lack of sleep, resulting in memory loss, slow reaction and so on (Zhang, 2012). In recent years, however, studies have shown that online games have a positive impact on teenagers, such as Alfredo Flores' study, which found that online games help children lose weight (Ausmus, 2006). Gil-Gomez et al. investigated the rehabilitation of the population suffering from Acquired Brain Injury (ABI). Acquired brain injury (ABI) is the leading cause of death and disability among young people. In most cases, survivors may be faced with unstable balance, resulting in reduced quality of life. But traditional rehabilitation can be tedious, which reduces motivation and compliance, and therefore has limited benefits for patients with balance disorders. The patients achieved excellent results through training using the Wii platform (a home gaming console developed by Nintendo). Research findings have demonstrated that this approach is a safe and effective alternative to traditional treatment methods, improving static balance in individuals with ABI (Gil-Gómez et al., 2011). In addition, in terms of vision, contrast sensitivity function (CSF) is a common measure used in clinical visual assessment and is a major determinant of visual acuity. Improvements in CSF are typically achieved through optical corrections such as glasses, contact lenses, or surgical interventions to correct the eye's optical function. However, Li's research has found that playing action games itself can enhance contrast sensitivity, providing an additional approach for improving vision (Li et al., 2009). Attention-deficit/hyperactivity disorder (ADHD) affects approximately 5% of children worldwide. The current therapies for ADHD, such as medication and psychotherapy, face challenges in terms of effectiveness, compliance, tolerability, and accessibility. In 2020, the United States Food and Drug Administration (FDA) approved the first prescription video game, EndeavorRx (AKL-T01), for the treatment of ADHD in children aged 8 to 12. This official inclusion of a video game in clinical treatment marks a significant development in addressing

ADHD treatment (Zhao et al., 2011).

3.2. Cognitive Development

Sung Hsiung believes that online games are not just games but also a “cultural weapon” and an “ideological weapon” to compete for young people’s minds. He suggests that there is a connection between the Hong Kong riots and young people playing the online game GTA5 (Grand Theft Auto 5). According to him, GTA5 has led to the involvement of a large number of young players in the riots and actively promotes the escalation of violence. Sung Hsiung argues that GTA5 not only violates the principle of a “virtual” game by incorporating equipment used by Hong Kong rioters into its updates but also serves explicit political motivations to achieve real-world political interests. As a result, it has fundamentally lost its entertainment function and has become a tool for political service (Su, 2020). Hussain and Griffiths conducted interviews with 71 players from 11 different countries, and they found that online games can easily make players neglect real-life activities (Hussain & Griffiths, 2009).

However, video games have shown promising results in training individuals’ cognitive abilities. In a study conducted by Feng, it was found that after just 10 hours of action game training, participants showed substantial improvements in spatial attention and mental rotation. Interestingly, females benefited more from the training compared to males (Feng et al., 2007). In regards to the concern that electronic games may affect children’s academic performance, van Schie and Wiegman conducted a study on 346 children with an average age of 11.5 years. The results indicated that there was no significant correlation between the duration of game playing and academic performance. It appears that playing electronic games does not harm children’s participation in other leisure activities, social integration, or social behavior. In fact, if they don’t play games, they might spend time watching TV, reading comics, engaging in unstructured physical activities, playing indoor games, or using the computer for other purposes (van Schie & Wiegman, 1997).

Nicholas Yee conducted a systematic analysis of various psychological and mental states of players in large-scale Massively Multiplayer Online Role-Playing Games (MMORPGs). This analysis covered aspects such as time and emotional investment, motivations, in-game relationships, romantic partners and family, as well as the pathological psychology associated with excessive gaming. Through this research, Yee concluded that the virtual world of online games can impact the relationships between individuals from multiple perspectives, and that these relationships can be altered by the structure of the virtual world. Furthermore, the study indicated that online games should be utilized in the field of education to make learning more enjoyable and have better instructional outcomes (Yee, 2006). Huang Shaohua believes that immersing players in the virtual world of games helps them explore the unknown and, consequently, facilitates knowledge construction. Therefore, online games have the potential for educational and

learning purposes. The interaction and cooperation among players also contribute to the exchange of information, the examination, understanding, and feedback of acquired knowledge (Huang & Xu, 2015).

Suh et al. conducted a study on the effectiveness of MMORPG in elementary school English teaching, and the results showed that students who learned English through online role-playing games scored higher in listening, reading, and writing than those who participated in face-to-face classroom teaching. The study also found that prior knowledge, learning motivation, and internet speed were factors influencing English learning outcomes. These findings indicate the significant role of MMORPG in improving English communication skills (Suh et al., 2010).

Through statistical analysis of a sample of 1241 middle school students in Shanghai (including 1009 gamers), the data indicates that whether teenagers play online games or not, their weekly gaming duration, and the type of games they play most frequently can significantly predict/influence their actual moral behavior. Therefore, it is inferred that in order to mitigate the impact of online games on the moral development of teenagers, society, schools, and families need to take necessary measures to supervise and regulate teenagers' gaming behavior. These measures include delaying the age at which teenagers start playing games, reducing gaming time, limiting teenagers' exposure to adult-oriented games, and guiding them to choose healthier game genres. Additionally, the study suggests that families and schools should leverage their roles in providing moral education for teenagers who play online games and work together to create a collaborative guidance model. Furthermore, it is recommended to promote the inclusion of digital literacy courses at schools as the core element, in order to build a comprehensive ecosystem for teenagers' digital literacy and moral education.

3.3. Sociality and Personality Development

Bu Pingping believes that online games can confuse teenagers' roles in reality with their roles in the game, and easily develop a dependency on online games (Bu, 2004). Relevant research by Wiemer-Hastings indicates that online games occupy a significant amount of time in real life, leading to excessive engagement in virtual social interactions online and a decrease in frequency of communication with friends in real life, thereby harming real-life interpersonal relationships (Ng et al., 2005). Through her study, Chen Chunjin and Gu Xiaoqing found that, after controlling for individual psychological and behavioral characteristics and family background, both exposure to online games and gaming addiction have a negative impact on standardized test scores in subjects like math, reading, science, and finance, as well as four social integration indicators: sense of belonging, collective integration, teamwork, and collaborative problem-solving ability. Additionally, it significantly reduces study time, classroom participation, and achievement motivation. Furthermore, male students who skip school, have repeated grades, or engage in chatting or online socializing before or after school

have a significantly higher probability of being exposed to online games and developing gaming addiction. Moreover, those addicted to online games mainly come from families with emotional deprivation from parents and lower socio-economic-cultural status. The dual negative effects of “low academic literacy” and “low social integration” resulting from online gaming addiction also manifest in these families. These findings indicate that the key to keeping adolescents away from harmful online games lies not in prohibiting them, but rather in filling the gaps in family education and addressing psychological deficiencies (Chen & Gu, 2019).

However, a foreign study from Oxford University by Niklas Johannes, Matti Vuorre, and Andrew K. Przybylski, in collaboration with a gaming company, researched data from two games, *Plants vs. Zombies: Battle for Neighborville* and *Animal Crossing: New Horizons*, to study players’ happiness, motivation, and needs satisfaction. They found that contrary to the concerns of excessive game time leading to addiction and poor mental health, there was a small positive correlation between game time and happiness. They believe that many people worry about the harm of playing video games, but so far, there is little evidence to support these concerns or for policymakers to take action in regulating gaming time (Johannes et al., 2020).

In response to the negative effects of online games on adolescents’ physical and mental health, many scholars and governments have proposed intervention measures. China has issued the “Notice on Further Strengthening the Strict Management and Effective Prevention of Minors’ Addiction to Online Games,” stating that the problem of minors excessively using or even being addicted to online games has had a significant impact on their normal life, learning, and healthy growth. Therefore, relevant measures have been implemented. Firstly, there is strict restriction on the time for providing online game services to minors. Secondly, real-name registration and login requirements for online game user accounts are strictly enforced. Thirdly, supervisory and inspection measures are strengthened by publishing management departments at all levels. Fourthly, active guidance is given to families, schools, and other social aspects to create a favorable environment for the healthy growth of minors. Moreover, besides the aforementioned negative effects, scholars have also started to pay attention to the positive impacts of online games on adolescents. Existing research suggests that electronic games can be both harmful and beneficial to social relationships, depending on the content of the games. Research has confirmed the hypothesis that prosocial video games increase the accessibility of prosocial thoughts and provide support (Greitemeyer & Osswald, 2011). In the United States, 97% of children play video games for at least one hour every day, making online gaming an important tool for leisure, and even socialization in the daily lives of most adolescents (Granic et al., 2014). Currently, research on Massively Multiplayer Online Role-Playing Games (MMORPGs) has found that players can gain a sense of identity in the virtual worlds created by these games (Gabbiadini et al.,

2016).

Alice Mitchell and Carol Savill-Smith found through their research that participating in online games can improve participants' communication skills with others. Game players enhance their teamwork and communication skills through cooperative tasks, which can be applied to the real world, thereby improving their interpersonal skills and abilities in real-life interactions (Mitchell & Savill-Smith, 2004). Researchers such as Jeffrey G. Snodgrass have found that participating in games with real-world friends further helps game participants transfer their self-identity from the game world to the real world, bringing the praises and experiences from the game world into real-life (Snodgrass et al., 2011).

Bu Pingping believes that online games have several positive impacts. Firstly, online games help in adjusting role positioning and understanding role behavior. They provide teenagers with opportunities to try various roles and temporarily set aside real-life constraints such as gender and age, allowing them to choose roles that interest them. By playing these roles, they can experience different personalities, emotions, and experiences, resolve conflicts between characters, and receive feedback on their role-playing from other players.

Secondly, online games enhance self-awareness. Teenagers can express themselves fully and experience the joy of victory and the frustration of failure in online games, which helps strengthen their self-awareness in real life and enables them to make better choices for personal development.

Thirdly, online games facilitate broader social interactions. Through online gaming platforms, teenagers can meet and interact with players from different regions and cultural backgrounds. They can cooperate, communicate, and compete with each other, forming new friendships and social networks.

Lastly, online games cultivate a spirit of teamwork. Certain online games, such as "Empire Online" and "Knight Online," emphasize the importance of teamwork and collective will. By collaborating with other players to solve problems and achieve game objectives, teenagers can learn teamwork, communication, and coordination skills.

However, it's important to note that while online games may have positive effects, there are also potential negative impacts. Teenagers should engage in online gaming moderately, avoiding addiction. Parents and schools should supervise and guide their gaming behavior to ensure that it doesn't have adverse effects on their normal lives and healthy development. Additionally, maintaining a balance between gaming and other activities is important for maintaining a healthy balance of physical and mental well-being (Bu, 2004).

In conclusion, online games can be a double-edged sword. They can provide teenagers with more role experiences, enhance self-awareness and teamwork, and broaden their social interactions. However, they can also lead to addiction, imbalanced mental state, and negative effects if not managed properly. Researchers have analyzed how to play online games in a way that generates positive impacts,

focusing on five dimensions: game time, game content, game context, spatial structure, and game skills (Zhao et al., 2011). This provides guidance for guiding teenagers to explore online games in a responsible manner.

This article strongly recommends the cultivation of adolescents' gaming literacy. Schools and parents should enhance education on gaming literacy, aiming to develop their rational understanding of games and their ability to use games correctly. By conducting courses on game ethics, online safety, and time management, adolescents can gain a comprehensive understanding of the operational mechanisms of the gaming industry, learn to discern appropriate game content, and establish a sound gaming value system. Guiding adolescents in the correct use of online games will enable them to harness the positive impacts on cognition, social interaction, and creativity while minimizing potential negative consequences, thereby creating more favorable conditions for their holistic development and healthy growth.

Fund

2023 Zhejiang Open University Scientific Research Project "Research on the Development Obstacles and Future Challenges of Game-based Learning in China from the Perspective of Digital Transformation" (Project Number: XKT2023Y07).

Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

References

- Ausmus, S. (2006). Using Computer Games and Other Media to Decrease Child Obesity. *Agricultural Research*.
<https://agresearchmag.ars.usda.gov/ar/archive/2006/mar/games0306.pdf>
- Bu, P. P. (2004). An Initial Study on the Psychological Development Impact of Online Games on Adolescents. *Chinese Youth Research*, No. 5, 119-126.
<https://doi.org/10.19633/j.cnki.11-2579/d.2004.05.015>
- Cai, Y. Y. (2007). *Research on Psychological Needs of Young Online Gamers*. East China Normal University.
- Cao, D. Z. (2007). The Interpretation of Social Role Theory on Teenagers' Online Game Behavior. *Xinxiang: Journal of Henan Normal University (Philosophy and Social Sciences Edition)*, No. 6, 207-209.
- Chen, C. J., & Gu, X. Q. (2019). The Influence of Online Games on Students' Disciplinary Literacy and Social Integration—An Analysis Based on the PISA 2015 Test Data from Four Provinces and Municipalities in China. *Open Education Research*, 25, 73-87.
<https://doi.org/10.13966/j.cnki.kfjyyj.2019.05.008>
- Feng, J., Spence, I., & Pratt, J. (2007). Playing an Action Video Game Reduces Gender Differences in Spatial Cognition. *Psychological Science*, 18, 850-855.
<https://doi.org/10.1111/j.1467-9280.2007.01990.x>
- Gabbiadini, A., Mari, S., Volpato, C., & Grazia Monaci, M. (2016). Identification Processes in Online Groups: Identity Motives in the Virtual Realm of MMORPGs. *Journal of Me-*

- dia Psychology Theories, Methods, and Applications*, 26, 141-152.
<https://doi.org/10.1027/1864-1105/a000119>
- Gao, Y. T., & Liu, Y. S. (2007). On Soft Power and Online Games—From the Perspective of Moral Education for Minors. *Foreign Education Research*, No. 6, 72-76.
- Gil-Gómez, J., Lloréns, R., Alcañiz, M., & Colomer, C. (2011). Effectiveness of a Wii Balance Board-Based System (eBaVIR) for Balance Rehabilitation: A Pilot Randomized Clinical Trial in Patients with Acquired Brain Injury. *Journal of Neuroengineering and Rehabilitation*, 8, Article No. 30. <https://doi.org/10.1186/1743-0003-8-30>
- Granic, I., Lobel, A., & Engels, R. C. (2014). The Benefits of Playing Video Games. *American Psychologist*, 69, 66-78. <https://doi.org/10.1037/a0034857>
- Greitemeyer, T., & Osswald, S. (2011). Playing Prosocial Video Games Increases the Accessibility of Prosocial Thoughts. *Journal of Social Psychology*, 151, 121-128. <https://doi.org/10.1080/00224540903365588>
- Huang, S. H., & Xu, J. (2015). A Review of Foreign Research on Online Games—Taking MMORPG as an Example. *Journal of Huaiyin Normal University (Philosophy and Social Sciences Edition)*, 37, 106-114+140.
- Huang, S. H., & Zhu, D. H. (2017). The Negative Influence of Online Games on Teenagers and Its Guiding Strategies. *China Moral Education*, No. 12, 30-33.
- Hussain, Z., & Griffiths, M. D. (2009). The Attitudes, Feelings, and Experiences of Online Games: A Qualitative Analysis. *Cyber Psychology and Behavior*, 12, 747-753. <https://doi.org/10.1089/cpb.2009.0059>
- Jin, Y. C., Yu, M., & Hu, Y. L. (2019). Controversy and Trend of Online Game Addiction Research. *Advances in Psychological Science*, 27, 83-95. <https://doi.org/10.3724/SP.J.1042.2019.00083>
- Johannes, N., Vuorre, M., & Przybylski, A. K. (2020). Video Game Play Is Positively Correlated with Well-Being. *PsyArXiv*. <https://doi.org/10.31234/osf.io/grjza>
- Lei, L., Zhang, G. H., & Wei, H. (2018). *Youth and Online Games*. Beijing Normal University Press.
- Li, R. J., Polat, U., Makous, W., & Bavelier, D. (2009). Enhancing the Contrast Sensitivity Function through Action Video Game Training. *Nature Neuroscience*, 12, 549-551. <https://doi.org/10.1038/nn.2296>
- Mitchell, A., & Savill-Smith, C. (2004). *The Use of Computer and Video Games for Learning: A Review of the Literature*. Learning and Skills Development Agency.
- Ng, B. D., & Wiemer-Hastings, P. (2005). Addiction to the Internet and Online Gaming. *Cyber Psychology and Behavior*, 8, 110-113. <https://doi.org/10.1089/cpb.2005.8.110>
- Snodgrass, J. G., Lacy, M. G., Francois Dengah II, H. J., & Fagan, J. (2011). Enhancing One Life Rather than Living Two: Playing MMOs with Offline Friends. *Computers in Human Behavior*, 27, 1211-1222. <https://doi.org/10.1016/j.chb.2011.01.001>
- Sørensen, B. H. (2003). Online Games: Scenario for Community and Manifestation of Masculinity. *Nordic Journal of Women's Study*, 11, 149-157. <https://doi.org/10.1080/08038740310004273>
- Su, S. X. (2020). Analysis of Hong Kong Riots, Online Games, and Cultural Weapons—How Teenage Players Bring GTA5 to the Streets. *Youth Journal*, No. 2, 25-31.
- Suh, S., Kim, S. W., & Kim, N. J. (2010). Effectiveness of MMORPG-Based Instruction in Elementary English Education in Korea. *Journal of Computer Assisted Learning*, 26, 370-378. <https://doi.org/10.1111/j.1365-2729.2010.00353.x>
- van Schie, E. G., & Wiegman, O. (1997). Children and Videogames: Leisure Activities, Aggression, Social Integration, and School Performance. *Journal of Applied Social Psy-*

chology, 27, 1175-1194. <https://doi.org/10.1111/j.1559-1816.1997.tb01800.x>

- Yan, Y. L. (2021). *Primary School Students Online Game Behavior Research*. Shanghai Normal University.
- Yee, N. (2006). The Psychology of Massively Multi-User Online Role-Playing Games: Motivations, Emotional Investment, Relationships and Problematic Usage. In R. Schroeder, & A. S. Axelsson (Eds.), *Avatars at Work and Play* (pp. 187-207). Springer. https://doi.org/10.1007/1-4020-3898-4_9
- Zhang, Y. N. (2003). The Influence of online Games on Adolescent Personality and Psychological Development. *Modern Communication*, No. 5, 91-95.
- Zhang, Z. B. (2012). Analysis of the Influence of Online Games on Physical Health. *Examination Weekly*, No. 25, 176-177.
- Zhao, Y., He, Y., & Zheng, Y. (2011). The Negative Effects and Controversy of Electronic Games. *Advances in Psychological Science*, 19, 1788-1797.
- Zheng, H. M., & Sun, Y. J. (2006). The Effect of Violent Video Games on Aggressive Behavior and Related Variables. *Advances in Psychological Science*, No. 2, 266-272.
- Zhu, D. H., & Huang, S. H. (2021). *Online Game Behavior, Awareness and Addiction* (p. 19). Shanghai University of Finance and Economics Press.