The Influence of Mobile Phone Addiction on Adolescent' Academic Performance

Yang Jiao[1, *, †] Siyu Lu[2, †]

[1] *United States of America, Santa Cruz, America*
[2] *Shenzhen College of International Education, Shenzhen, Guangdong, China*
Corresponding author. Email: [1]yjiao7@ucsc.edu
[†]*Those authors contributed equally.*

ABSTRACT

In the 21st century, the Internet and everyday human life have a lot of intersections. The computer replaced another popular online electronic product, mobile phones, also gradually occupied People's Daily life. Because the Internet is full of a large number of practical and ineffective information, and teenagers and children lack the mature ability to delete and select adequate information, in the 21st century, a scorching topic has emerged: teenagers and children's Internet addiction. And mobile phone as a portable Internet tool has become an indispensable object in our research. Mobile phones' diversity and powerful functions are the main reasons for rapidly occupying the population and market of teenagers and children, so mobile phone addiction has inevitably become a vast category of Internet addiction. Therefore, our main research direction is whether mobile phone addiction will affect the learning ability of adolescents and children.

Keywords: Mobile Phone Addiction, Academic Performance, Adolescent

1. INTRODUCTION

The products of the first industrial revolution were giant machines such as steam engines and Jennie textile machines, which led to the convenience of human life at that time. The product of the second industrial revolution was the widespread use and innovation of electric power and internal combustion engines. Soon, electric light, telephone, and fuel vehicles dominated the market at that time. The nearest industrial revolution we are most familiar with is the third industrial revolution. The most crucial idea of the third industrial revolution was the scientific and technological revolution, so the Internet was born. So far, most people's lives have been inseparable from the Internet. Nowadays, children and teenagers are the first groups to grow up with the Internet [1]. The Internet has become one of the most popular leisure activities for children and teenagers in China. Children and teenagers are the most Internet users because more than 200 million children and teenagers are Internet users [2]. In this era of the Internet information explosion, children's learning ability has become a problem that people are very concerned about. Because children can easily find information through the Internet, Internet addiction has become a considerable hidden danger, the main direction of our research and investigation. The mobile phone is one of the greatest inventions of the late 20th century, but it has become the world's newest addiction tool for teenagers.

The power of the Internet is that in less than 20 years, the communication of computer media has successfully woven a network for the whole American society. Its online social network function provides a way for different groups of people and offers unprecedented access to information [3]. Nowadays, children and adolescents account for a substantial proportion of Internet users. There are about 30 million teenagers online every year, and the number of children and adolescents using the Internet exceeds any other age group [1]. For adults and the elderly, the Internet may be just a tool, a very virtual software, but this virtual feeling has led to many young people riddled in it. Bremer and Rauch [4] think that teenagers can communicate freely and joke with people they don't know about their age, gender, or name in cyberspace. On the premise that there are nearly 30 million teenagers on the Internet, the Internet is also full of traps for young Internet users, whether unintentional or malicious. Bremer and Rauch [4] summarized three significant categories, child predictors, online, exposure to inappropriate material, and chat

rooms, which are harmful or risky to young Internet users [3]. Although the Internet has brought a lot of convenience to our life, whether in study or work, we cannot ignore the harm of the Internet to the learning ability of the future generation, that is, the youth, whether it is potential or has been revealed. I also predict that the learning ability of teenagers who are addicted to the Internet will be worse than those who use the Internet correctly and healthily. Because the Internet can bring great benefits to education. However, excessive Internet use often leads to unhealthy consequences, while heavy use of the Internet leads to little time for other things [5].

Internet addiction disorder (IAD) is characterized by excessive or compulsive internet use that induces prolonged impairment in various individuals ' life domains. The prevalence of IAD is significantly addressed in the adolescent population (12-19 years old) and has been hypothesized to be positively correlated to a variety of psychological and environmental factors, including low subjective well-being, low engagement with outdoor activities, high virtual social support, and more. Such stimuli are particularly highlighted during Covid-19 as the result of confinement orders.

2. LITERATURE REVIEW

2.1. Mobile phone addiction

Although cell phones have brought convenience and comfort to human beings, it doesn't mean that they don't have adverse effects. Mobile phones have gradually become an indispensable tool for communication, Internet access, and entertainment for almost everyone. Life without mobile phones seems to be incomplete. Inappropriate or excessive cell phone use among teens is increasingly a direct source of stress, depression, sleep disturbances, aggression, and a host of risky behaviors. However, there has been relatively little research on the relationship between mobile phone use problems and psychological problems. Mobile phones are the mainstream carrier and tool to guide teenagers to use the Internet, so there is a relationship between mobile phone addiction and Internet addiction that cannot be ignored. The research found that mobile phone dependence has a significant positive correlation with psychological disorders, and mobile phone dependence explains the majority of students who overuse mobile phones. Students in increasing the use of mobile phone time, spend more time surfing the web, chatting later, may have some loneliness, depression because their time is spent on the Internet and loneliness, anxiety and guilt because they waste their time on the whole, with the increase of cell phone use psychiatry index scores is also on the rise [6]. The main reason mobile phones have become the main culprit of Internet addiction among children is that in the 21st century, mobile phones have become a "daily

use" for the elderly, adults, teenagers, and children. People have almost adapted to a state of life that they need to use mobile phones every day. In other words, life without mobile phones is unimaginable for modern people. Moreover, the technological innovation of mobile phones has become more and more rapid and high-end. Nowadays, smartphones almost cover all functions of alarm clocks, home phones, cameras, tablets, and other devices, among which the function of surfing the Internet is nearly the most important [7].

2.2. Negative effects of mobile phone addiction

Facing the double-edged sword of online media, adolescents who are in a period of unstable psychological development and a critical period of maturity shaping lack effective self-control and often become high-risk groups towards "mobile phone addiction". Various previous empirical research conclusions show that mobile phone addiction has caused varying degrees of harm to high school and college students. Individuals with mobile phone addiction also have different levels of mental health problems, such as interpersonal sensitivity, depression, hostility, paranoia, compulsion, anxiety, and mania.

2.2.1. Interpersonal Relationships

Indifference in interpersonal relationships. Excessive use of the Internet will cause serious interpersonal problems, the longer you spend online, the fewer opportunities to get along with people in reality. Mei et al. [8] found that excessive use of mobile phones leads to a decrease in interpersonal communication, while less interpersonal communication directly leads to an increase in negative emotions, which can easily cause interpersonal alienation between friends and lovers, thereby declining personal happiness and life satisfaction.

2.2.2. Sense of Self-loneliness

A sense of self-loneliness. Bhardwaj and Ashok [9] found that mobile phone addiction is significantly related to loneliness, and adolescents ' loneliness plays a mediating effect in interpersonal adaptability and mobile phone Internet dependence. A study also found that adolescents with mobile phone addiction are more sensitive to faces with sad expressions when presented alongside different facial expressions, which coincide with the results of Zheng Xifu et al [10] on the negative emotion processing bias caused by internet addiction to college students.

2.2.3. Attention and Bias

Attention and bias influence. In 2016, Hua Rong et al [11] studied the cognitive characteristics and mechanisms of mobile phone addiction within college

students from the perspective of attention bias. They used the point detection paradigm to study the internal mechanism of the attention bias mode of mobile phone addiction subjects and found that the level of mobile phone addiction critically influences the attention bias of mobile phone-related words. Non-mobile phone addicts did not show significant attention bias for words, while mobile phone addicts have an attention bias for mobile phone-related information. In addition, the research also pointed out that just like the intervention of social fear groups and people with tobacco addiction, attention bias training can improve the mental health of mobile phone addicts.

2.2.4.Physiological Effects

Physiological effects. Long-term use of mobile phones can cause headaches, dizziness, visual and auditory impairment, loss of concentration, decreased memory, fatigue, and other discomfort symptoms, as well as physical changes such as cervical spine deformation. Overuse of mobile phones is often accompanied by symptoms of mental disorders such as anxiety and depression. Studies have also shown that overuse of mobile phones is closely related to stress and individual sleep conditions [12]. Zhu Yuxin [13] conducted an empirical study on the mobile phone addiction and sleep quality of college students, and the results showed that the sleep quality of mobile phone addicts is lower than that of non-mobile phone addicts.

2.3. Academic Performance

Academic performance is the outcome of education— the extent to which a student, teacher, or institution has achieved their educational goals [14].

Standardized achievement test scores, teacher judgments of academic performance, and report card grades are all used to assess a child's academic success. Standardized achievement tests are objective tools that measure skills and abilities learned via direct instruction in a range of subject areas, such as reading, arithmetic, and writing [15]. Teacher rating scales allow teachers to assess the correctness of a student's academic work in comparison to that of other students in the class, and they allow for ratings on a broader range of academic activities than standardized achievement exams [16]. Report card grades allow instructors to report on classroom academic achievement, but they are seldom utilized in studies for early elementary school children due to a lack of a consistent grading system and uniform topic areas on which students are evaluated, among other things.

Several factors are commonly considered as imposing adverse effects on academic performances. Procrastination is especially common in the academic domain. Ellis and Knaus [17] estimated that 95% of American college students procrastinate. In Solomon and Rothblum's [18] survey, 50% of students reported that they procrastinated on academic tasks at least half the time, and an additional 38% reported procrastinating occasionally. Faculty estimation of students' procrastination was even higher. Procrastination was more common for term papers than for studying for exams or doing weekly assignments.

According to many education theories, self-regulation shall be developed to cancel out the detrimental effect brought by academic procrastination to maintain an excellent level of academic performance.For many students, school becomes an increasingly negative experience as they advance in grade. As a result, they frequently struggle to perceive academic assignments as relevant, fascinating, or engaging, and they lack the self-discipline required for academic success. They are disengaged and do not put up a lot of effort, set academic goals, examine task-solving techniques, or keep track of their performance and development. Furthermore, disengaged students are less likely to accept responsibility for the consequences of their academic decisions; they avoid exercising and sustaining willpower, especially if doing so is unpleasant; and they have trouble controlling attention [19].

Students that display these negative attributes are considered to have issues associated with academic self-regulation, or the ability to apply self-control and self-discipline while performing schoolwork [20]. Students with academically self-regulated behavior patterns, on the other hand, may willing to study or perform a demanding or repetitious school activity even if they were tempted to do something else.

2.4. The Association Between Mobile Phone Addiction and Academic Performance

In our research, we have used "theory of planned behavior". The theory is all about peoples' intentions towards concepts, beliefs, values, norms, and control over ones' self and they together form the attitude an individual possesses and the way they react or perceive their ecosystem.

The study had three hypotheses discussed below: first, smartphone self-efficacy has a positive influence on academic performance. Second, interaction Competency has a positive influence on academic performance. Finally, behavioral Intention has a positive influence on academic performance.

Self-efficacy: Individual judgment has an impact on how well a person does a specific action. In the case of mobile phones, self-efficacy is associated with the perception of having confidence in using the technology that a user possesses. A person using a cell phone, for example, believes that utilizing a cell phone will allow him to do tasks more quickly. Self-efficacy is influenced

by technical support/training and amicability, which boosts an individual's ability to use technology effectively.

Interaction Competencies: Students develop relationships with others by using various technologies to communicate with them. Students like to engage with their peers by using messenger, which facilitates them to respond quickly. They must have technology-related competencies, such as a mobile phone, for efficient communication. And this essential competency is known as interaction competency.

Behavioral Intention: Behavioral intention is a person's intention to act in a particular manner with someone. It's a subjective probability that an individual will perform in a specified behavior [21].
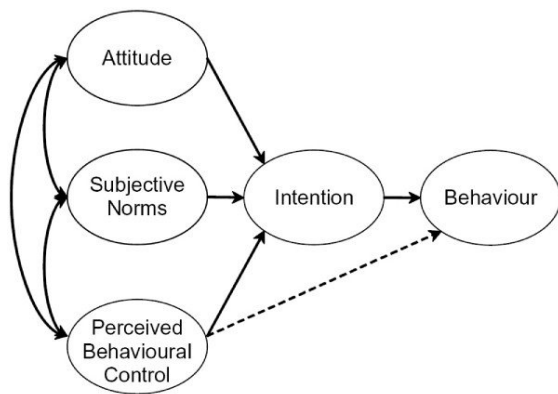

Figure 1 Theory of planned behavior

3. LIMITATIONS AND FUTURE IMPLICATIONS

According to the data we observed, we know that the harm of Internet addiction caused by mobile phone addiction to teenagers is very significant. However, the information we have collected at present still has defects. The significant shortcomings we face fall into three main categories. The first point is that all the data we've observed and collected so far is theoretical. In other words, our theory lacks a lot of practice to test it more accurately. For an approach, the work from hypothesis to data collection is preliminary preparation. The preparation we have made so far is for future practice and tests to be more accurate. So we hope that we and other researchers interested in the topic "the harm of mobile phone addiction to adolescents' academic performance" can further practice the data techniques we have collected. The second flaw in our theory is that our data on adolescents' mobile phone addiction patterns and their academic performance still has some limitations. For example, our teenagers can only represent teenagers of one cultural background and race. To make our data more authoritative and representative, we need to collect the data on mobile phone usage and the academic performance of teenagers around the world more widely.

Since teenagers from different cultural backgrounds have different ways and concepts of using mobile phones, we need more extensive worldwide data to support our theory. The third defect of our paper is that we do not have enough data and articles to eliminate the hidden errors that may appear in our view. For example, the main reason for declining children's academic performance may not be the distinguishing factor of mobile phone addiction. Because all the data we collected are the results of long-term tracking and investigation, there is a pronounced difference between this kind of experiment and a real-time experiment. That is, a long-term experiment can hardly track and investigate the situation of experimental subjects anytime and anywhere. Therefore, such empirical conclusions are subject to change and uncertainty. Even a 24-hour follow-up study could not completely rule out other factors that might have contributed to the teens' grades. Because the theories and data we collect are based on observation to achieve the best experimental results, there will be a lot of unpredictable factors if the data remain true and accurate. So other factors may cause fluctuations in academic performance, such as TV watching, sports activities, family involvement, etc. These are both missing and not predicted in the data we have collected so far. So I hope that we can use more methods to reduce the error caused by personal factors in future experiments. In general, there is still a lot of room for improvement in our experimental theories' accuracy, scope, and reliability. I hope the errors and defects mentioned above can be reduced in future experimental investigation and data collection.

4. CONCLUSION

Because mobile phone addiction is on the rise among young people as a result of their increasing reliance on technology in all aspects of their lives, it is necessary to conduct ongoing and comprehensive research to determine whether mobile phone addiction is beneficial to students or harms their academic performance. Many future researchers have conducted studies on this topic on various populations, finding positive and negative correlations between mobile phone addiction and academic performance. Although cell phone addiction has a positive impact on life satisfaction, it has a negative impact on academic performance. After numerous studies, it remains unclear whether mobile phone addiction is beneficial to students' lives and whether it has a negative or positive impact on their academic performance.

Individual judgment has an impact on how well a person does a specific action. In the case of mobile phones, self-efficacy is associated with the perception of having confidence in using the technology that a user possesses. Students' intents cannot be changed by possessing mobile phones until and unless they are not

intending to study, as intrinsic motivation is the most important factor in academic performance. According to the data we gathered, despite constructively using many communication channels, students utilize them for amusement purposes, which leads to procrastination and can negatively impact academic performance.

Overall, as previously indicated, the behavioral intention has a positive link with student academic performance, according to the data obtained. This research study would serve as a solid foundation for future studies in this field. Researchers will be able to use this framework to investigate the harmful effects of excessive mobile phone usage as well as the influence of various social networking sites available on mobile phones in the future. They can also include extra factors that are relevant to the topic to analyze the total impact of mobile phones.

REFERENCES

[1] Bremer, J. The Internet and Children: Advantages and Disadvantages. Child and Adolescent Psychiatric Clinics of North America, 2005, 14(3), pp. 405-428. DOI: http://dx.doi.org/10.1016/j.chc.2005.02.003

[2] Liu, Q., Fang, X., Deng, L., & Zhang, J. Parent-adolescent communication, parental internet use and internet-specific norms and pathological internet use among Chinese adolescents. Computers in Human Behavior, 2012, 28(4), pp. 1269-1275. DOI: http://dx.doi.org//10.1016/j.chb.2012.02.010

[3] Douglas, A. C., Mills, J. E., Niang, M., Stepchenkova, S., Byun, S., Ruffini, C., . . . Blanton, M. Internet addiction: Meta-synthesis of qualitative research for the decade 1996-2006. Computers in Human Behavior, 2008, 24(6), pp. 3027-3044. DOI: http://dx.doi.org/10.1016/j.chb.2008.05.009

[4] Bremer, J., & Rauch, P. K. Children and computers: Risks and benefits. Journal of the American Academy of Child & Adolescent Psychiatry, 1998, 37(5), pp. 559-560. DOI: http://dx.doi.org/10.1097/00004583-199805000-00019

[5] Suhail, K. , & Bargees, Z. Effects of excessive internet use on undergraduate students in pakistan. Cyberpsychol Behav, 2006, 9(3), pp. 297-307.

[6] Noruzi Kuhdasht, R., Ghayeninejad, Z., & Nastiezaie, N. The relationship between phone dependency with psychological disorders and academic burnout in students. Journal of Research & Health,2018, 8(2), pp. 189 – 195. DOI: https://doi.org/10.29252/jrh.8.2.189

[7] Ruzic-Baf, Maja, et al. Use Of Smartphones In 6Th And 7Th Grade (Elementary Schools) In Istria: Pilot Study. Zenodo, 2016, DOI: https://doi.org/10.5281/zenodo.1111697.

[8] Mei, S., Chai, J., Shi-Bin, W., Ng, C. H., Ungvari, G. S., & Yu-Tao, X. Mobile Phone Dependence, Social Support and Impulsivity in Chinese University Students. International Journal of Environmental Research and Public Health, 2018, 15(3), pp. 504. DOI: http://dx.doi.org/10.3390/ijerph15030504

[9] Bhardwaj, M. , & Ashok, M. S. J. Mobile phone addiction and loneliness among teenagers. The International Journal of Indian Psychology, 2015, 2(3).

[10] XiFu, Z. Cognitive Interference or Emotional Interference： Comparison of PIU College Students ' Implicit Mental Characteristics.. Acta Psychologica Sinica, 2018, 40(8), pp. 920-926.

[11] Lee, J., Cho, B., Kim, Y., & Noh, J. Smartphone Addiction in University Students and its Implication for Learning. Paper presented at the International Conference on Smart Learning Environments (ICSLE), Hong Kong, PEOPLES R CHINA. 2014. DOI: https://doi.org/10.1007/978-3-662-44188-6_40

[12] Xie Z;Chen F;Li WA;Geng X;Li C;Meng X;Feng Y;Liu W;Yu F; (n.d.). *A review of sleep disorders and Melatonin*. Neurological research. Retrieved December 1, 2021, from https://pubmed.ncbi.nlm.nih.gov/28460563/.

[13] Li, Y., Li, G., Liu, L., & Wu, H. Correlations between mobile phone addiction and anxiety, depression, impulsivity, and poor sleep quality among college students: A systematic review and meta-analysis. Journal of Behavioral Addictions, 2020, 9(3), pp. 551-571. DOI: http://dx.doi.org/10.1556/2006.2020.00057

[14] Ward, A. (n.d.). *Educational measurement: Theories and applications*. Google Books. Retrieved December 1, 2021, from https://books.google.com/books/about/Educational_Measurement_Theories_and_app.html?id=dWTx7RXc028C.

[15] Sattler, J. M. (n.d.). *Assessment of children: Cognitive applications*. Google Books. Retrieved December 1, 2021, from https://books.google.com/books/about/Assessment_of_Children.html?id=3P0QAQAAIAAJ.

[16] Topor, D. R., Keane, S. P., Shelton, T. L., & Calkins, S. D. Parent involvement and student academic

performance: a multiple mediational analysis. Journal of prevention & intervention in the community, 2010, 38(3), pp. 183-197. DOI: http://dx.doi.org/10.1080/10852352.2010.486297

[17] Ellis, A., & Knaus, W. J. (1977). overcoming procrastination. New York Institute for Rational Living. - references - scientific research publishing. (n.d.). Retrieved December 1, 2021, from https://www.scirp.org/(S(351jmbntvnsjt1aadkposzj e))/reference/ReferencesPapers.aspx?ReferenceID= 883211.

[18] Solomon, L. J., & Rothblum, E. D. ACADEMIC PROCRASTINATION - FREQUENCY AND COGNITIVE-BEHAVIORAL CORRELATES. Journal of Counseling Psychology, 1984 31(4), pp. 503-509. DOI: http://dx.doi.org/10.1037/0022-0167.31.4.503

[19] Hidi, S., & Harackiewicz, J. M. Motivating the academically unmotivated: A critical issue for the 21st century. Review of Educational Research, ,2000, 70(2), pp. 151-179. DOI: http://dx.doi.org/10.3102/00346543070002151

[20] Zimmerman, B. J. Investigating self-regulation and motivation: Historical background, methodological developments, and future prospects. American Educational Research Journal, 2008, 45(1), pp. 166-183. DOI: http://dx.doi.org/10.3102/0002831207312909

[21] Marta, E., Manzi, C., Pozzi, M., & Vignoles, V. L. Identity and the Theory of Planned Behavior: Predicting Maintenance of Volunteering After Three Years. Journal of Social Psychology, 2014, 154(3), pp. 198-207. DOI: http://dx.doi.org/10.1080/00224545.2014.881769