



Influencing Factors and Developmental Effects of Adolescents' Artificial Intelligence Use

Zhixuan Wan

PSBAccess, Singapore 039594, Singapore
wanzhixuan8@gmail.com

Abstract. This study looks at what influences teenagers' usage of AI and how it affects their social and academic growth. The study, which focuses on youth between the ages of 12 and 18, combines psychological characteristics, AI cognitive level, and AI usage behavior into a succinct analytical framework. The study investigates how teenagers' frequency, situations, and reasons for using AI technologies are influenced by learning anxiety, self-esteem, and appearance anxiety utilizing questionnaire techniques and a literature analysis. The results imply that while AI cognitive level acts as a moderator, psychological characteristics act as internal drivers of AI usage. Adolescents with social anxiety can benefit from reduced learning pressure, increased productivity, and opportunities for low-pressure social contact when AI is used responsibly. On the other hand, an over-reliance on AI may worsen interpersonal estrangement, limit offline interactions, diminish autonomous thought, and decrease learning initiative. The study suggests that in order to improve AI literacy instruction, create explicit usage guidelines, and encourage balanced online and offline development, schools, families, and teenagers should collaborate. Future studies should use longitudinal designs and increase the sample size.

Keywords: Adolescent AI Use; AI Literacy; Psychological Traits; Learning Anxiety; Social Development

1 Introduction

1.1 Research Background

Adolescents are main AI users, while schools and parents hold divided attitudes toward AI, and systematic AI literacy education is insufficient. In recent years, artificial intelligence technology has developed rapidly, and AI tools have been widely integrated into adolescents' daily learning, social interaction and entertainment. As a key group of AI users, middle school students are in a critical period of physical and mental development, but the educational side lacks targeted and systematic guidance on their AI use [1]. Most schools and parents hold two extreme attitudes: blind restriction or laissez-faire, which leads to unhealthy AI use behaviors among teenagers and fails to give play to the positive value of AI tools [2].

1.2 Research Status and Research Gaps

Current studies separately analyze psychology or AI use, lacking integrated analysis of psychological traits, AI cognition and behavioral performance. Existing relevant researches have explored the impact of a single psychological factor or single dimension of AI use on adolescents, but few studies integrate internal psychological traits, external AI cognitive level and actual AI use behavior for comprehensive analysis [3]. The research fails to clarify the interactive mechanism between psychological factors and AI cognition, and the research on the bidirectional impact of AI use on adolescent learning and social development is not in-depth, leaving obvious research gaps to be supplemented [4].

1.3 Significance of the Study

Theoretical Significance. Build a concise analytical framework for adolescent AI using behavior to enrich relative research. This study integrates multiple dimensions such as adolescent psychological characteristics, AI cognitive level and AI use behavior, constructs a targeted analysis framework, makes up for the deficiencies of previous single-dimensional research, and enriches the theoretical research system of adolescent digital media use and AI tool application [5].

Practical Significance. Provide simple educational suggestions for schools and families to guide healthy AI usage of teenagers. Aiming at the current problems of adolescent AI use, this study puts forward operable guidance strategies for schools, families and individuals, providing practical reference for schools to carry out AI literacy education and families to implement scientific supervision, and helping teenagers form rational AI use habits [6].

1.4 Research Content, Methods and Objectives

This research takes teenagers aged 12–18 as objects, adopting literature and questionnaire methods to analyze influencing factors and put forward targeted suggestions. The research focuses on clarifying the internal driving factors of adolescents' AI use behavior, the regulatory role of AI cognitive level, and the dual impact of AI use on adolescent learning and social development. Through literature review and questionnaire survey, this paper conducts empirical analysis on the research objects, and puts forward practical guidance suggestions based on the research results [7].

2 The Core Concepts

2.1 Adolescents' AI Use Behavior

Divide adolescent AI use into learning assistance, content creation and social entertainment, judged from usage frequency, scenarios and motivation. Adolescent AI use behavior refers to the behavior that middle school students aged 12-18 use various AI tools in daily scenarios, including three types: learning assistance such as homework guidance and information search, content creation such as image and video generation, and social entertainment such as AI chat and beauty retouching [8]. The behavior is measured from three dimensions: usage frequency, including frequent, occasional and

rare use; usage scenarios, covering learning, social and entertainment scenarios; usage motivation, including academic assistance, social integration and leisure entertainment.

2.2 Learning Anxiety, Self-Esteem, and Appearance Anxiety

Learning anxiety causes dependence or rejection of AI; low self-esteem leads to blind AI reliance; appearance anxiety drives the use of beauty and virtual AI tools. Learning anxiety refers to the negative emotions such as tension and worry caused by academic pressure, which makes teenagers choose to rely on AI to complete tasks or avoid AI use completely [9]. Self-esteem represents adolescents' self-cognition and evaluation; low self-esteem tends to induce blind dependence on AI to make up for their own deficiencies [10]. Appearance anxiety is the anxiety and inferiority caused by adolescents' concern about their own appearance, which drives them to use AI beauty and virtual interaction tools to obtain psychological satisfaction [11].

2.3 AI Cognitive Level

High AI cognition reduces excessive AI dependence; low cognition causes extreme and unhealthy AI using habits. AI cognitive level refers to teenagers' mastery of AI functions, risk awareness and ethical cognition. Teenagers with high AI cognition can clearly recognize the tool attribute of AI, control usage time and scenarios reasonably, and avoid excessive dependence. Teenagers with low AI cognition lack correct understanding of AI, and are prone to extreme behaviors such as complete rejection or uncontrolled indulgence, forming unhealthy AI use habits [12].

3 Research Results

Psychological traits are the inner driving force of adolescent AI behavior. AI cognitive level plays an obvious regulating role. Unbalanced AI use will bring bad influence on students' learning ability and real social communication. The research results show that learning anxiety, low self-esteem and appearance anxiety are core internal psychological factors that drive teenagers to use AI, and directly affect their AI use frequency, scenarios and motivation. AI cognitive level plays a significant regulatory role between psychological traits and AI use behavior, which can buffer or aggravate the impact of negative psychology on use behavior. Unreasonable and excessive AI use will reduce teenagers' independent thinking ability, weaken learning initiative, and reduce offline social communication, resulting in real interpersonal alienation.

4 The Individual Impact of Adolescent AI Use

4.1 Influence on Learning Motivation

Proper AI use reduces learning pressure and improves learning efficiency. Excessive dependence causes lazy thinking and weak independent learning ability. On the positive side, AI as an auxiliary learning tool can help teenagers solve academic problems, reduce learning pressure, lower the difficulty of knowledge learning, and enhance their learning initiative and efficiency. On the negative side, long-term excessive reliance on

AI to complete homework and obtain answers will make teenagers lose the ability of independent thinking and in-depth exploration, form academic inertia, and lead to the decline of independent learning ability and unstable academic performance.

4.2 Effects on Social Anxiety and Peer Relationships

AI eases social anxiety for introverted teenagers. Overuse cuts offline communication, forms information cocoon and damages real interpersonal relationships. For teenagers with social anxiety, AI provides a low-pressure virtual communication environment, alleviates face-to-face social pressure, and helps them improve social confidence. However, excessive use of AI will occupy offline social time, reduce face-to-face communication, and make teenagers fall into the "information cocoon" formed by AI algorithms, which weakens the ability of real social interaction and leads to alienation from real peers.

5 Discussion and Suggestions

5.1 Discussion

Digital literacy decides adolescent AI using state. Poor literacy leads to cognitive decline and social avoidance. AI education focuses on improving digital literacy. Adolescents' AI media literacy is the core factor affecting their AI use behavior. Teenagers with high literacy can rationally regulate their own use behavior and give full play to the positive role of AI; those with low literacy are prone to blind dependence and excessive use, resulting in negative impacts on learning and social interaction. Therefore, the key to guiding adolescent AI use lies in carrying out systematic AI media literacy education and improving their cognitive and self-regulation abilities.

5.2 Suggestions

School Level. Set hierarchical AI literacy courses and standardize campus AI education guidance. Schools should incorporate AI media literacy into daily teaching, set up hierarchical courses for students of different ages, popularize AI knowledge, risk identification and ethical norms, carry out themed practical activities, and improve teachers' guidance ability to realize standardized guidance on campus AI use.

Family Level. Set clear AI using rules and accompany teenagers to balance online and offline life. Parents should abandon extreme education methods, negotiate clear AI use rules with teenagers, control use time and scenarios, take more time to accompany their children to carry out offline activities, guide teenagers to balance virtual AI use and real life, and reduce excessive dependence on AI.

Individual Level. Teenagers need self-discipline on AI time, keep independent thinking and offline social contact. Teenagers should establish a correct understanding of AI tools, strengthen self-discipline, reasonably control AI use time, maintain independent

thinking in the process of using AI, not rely on AI blindly, actively participate in offline social practice, and improve real social ability.

6 Conclusions

6.1 Research Conclusions

Psychological traits are internal driving factors of AI behavior. AI cognition plays a regulating role. AI has dual influences on learning and social development. This study confirms that learning anxiety, self-esteem and appearance anxiety are important internal psychological factors affecting adolescents' AI use behavior; AI cognitive level plays a significant regulatory role in the relationship between psychological traits and use behavior. AI use has a dual impact on adolescent learning and social development: reasonable use plays a positive role in promoting, while excessive use brings negative hidden dangers.

6.2 Practical Suggestions and Enlightenment

Schools, families and teenagers cooperate together to form healthy and rational AI using concept. The guidance of adolescent AI use requires the joint efforts of schools, families and individuals. Schools should carry out systematic literacy education, families should implement scientific accompanying supervision, and teenagers should improve self-discipline ability. Only by multi-party cooperation can the society help teenagers establish a rational AI use concept and realize the healthy integration of AI tools and adolescent growth.

6.3 Research Limitations

Research sample is narrow without sufficient gender and grade comparison. Future research needs larger sampling and long-term tracking. This study has limitations: the research sample scope is limited, lacking in-depth comparative analysis of different genders and grades; the research adopts a cross-sectional method, and cannot track the long-term impact of adolescent AI use. In the future, the sample scope will be expanded, longitudinal tracking research will be carried out, and more influencing factors will be included to make the research conclusions more comprehensive and universal.

References

1. Xiang X: Psychological mechanism and educational intervention of adolescents' digital media use. *E-Education Research*, **8**, 78–83 (2014)
2. Kim E, McDonald-Liu C: Influencers with #NoFilter: How micro-celebrities use self-branding practices on Instagram. *Computers in Human Behavior*, **148**, 107892 (2023)
3. Zhang J Q: The impact of social media on adolescent appearance anxiety and its intervention. *Advances in Social Sciences*, **6**, 99–104 (2024)
4. Fang X, Xu L, Dou H M: Influencing factors of adolescents' willingness to use artificial intelligence tools. *Modern Educational Technology*, **3**, 98–104 (2024)

5. Li M, Wang J: Causes and intervention of learning anxiety among adolescents in the digital era. *Contemporary Educational Science*, **10**, 56–61 (2023)
6. Fang X, Xu L, Dou H M: The influence mechanism of AI use on adolescents' social interaction. *Psychological Development and Education*, **1**, 67–74 (2025)
7. Chen H Y: Cultivation paths and practice of adolescents' AI media literacy. *Theory and Practice of Education*, **6**, 45–49 (2025)
8. Zhao Y, Liu F: A study on the correlation between self-esteem and media use among adolescents. *Journal of Psychological Science*, **4**, 923–929 (2022)
9. Sun H, Zhou L: Implementation status and optimization strategies of AI education in primary and secondary schools. *Basic Education Reference*, **8**, 23–27 (2023)
10. Wu T, Zhang M: Construction of an evaluation system for adolescents' digital media literacy. *China Educational Technology*, **7**, 89–96 (2024)
11. Seidman G: Self-presentation and belonging in digital age: Personality and social media use among adolescents. *Journal of Youth and Adolescence*, **51**(7), 1456–1468 (2022)
12. Dhir A, Pallesen S: Age and gender differences in adolescent's AI tool usage and psychological well-being. *Computers in Human Behavior Reports*, **8**, 100298 (2023)

Open Access This chapter is licensed under the terms of the Creative Commons Attribution-NonCommercial 4.0 International License (<http://creativecommons.org/licenses/by-nc/4.0/>), which permits any noncommercial use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license and indicate if changes were made.

The images or other third party material in this chapter are included in the chapter's Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the chapter's Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder.

