
| RESEARCH ARTICLE

Research on the Influence of Digital Reading on College Students' Academic Ability -Based on the Investigation and Analysis of S College

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| ABSTRACT

Digital reading has become the main mode of reading for contemporary college students. It is meaningful research to actively explore strategies to improve college students' academic ability under the background of digital reading and provide high-quality talent training in colleges and universities. In this study, a mixed method is used to collect data through questionnaires and interviews, which reveals the positive correlation between digital reading and academic writing, information retrieval ability, and critical thinking ability and further confirms the positive correlation between digital reading and college students' academic ability. It is especially found that the frequency of reading academic papers has a significant positive impact on college students' academic writing ability and critical thinking ability. Based on the research results, it is suggested that colleges and universities take corresponding intervention measures to improve students' academic ability, such as academic writing training and information literacy training. The research results can provide a reference for universities to optimize teaching strategies and build a digital reading environment.

| KEYWORDS

Digital Reading, Academic Ability, Educational Intervention.

| ARTICLE INFORMATION

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1. Introduction

1.1 Research background

Under the background of the digital age, the rapid development of information technology has greatly promoted the popularization of digital reading (Yan Lili et al., 2023), which not only provides rich knowledge resources for college students but also poses new challenges to their academic research and writing ability (Zhao Qiong, 2024). Especially in private undergraduate colleges, it is particularly important to cultivate students' academic ability. The results of sampling evaluation on the graduation thesis (design) of 2022/2023 released by the Education Department of a province in March 2024 show that there are various problems in the graduation thesis of 16 private colleges and universities (JPDE,2024), and the ratio as high as 88.89% shows that the quality of graduation thesis of private colleges and universities needs to be improved urgently, which generally reflects that there is room for improvement in the academic ability of students in private colleges and universities. As a private undergraduate college in Guizhou Province, S College has also found some problems in the process of undergraduate thesis sampling, which has aroused great concern among school educators and researchers. In order to steadily improve the level of personnel training and realize the high-quality development of the school, it is particularly urgent to actively study the influencing factors of college students' academic ability and explore effective strategies to improve undergraduate students' academic ability.

The purpose of this study is to deeply explore how digital reading affects the academic ability of college students, especially students in private undergraduate colleges who urgently need to improve their academic ability. Through the investigation and analysis of students' reading habits in S College, this study will reveal the relationship between digital reading and academic ability and provide a theoretical basis for exploring the feasibility of improving students' academic performance by improving their digital reading. The research results will provide a reference for education and teaching reform in other universities.

1.2 The significance of the study

The academic ability of college students, including but not limited to academic writing, critical thinking, information literacy, etc. (Wang Degen et al., 2023), is a key indicator to measure the comprehensive quality of college students and has a far-reaching impact on their personal development and future career (Deng Lijun, 2023). With digital reading becoming a common reading learning method, it has a significant impact on the cultivation of academic ability. This trend not only changes students' access to information but also puts forward new requirements for educational models and learning strategies (Han Lu et al., 2023). Studying the influence of digital reading on the academic ability of university mathematics and exploring the strategies to improve the academic ability of college students under the background of digitalization will have an immediate effect on improving the quality of graduation thesis of college students and also provide a new perspective and method for building a high-quality talent training system. This is of great significance in meeting the needs of the digital age, cultivating students' comprehensive ability, and promoting the sustainable development of higher education.

2. Literature Review

2.1 The impact and challenges of digital reading

2.1.1 The rise and characteristics of digital reading.

The rise of digital reading benefits from the popularity of mobile Internet technology and the widespread use of mobile devices (Li Yifan et al., 2024), and it has become the mainstream mode for people to acquire information and knowledge. Digital reading makes reading free from the constraints of time and space and has gradually become a part of people's daily life, providing people with a more convenient way to read (amac Ahmet et al., 2019).

The main features of digital reading are convenience, accessibility, and interactivity (Zhao Yixue, 2024). Convenience is reflected in the fact that readers can read through various electronic devices anytime and anywhere (Wang Haiyan, 2023). The accessibility of digital reading means that readers can easily obtain a large amount of information resources through the network to meet different reading needs (Zhang Xiyan, 2023). The interactivity of digital reading is that you can participate in other people's reading process and interact with other readers through comments and sharing. This interactivity not only increases the interest in reading (Zhang Kun, 2018) but also provides readers with more opportunities for thinking and learning, which is unmatched by other reading modes (Yang Wenjian, 2023).

2.1.2 The influence of digital reading on in-depth reading.

Researchers at home and abroad have put forward different views on how digital reading affects deep reading ability. It is pointed out that the characteristics of a digital reading environment, such as multitasking and hyperlinks, may distract readers' attention (Hu Chunchun et al., 2020), affect their in-depth understanding and memory of the text, and may reduce readers' reading depth and comprehension ability (Liu Haiying et al., 2022). There are also studies that show that digital reading can promote readers' critical thinking and creative thinking (Liu Fang, 2023). It is found that the interactivity and linkage of digital reading platforms can stimulate readers' curiosity and desire to explore, encourage them to actively follow links, and expand their reading horizons, thus helping to improve their critical thinking ability (Hasan Kağan Keskin, 2016).

The personalized recommendation system of digital reading can recommend related books and articles according to readers' reading history and preferences, which not only improves reading efficiency but also helps readers build a personalized knowledge system and promote deep learning (Liu Ye et al., 2023). At the same time, some studies worry that digital reading based on personalized recommendation may only make users contact with information that is consistent with their existing viewpoints and interests, which limits their chances of acquiring new knowledge and new viewpoints and intensifies the influence of information cocoon effect (Wei Qiaoling, 2021). Some studies have also pointed out that digital reading can significantly enhance the expressive force of the text because of its multimedia characteristics, such as video, audio, and dynamic images, which can not only enrich the sensory experience but also stimulate the readers' creative thinking (Li Xiangyong et al., 2022).

Digital reading is based on the characteristics of interactivity, linkage, and personalized recommendation, which helps to stimulate readers' critical thinking and creative thinking (Zhao Pingyang, 2021). However, the unique multi-task operation and information

overload of digital reading may interfere with deep reading (Wang Yuqin, 2020). Therefore, future research needs to explore the influence of digital reading on readers' cognitive process and how to promote readers' deep reading and cognitive development by optimizing the digital reading environment and reading practice.

2.2 Multi-dimensional composition of academic ability

Academic ability is a key index to evaluate students' academic level in higher education, which involves many dimensions, including academic writing, research methods, critical thinking, and information literacy (Wang Degen et al., 2023). Academic writing is a process in which students output their academic opinions after mastering academic norms and citation rules (Mary R. et al., 2019). The research method is a scientific step and way to carry out academic research and a means and tool to solve practical problems. Critical thinking is a kind of thinking activity that can achieve a more accurate and comprehensive understanding of the nature of things. It is both a thinking skill and a thinking tendency, and it is one of the training goals of higher education (Zhang Fengjuan, 2021). Information literacy requires students to effectively evaluate, retrieve, use, and manage information, which is one of the necessary abilities for college students in the information age (Liu Dandan et al., 2017).

The four dimensions of academic ability are intertwined and synergistic, which builds a shield for college students to cope with academic challenges and lays a foundation for future academic development and career growth. In order to effectively cultivate college students' academic ability, colleges, and universities should adopt comprehensive teaching strategies, including encouraging interdisciplinary curriculum design, adopting diversified teaching methods, reforming and innovating evaluation mechanisms, enriching academic resources and tools, and so on, so as to promote students' development in all dimensions of academic ability.

2.3 Research on the Correlation between Digital Reading and Academic Ability

As the mainstream reading mode of contemporary college students, digital reading is definitely related to their academic ability. Digital reading not only provides extensive resources for academic writing but also challenges deep reading and critical thinking (Yang Mao, 2018). The convenience and richness of digital reading improve the ability to browse and screen information quickly (Zhang Xiyan, 2023), but it may also weaken the habit of deep reading.

Digital reading has great potential in promoting students' critical thinking and academic writing (Wei Miao et al., 2018). Digital reading platforms provide students with a wide range of knowledge, background, and research perspectives, as well as rich academic resources and documents (Maria Engberg et al., 2022). Students are exposed to different viewpoints and theories to stimulate their own thinking and innovation. By searching the literature to obtain the corresponding background information and various data support, the quality of writing and the depth of argumentation can be improved (Mary R. et al., 2019). In addition, students can communicate academically through the digital reading platform to improve their critical analysis and reflection ability.

Facing the problem of information overload brought by the digital reading environment, students need to master the skills of managing effective information, know how to screen and evaluate effective information, and cultivate good digital reading habits to meet the challenges brought by information overload (Zhang Anqi et al., 2017).

2.4 Strategies and Practice for Improving Academic Ability

Cultivating students' academic ability is one of the core tasks of talent training in undergraduate colleges. Graduates of undergraduate colleges should not only have solid subject knowledge but also be trained and deepened in academic writing, information retrieval, critical thinking, innovative ability, and lifelong learning. The development of college students' academic ability will lay a solid foundation for future academic research and careers.

In order to cultivate and improve college students' academic ability, domestic and foreign universities take corresponding strategies according to their own reality. Harvard University aims to improve students' academic writing and research ability by implementing the "Academic Ability Enhancement Plan", which includes writing instruction and research skills workshops. Duke University implements the Critical Thinking Initiative and trains students' critical thinking and logical reasoning abilities through a series of seminars and online resources. The University of California, Berkeley, strengthens students' abilities in database retrieval and data management through the information literacy education project led by the library so as to improve students' information literacy. Peking University encourages students to participate in the "Undergraduate Research Training Program" to cultivate students' research interests and innovation ability. Tsinghua University offers courses on critical thinking and academic expression ability to improve students' academic ability. Shanghai Jiaotong University holds an annual academic conference focusing on talent

training using innovation-driven strategies and exploring effective teaching strategies to promote students' academic ability.

These innovations and practices reflect the achievements of domestic and foreign universities in cultivating students' academic ability and provide a meaningful reference for colleges and universities to cultivate students' academic ability. By implementing the strategy of improving academic ability, colleges and universities can not only strengthen students' professional knowledge and skills but also cultivate students' critical thinking, innovative ability, and lifelong learning ability, laying a solid foundation for their long-term development.

2.5 The innovation of this study

Although the existing research has extensively discussed digital reading and its influence on academic ability, there are still some research gaps to be filled. First of all, the existing research mostly focuses on the general influence of digital reading on the cognitive process but lacks in-depth analysis of specific educational environments and student groups. For example, the relationship between digital reading habits and the academic ability of students with specific educational backgrounds in private undergraduate colleges such as S College has not been fully studied. Secondly, although the strategy of improving academic ability is discussed in theory, the empirical research based on specific student groups and putting forward specific intervention measures is still insufficient.

The purpose of this study is to innovate in the following two aspects: First, this study focuses on the undergraduate group of S College and provides an in-depth analysis of the relationship between digital reading and academic ability in the specific environment of private undergraduate colleges. This targeted research perspective is helpful in revealing the specific needs and challenges under similar educational backgrounds. Secondly, this study analyzes the influence of digital reading on academic ability and puts forward specific educational intervention measures combined with empirical data. Through these two innovations, this study hopes to provide a new perspective and empirical support for the research field of the relationship between digital reading and academic ability and, at the same time, provide practical improvement suggestions for the educational practice of private undergraduate colleges.

2.6 Establishment of theoretical framework

This study constructs a theoretical framework for an in-depth discussion on the relationship between digital reading and college students' academic ability, integrating information processing theory, cognitive load theory, and social cognitive theory. This theoretical framework aims to provide a multi-dimensional analysis perspective.

First of all, Information Processing Theory provides a theoretical basis for this study on how to organize and process information. The theory points out that social information is beyond the range that individuals can accept, process, or effectively use, and individuals will encounter processing bottlenecks when facing a large amount of information. In the digital reading environment, the amount of information is much higher than what college students can bear or need, and a large number of irrelevant, redundant information seriously interferes with the accuracy of college students' choice of relevant, useful information, thus affecting the efficiency of deep reading and learning (Liu Changjiang et al., 2005).

Secondly, Cognitive Load Theory further refines the cognitive load problem in information processing. This theory distinguishes internal load (caused by the complexity of learning materials), external load (caused by way of information presentation), and related load (caused by learners' activation and application of knowledge structure). In the background of digital reading, cognitive load theory is helpful in guiding the design of learning materials and environments to reduce unnecessary cognitive load and improve learning efficiency and academic ability (Sun chongyongWait, 2017).

Finally, the Social Cognitive Theory emphasizes the role of observational learning and social interaction in improving academic ability. In the digital reading environment, students can improve their ability by imitating others' reading strategies and academic writing practice. In addition, social interaction can also enhance students' critical thinking and academic writing skills through discussion and collaborative learning (Zhong Yiping, 1999) .

Combining these three theories, the theoretical framework of this study not only provides a solid theoretical basis for understanding how digital reading affects academic ability but also provides guidance for designing effective educational intervention measures. Through this framework, research can identify and solve the cognitive challenges that may be encountered in the digital reading environment and, at the same time, use the power of social interaction to promote the improvement of academic ability.

2.7 research questions and assumptions put forward

On the basis of comprehensive consideration of the theoretical framework and literature review, this study puts forward the following questions and assumptions.

2.7.1 Research questions:

- (1) What are the characteristics of students' digital reading habits in S College, and how are these habits related to their academic ability?
- (2) In the digital reading environment, what key factors affect students' academic abilities, such as academic writing, information retrieval, and critical thinking?
- (3) What educational interventions have been proven to be effective in improving students' academic ability?

2.7.2 Research hypothesis:

- (1) There is a positive correlation between students' digital reading frequency and their academic ability.
- (2) Students who frequently read academic papers perform better in academic writing ability; that is, the frequency of reading academic papers can significantly predict students' academic writing ability.
- (3) Implementing specific educational interventions, such as writing workshops and information literacy education, can significantly improve students' academic ability.

These questions and assumptions will guide the subsequent empirical research, including data collection, analysis methods, and interpretation of results. Through these research questions and assumptions, this study hopes to provide a new perspective for understanding the relationship between digital reading and academic ability and provide theoretical support and empirical basis for educational practice.

3. Methodology

3.1 Research Design

This study adopts mixed research methods, including qualitative research and quantitative research. The mixed research method combines the extensiveness of quantitative research and the depth of qualitative research and can provide a more comprehensive perspective to deeply explore the relationship between digital reading and the academic ability of students in S College.

Quantitative research: Collect data related to students' digital reading through a questionnaire survey and then quantitatively analyze the correlation between students' digital reading and academic ability. Based on information processing theory and cognitive load theory, the questionnaire design focuses on evaluating students' information processing ability and cognitive load in digital reading.

Qualitative research: Through structured interviews, we can deeply understand students' digital reading habits, reading strategies and skills, and views on educational intervention measures. Qualitative research will be based on social cognitive theory, and the deep-seated reasons behind quantitative data will be deeply analyzed.

3.2 Survey of Participants and Construction of Research Tools

The research object is undergraduates at S College. This study adopts a stratified random sampling method to ensure the diversity of samples in grade, major, and gender. In this study, 1530 students were invited to investigate, and 1327 valid questionnaires were collected, with an effective recovery rate of 86.73%, which showed that the student groups were highly interested in and recognized the theme of this study.

The research tools include a questionnaire designed using the template of an online survey platform and a semi-structured in-depth interview guide. The questionnaire survey consists of three parts: basic information, digital reading habits, and self-evaluation of academic ability. The first part aims to collect basic information such as grade, major, and gender of participants; the second part is used to evaluate their digital reading frequency, preferred reading materials, and reading equipment used, and the third part is used to evaluate students' academic ability through Likert scale (1-5 points), which is widely regarded as a reliable tool to evaluate subjective ability. In-depth interview is based on the results of a questionnaire survey, and participants from different backgrounds are selected to learn more about their digital reading experience and views on academic ability through semi-structured interviews.

3.3 Data collection strategies and analysis methods

Use the template provided by the online questionnaire survey platform "Questionnaire Star" (<https://www.wjx.cn/>) to generate an electronic questionnaire and send the questionnaire link and QR code to the pre-determined sample students through WeChat. The questionnaire design pays attention to user-friendliness and ensures concise language and clear logic. The interviewees are

selected according to the questionnaire results, and the interview time and method (online or offline) are arranged according to the convenience of the participants.

Quantitative data analysis is carried out using the Chinese version of SPSS software. In this study, descriptive statistical analysis and inferential statistical analysis are carried out on the survey data. Descriptive statistics are used to summarize participants' basic situation and digital reading habits, while inferential statistics include correlation analysis and regression analysis to explore the relationship between digital reading and academic ability.

3.4 Research limitations and ethical considerations

The sample of this study is limited to the students of S College, the questionnaire design may be limited by the ability of researchers, and the data reported by students may be biased. Based on the above factors, this study has certain limitations. This study followed strict ethical standards, and all the students participated in this study voluntarily on the basis of understanding this study. During the research, the privacy and personal information of participants are strictly protected to ensure the ethics of the research. In addition, in order to show respect for the concept of equality between men and women, this study does not collect gender information of participants.

3.5 Reproducibility and transparency of research

In order to ensure the reproducibility and transparency of the study, this study will provide questionnaire samples and interview guides as appendices. In addition, this study will present the process of data discovery and data analysis in a clear and detailed way, including the key decision points of the study, so that other researchers can copy and verify this study. It is expected that this transparent way can enhance the credibility of the research results and provide a solid foundation for future research.

4. Results and Discussion

4.1 Reliability and validity test of research tools

4.1.1 Reliability test

After completing the questionnaire design, this study tested the reliability and validity of the questionnaire to ensure the scientific research tools.

Table 1: Reliability Analysis of Questionnaire-Cronbach's alpha Coefficient

dimension	Cronbach's alpha
Overall questionnaire	0.78
Academic writing ability	0.76
Information retrieval ability	0.73
Critical thinking ability	0.75

Reliability analysis shows that the Cronbach coefficient of the whole questionnaire is 0.73, which indicates that the questionnaire has high internal consistency. The reliability analysis results of several key dimensions are also satisfactory. The Cronbach's alpha coefficients of academic writing ($\alpha=0.76$), information retrieval ($\alpha=0.73$), and critical thinking ($\alpha=0.75$) all exceed 0.7. For exploratory research, such coefficient values show that the reliability of these dimensions is acceptable and the questionnaire has good internal consistency.

4.1.2 Validity test

In terms of validity analysis, content validity is guaranteed by extensive literature review and expert consultation, ensuring that the questionnaire items cover the key areas of research comprehensively. Because the number of samples in this study is over 1000, the construct validity is tested by exploratory factor analysis (EFA), and the analysis results support the theoretical structure of the questionnaire items.

Table 2: Questionnaire Conceptual Validity Analysis-Exploratory Factor Analysis (EFA) Results

Item description	Factor 1 (academic writing)	Factor 2 (information retrieval)	Factor 3 (critical thinking)
Ability to describe and analyze academic articles	0.70		
Write clear and logical academic papers	0.75		
Retrieve relevant information from multiple sources.		0.68	
Assess the reliability of information sources.		0.72	
Identify logical fallacies in arguments.			0.75
Applying critical thinking to solve complex problems			0.71

Table 2 shows the results of exploratory factor analysis (EFA), which lists some representative items in the questionnaire and their load on different factors. The load indicates the degree of correlation between the item and the factor, and the higher load indicates that the item is consistent with the theoretical expected factor structure. Factors 1, 2, and 3 represent academic writing, information retrieval, and critical thinking, respectively, and the load value approaches or exceeds 0.7, indicating that the quality of the questionnaire survey is relatively good.

4.2 Questionnaire survey and statistical analysis results

The questionnaire survey received 1327 valid responses, accounting for 86.73% of the students invited to participate. Participants include freshmen to seniors with a wide range of majors (see Table 3).

Table 3. Distribution of Students Participating in the Survey

Major categories	Number of students in school	Invite students	Number of questionnaires recovered
Medical Class	10975	1210	1016
Engineering class	1091	110	108
Science class	1781	170	164
Literature and teaching	416	40	39

Table 4: Digital Reading Habits

reading habit	Number of participants	Proportion of participants
Read frequently	1318	99.3%
Occasionally read	nine	0.7%

The survey of digital reading habits shows that 1318 students have the habit of reading frequently, only 9 students have no habit of reading frequently, and more than 99% of the participants have the habit of reading frequently, which fully shows that students in S College generally have reading habits (Table 4).

In the survey results of reading equipment preference, 85.1% of students choose smart phones, which shows that among college students, e-reading is mainly carried out through smart phones (Table 5).

Table 5: Preferred reading devices

device type	Number of participants	Preference ratio
smartphone	1130	85.1%
Tablet computer	97	7.3%
laptop	seventy-two	5.4%
Other electronic readers	38	2.9%

According to the survey results, there are various types of reading materials for college students. News information, online course materials, e-books, and academic papers are the main contents that students choose, and news information materials are the most frequently read by students (Table 6).

Table 6: Types of Reading Materials

material type	Number of participants	Select proportion
News information	703	53.0%
Online course materials	485	36.5%
Electronic book	394	29.7%
Academic paper	198	14.9%

In terms of self-evaluation of academic ability, students' self-evaluation of their academic writing ability is 3.0 points, their information retrieval ability is 3.4 points, and their critical thinking ability is 3.1 points, which reflects that students have performed well in information retrieval, but there is still room for improvement in academic writing and critical thinking. (Table 7).

Table 7: Self-assessment of academic ability

Ability type	Mean value (μ)	Standard deviation (σ)	Range of students' self-evaluation scores
Academic writing ability	3.0	0.52	2.1 - 3.6
Information retrieval ability	3.8	0.41	3.2 - 4.8
Critical thinking ability	3.1	0.44	2.6 - 3.7

Correlation analysis shows that digital reading frequency is positively correlated with academic writing ability ($r=0.51$, $p<0.01$), information retrieval ability ($r=0.62$, $p<0.01$), and critical thinking ability ($r=0.46$, $p<0.01$) (Table 8).

Table 8: Correlation analysis between digital reading frequency and academic ability

scholarly competence	Correlation coefficient of digital reading frequency (R)	Significance level (P)
Academic writing ability	0.51	<0.01
Information retrieval ability	0.62	<0.01
Critical thinking ability	0.46	<0.01

In-depth interviews, students were asked about the frequency of reading academic papers. In regression analysis, weekly statistics were made, and the numbers from 1 to 7 were used to mark the number of days of reading academic papers, which also represented the frequency of reading academic papers. The students' academic ability was scored by the average of their academic writing ability (μ_1), information retrieval ability (μ_2), and critical thinking ability (μ_3). The results of regression analysis show that the frequency of reading academic papers is a significant predictor of academic writing ability ($\beta=0.42$, $p<0.01$), which means that reading academic papers frequently may help to improve students' academic writing ability and critical thinking ability (tables 9 and 10).

Table 9: Regression Analysis Results-Predicting Academic Writing Ability

independent variable	Regression coefficient (β)	Significance level (P)
Frequency of reading academic papers	0.42	<0.01

Table 10: Regression Analysis Results-Predicting Critical Thinking Ability

independent variable	Regression coefficient (β)	Significance level (P)
Frequency of reading academic papers	0.35	<0.05

4.3 In-depth interview insights and results summary

In the process of in-depth interviews, students generally agree that digital reading breaks through time and place restrictions and greatly improves the convenience of information acquisition. However, some students also realize that digital reading has brought some challenges. Interference factors in a digital environment, such as social media, advertisements, and notification push, easily distract people's attention, thus affecting the quality and efficiency of reading. In order to get a better reading experience, students prefer to read deeply in a non-interference environment such as a library. During the interview, the students also showed their desire to improve their academic ability. Students hope that the college can provide academic writing courses and more information literacy training. These courses and training will help students master the skills of academic writing, cultivate critical thinking, and fundamentally improve their academic ability. In addition, the students suggested that the college should create a focused and undisturbed digital reading environment, which will help to improve the concentration and depth of reading so as to absorb and understand academic materials more effectively.

The results of this study show that there is a positive correlation between digital reading and the academic ability of college students, and the frequency of reading academic papers has a significant impact on academic writing ability. Students expect more academic support to improve their academic ability. These findings suggest that colleges and universities should not only provide digital reading resources but also pay attention to cultivating an in-depth reading environment and cultivating students' critical thinking ability to help students develop their academic ability better.

4.4 Results discussion

4.4.1 Correlation between digital reading and academic ability

The results of this study show that college students' digital reading habits are positively related to their academic ability, especially to their information retrieval ability. Although digital reading provides students with a convenient way to obtain information, the improvement of students' critical thinking ability is unknown, which may be related to students' tendency to read at a shallow level in a digital environment. This study also found that the frequency of reading academic papers by college students may help to improve their academic writing ability and critical thinking abilities, and in-depth reading and understanding are very important for building college students' academic ability under the background of digital reading. This discovery has not been fully explored in the existing literature.

4.4.2 Challenges to existing literature and enlightenment to educational practice

Compared with the existing research, the findings of this study challenge the traditional view that digital reading leads to shallow reading. This study finds that when students read academic papers, they can think and analyze more deeply, which shows that digital reading does not always lead to shallow reading. In addition, in-depth interviews revealed students' expectations for a non-interference and dedicated digital reading environment, which provided specific directions for universities to optimize academic support and reading environment. The results of this study support the view that students' academic writing ability can be effectively improved through educational intervention, such as writing workshops and academic writing guidance. At the same time, it is equally important to strengthen information literacy education and cultivate college students' media recognition ability and information evaluation abilities to enhance their academic ability.

4.4.3 Future research direction and policy suggestions

The sample of this study is limited to undergraduates in S College, and it cannot represent all college students. Future research can improve the representativeness and universality of the research by expanding the sample range. In addition, longitudinal research design can be used to further understand the influence of digital reading habits on college students' academic ability over time.

Based on the findings of this study, it is suggested that colleges and universities should pay attention to cultivating college students' digital reading habits, improve students' academic writing and critical thinking ability through educational intervention,

and consider optimizing the digital reading environment to reduce interference and provide an environment more conducive to in-depth reading. These measures will help students to better improve their academic ability.

5. Conclusion

This study analyzes the relationship between digital reading and the academic ability of college students and draws a series of meaningful conclusions. The main conclusion of the study is that there is a positive correlation between digital reading and college students' academic ability, and the frequency of reading academic papers may have a significant impact on academic writing ability. This study also found that shallow digital reading did not significantly improve students' critical thinking ability. In addition, students generally expressed their desire for academic support and the development of academic ability.

This study not only provides a new perspective for understanding the role of digital reading in the development of academic ability but also provides a reference for other universities. In view of these findings, it is suggested that colleges and universities should attach importance to students' digital reading and improve their academic writing and critical thinking ability through educational intervention, thus promoting their academic development.

Looking forward to the future, researchers can further explore the influence of different types of digital reading materials on students' academic ability and the effect of different teaching interventions on improving academic ability. Through these efforts, we can fully understand the influence of digital reading on the development of academic ability and provide more effective references for colleges and universities to improve the quality of personnel training.

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Appendix 1:

Questionnaire on Digital Reading Habits and Academic Development

Dear students:

Hello! The purpose of this questionnaire is to understand your reading habits and their influence on academic development. Sincerely invite you to participate in this questionnaire survey. We promise that all the information collected will be used only for academic research and will be kept strictly confidential. Thank you for your participation and support!

I. Basic information

- 1. Your major _____
- 2. Your grade is _____
- 3. Your department (college) _____

Second, reading habits

4. How much time do you spend reading digitally every day?

- a. No.
- b. Less than 1 hour
- c. 1-3 hours
- d. 3 to 5 hours
- e. More than 5 hours

5. What types of materials do you often read digitally? (Multiple choices are allowed)

- a. News information
- b. Academic journals/papers
- c. Online teaching materials/reference books

d. E-books/online articles

6. What is the main purpose of your digital reading?

Leisure and entertainment

a. Academic research

b. Knowledge development.

c. Curriculum learning

d. Improve professional skills.

7. What media do you usually use for digital reading?

a. A smart phone

b. A tablet computer

c. Notebooks/desktops

d. Other electronic readers

8. Do you think digital reading is helpful for your academic development?

a. Very helpful.

b. A little help.

c. Neutral.

d. No help.

e. Very unhelpful.

9. How do you evaluate your digital reading efficiency?

a. Very efficient.

b. More efficient.

c. A. general

d. Less efficient.

e. Very inefficient

10. What are the main difficulties you encounter in the process of digital reading?

a. Time management

b. Information screening

c. Understanding difficulty

d. Memory and application

Others, please specify: _____ *

11. What do you think schools should do to help students improve their digital reading habits?

- a. Provide reading guidance and resources.
- b. Increase reading related courses and activities.
- c. Establish a reading community or group.
- d. Provide reading motivation incentives.

Others, please specify: _____ *

Third, self-assessment of academic ability

12. Be able to clearly describe and analyze academic articles.

- a. Very different, score 1 point.
- b. Disagree, score 2 points.
- c. Neutral, 3 points.
- d. Agree, score 4 points.
- e. Agree very much, and score 5 points.

13. Be able to write academic papers with clear structure and strong logic.

- a. Very different, score 1 point.
- b. Disagree, score 2 points.
- c. Neutral, 3 points.
- d. Agree, score 4 points.
- e. Agree very much, and score 5 points.

14. Be able to effectively use various citation formats for academic writing.

- a. Very different, score 1 point.
- b. Disagree, score 2 points.
- c. Neutral, 3 points.
- d. Agree, score 4 points.
- e. Agree very much, and score 5 points.

15. Be able to retrieve relevant information from multiple sources.

- a. Very different, score 1 point.
- b. Disagree, score 2 points.
- c. Neutral, 3 points.

-
- d. Agree, score 4 points.
 - e. Agree very much, and score 5 points.
16. Be able to evaluate the reliability and relevance of information sources.
- a. Very different, score 1 point.
 - b. Disagree, score 2 points.
 - c. Neutral, 3 points.
 - d. Agree, score 4 points.
 - e. Agree very much, and score 5 points.
17. Can effectively manage and use the retrieved information.
- a. Very different, score 1 point.
 - b. Disagree, score 2 points.
 - c. Neutral, 3 points.
 - d. Agree, score 4 points.
 - e. Agree very much, and score 5 points.
18. Be able to identify logical fallacies and defects in arguments.
- a. Very different, score 1 point.
 - b. Disagree, score 2 points.
 - c. Neutral, 3 points.
 - d. Agree, score 4 points.
 - e. Agree very much, and score 5 points.
19. Ability to use critical thinking to solve complex problems.
- a. Very different, score 1 point.
 - b. Disagree, score 2 points.
 - c. Neutral, 3 points.
 - d. Agree, score 4 points.
 - e. Agree very much, and score 5 points.
20. Be able to put forward insightful analysis and argumentation in the discussion.
- a. Very different, score 1 point.
 - b. Disagree, score 2 points.

- c. Neutral, 3 points.
- d. Agree, score 4 points.
- e. Agree very much, and score 5 points.

21. Usually able to complete academic tasks independently.

- a. Very different, score 1 point.
- b. Disagree, score 2 points.
- c. Neutral, 3 points.
- d. Agree, score 4 points.
- e. Agree very much, and score 5 points.

22. I feel that I have a deep understanding of academic materials.

- a. Very different, score 1 point.
- b. Disagree, score 2 points.
- c. Neutral, 3 points.
- d. Agree, score 4 points.
- e. Agree very much, and score 5 points.

23. Have confidence in your academic ability.

- a. Very different, score 1 point.
- b. Disagree, score 2 points.
- c. Neutral, 3 points.
- d. Agree, score 4 points.
- e. Agree very much, and score 5 points.

Appendix 2:

Outline of in-depth interview on digital reading habits and academic development

- 1) First, Basic information
 1. Major:
 2. Grade:
 3. Department:
- 2) Second, reading habits
 4. Can you describe your current digital reading habits? (Frequency, duration, environment, etc.)
 5. What types of digital books or materials do you usually read? (academic, leisure, professional related, etc.)
 6. What factors do you mainly consider when choosing digital reading materials?
- 3) Third, reading and academic development
 7. What specific influence do you think digital reading has on your academic thinking?
 8. Do you think there is a connection between digital reading habits and your knowledge accumulation? Can you give an example?

9. In your opinion, what are the potential positive effects of good digital reading habits on academic achievements?
- 4) Fourth, reading training and challenges
- 10. Have you received systematic digital reading training? How do these trainings affect your reading habits?
 - 11. What is the biggest challenge you encounter when reading digital academic materials?
 - 12. How do you think schools should help students overcome these challenges?
- 5) Fifth, Reading Strategies and Skills
- 13. What strategies or skills do you usually use in digital reading?
 - 14. How do you learn and master these digital reading strategies?
 - 15. What digital reading strategies do you think are most helpful to improve academic reading efficiency?
- 6) Sixth. Reading Resources and Support
- 16. What channels do you usually get digital reading materials?
 - 17. How do you think the school library has done in supporting students' digital reading?
 - 18. In what areas do you want the school to provide more support to promote students' digital reading?
- 7) Seventh, personal experience sharing
- 19. Do you have any specially recommended digital reading materials or books? Why?
 - 20. Can you share an experience of gaining important academic insights or enlightenment through digital reading?
 - 21. What suggestions do you have for students who want to improve their digital reading habits?
- 8) Eighth. Concluding questions
- 22. What do you think is the long-term impact of improving digital reading habits on your overall academic development?
 - 23. Do you have any plans or expectations for your future digital reading habits?
- 9) Ninth. Others
- 24. Is there anything you want to add in this interview?
- Are you willing to participate in follow-up interviews or related research?