The Effects of Technology - Integrated Course to Enhance Writing Achievement of Grade 6 Students in Primary School at Guangdong

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Abstract

This study delves into the integration of technology in sixth-grade primary school English writing education. It aims to understand the complex relationship between technology-integrated teaching, students' writing achievements, and their perspectives on such teaching. The research objectives are 1) to investigate how technology-integrated teaching methods affect students' writing achievement and 2) to explore the aspects of the technology-integrated teaching method that lead students to form specific perspectives, and these perspectives, in turn, affect the further integration of technology in teaching. The study involves two classes of 12-year-old students with low academic achievement. One class serves as the experimental group, receiving technology-integrated teaching, while the other serves as the control group, receiving traditional instruction. Paired samples t-tests were utilized for data analysis over one semester. While the study uses a relatively small sample of 50 students per group, it provides valuable insights into the effects of technology-integrated teaching methods on writing achievement for low-achieving students. Future research with a larger and more diverse sample could help validate and extend these findings. However, the experimental design and focused nature of this study ensure that the results are still meaningful in understanding the impact of technology on student learning outcomes.

The study found that 1) the overall of the result was the technology-integrated teaching method significant .05 and positively affects students' writing achievement compared to traditional methods, as evidenced by the experimental group's more substantial and stable score improvement,2) Students also formed diverse perspectives on technology-integrated teaching based on their academic levels, the overall of the result of students'perspective was Mean=3.39,Standard Deviation = 1.15, the teachers' perspective was Mean= 3.59, Standard Deviation= 1.16. It claimed that the positive perspectives could drive further technology integration, but challenges such as course difficulty were also identified. To address these, it is recommended that teachers strengthen technological tool training, provide better guidance on internet resource use, and optimize course difficulty according to student feedback.

Keywords: technology-integration, primary school english writing, grade 6 students, writing achievement, students' perspective

1. Introduction

Over the years, the amalgamation of technology and education has significantly developed, revolutionizing traditional teaching methods and enhancing overall learning experiences. Integrating educational technology has become a focal point in sixth-grade English writing classrooms, aiming to elevate students' writing skills, engagement, and overall learning outcomes. This comprehensive study delves into the historical development of educational technology in English writing education, examines the current landscape, and provides a personal outlook on the role of technology in primary school English writing.

Historical Development of Educational Technology in English Writing, Katina et al. (2022) emphasize the imperative

for improved writing instruction, urging educators to understand various factors contributing to students' past difficulties and engage in global professional development, incorporating successful practices and overcoming obstacles to foster a mindset shift towards enriched literacy outcomes. Laliberté (2024) emphasized the need to recognize each approach's unique characteristics and historical developments to appreciate their roles in contemporary society fully. Wang et al. (2023) propose that students facing challenges with writing in the past tense can benefit from a multifaceted approach, wherein educators employ strategies such as explicit instruction, examples, practice exercises, feedback, and regular writing tasks; Additionally, the integration of AI tools like chatbots or dictation ASR systems enhances personalized feedback, collectively aiding students in surmounting challenges and honing their past tense writing abilities. Clarence et al. (2024) highlight historical concerns regarding obstacles faced by students, particularly from low-income households, in developing proficient writing skills, with a focus on the disproportionate representation of low SES students among those struggling to meet minimum standards, underscoring the urgent need for comprehensive research and targeted methodologies to enhance writing proficiency, especially among students from disadvantaged backgrounds. Reid et al. (2023) highlight historical challenges for students with writing difficulties stemming from limited access to instruction, insufficient curriculum emphasis, and gaps in understanding cognitive processes; despite past disparities, recent years have witnessed a growing recognition of the importance of writing proficiency, leading to initiatives focused on improved instruction, targeted interventions, and increased research to ensure all students have the opportunity to cultivate strong writing skills for academic and career success. Peng (2013) The early adoption and support of interactive electronic whiteboards, particularly in countries like the UK, have paved the way for advancements in educational technology, as exemplified by significant investments and research highlighting benefits such as increased student engagement, enhanced learning motivation, and improved attention levels. Tan's (2022) primary school English writing instruction often followed traditional methods, with teacher-led classes, passive student reception of knowledge, and limited practical engagement, potentially hindering interest and motivation. Teachers may have lacked awareness and application of innovative teaching methods, possibly resulting in insufficient interaction, practice opportunities, and slow development of students' writing abilities.

This comprehensive study has provided a detailed overview of the historical development of educational technology in English writing education, summarized discussions by various authors, and presented the current landscape. Technology integration in teaching sixth-grade English writing holds great potential, offering opportunities for personalized guidance, real-time feedback, interactive learning, multimedia support, and autonomous learning. Embracing these advancements will elevate students' writing skills and enhance their learning experience, preparing them for the challenges and opportunities of the 21st century.

1.1 Research Questions

1. How does the technology-integrated teaching method affect students' writing achievement?

2. In what aspects will the technology-integrated teaching method lead students and teachersto form specific perspectives?

1.2 Research Objectives

1. To investigate how technology-integrated teaching methods affect students' writing achievement.

2. To explore the aspects of the technology-integrated teaching method leads students and teachers to form specific perspectives.

1.3 Research Hypotheses

Hypothesis 1: Technology-integrated teaching methods will significantly improve students' writing achievement compared to traditional teaching methods.

Hypothesis 2: Students and teachers who experience technology-integrated teaching will have more optimistic perspectives on using technology in education.

1.4 Research Framework

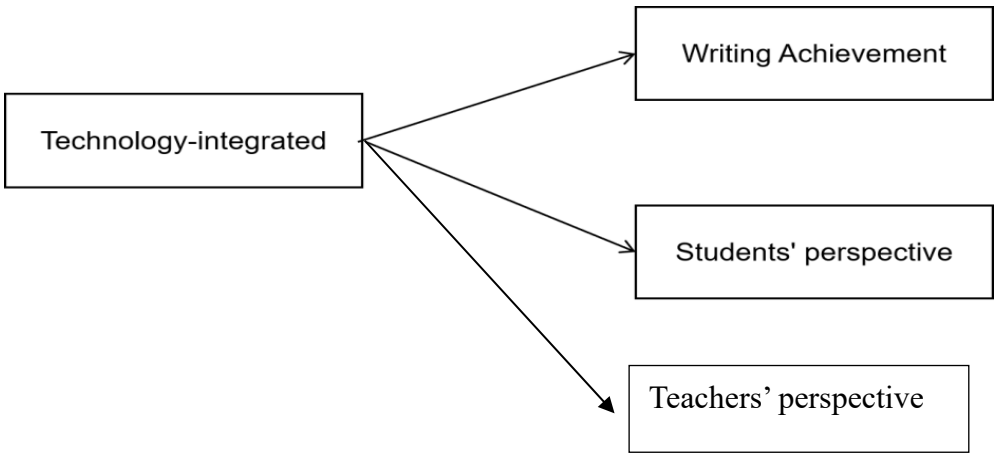

Figure 1. Research Framework

2. Literature Review

2.1 Seewo Whiteboard

Alhumsi (2024) examined Jordanian EFL teachers' perspectives on the impact of Interactive Whiteboard (IWB) technology on word identification, finding positive attitudes and consistent recognition of its efficacy across various demographic variables, thus advocating for the integration and further exploration of IWB technology in EFL classrooms to enhance language teaching and learning practices. Luo et al. (2023) investigated pre-service ESL teachers' perceptions of the usefulness of Seewo interactive whiteboards, revealing insights into how its functions enhance learning processes and outcomes, as well as identifying aspects perceived as non-useful, thereby highlighting key factors influencing the intention to adopt this technology. Stohr et al. (2020) evaluated the effectiveness of transforming a campus-based applied physics course into an online flipped format. The study found no significant difference in average performance but identified a notable polarization in performance due to fluctuations in transactional distance, highlighting implications for online instructional design and student support.

2.2 Pigai

Yao (2021) explores the effectiveness and accuracy of the Pigai System in providing automated feedback and scoring for ESL learners. The study assesses the system's ability to detect errors in ESL writing, compares its performance with human raters, and discusses implications for future research and practical applications in language learning and teaching. Gao (2021) examined the feedback quality of the Automated Writing Evaluation (AWE) system, Pigai, which is widely employed in English teaching in China. The study assessed Pigai's diagnostic accuracy by comparing its feedback with that of professional teachers on final exam essays from 104 university students. While Pigai was less accurate overall than human feedback, it excelled in identifying lexical errors. Students perceived Pigai's feedback as versatile but noted limitations in detecting collocation errors and offering syntactic suggestions. The study discussed the implications and limitations of using Pigai in educational settings. Guo (2020) argues that integrating Pigai.org into university-level English writing instruction enhances teacher efficiency and improves students' writing skills and self-awareness. The article examines traditional teaching methods and current practices, employing student writing samples, questionnaires, and interviews to explore the potential impact of Pigai.org on the effectiveness of university-level English writing instruction. Lin et al. (2020) evaluate Pigai, an intelligent online English writing correction system, within the context of second language acquisition. The study explores (1) learning theories, such as the Input Hypothesis and their application to Chinese learners, (2) the features of Pigai, and (3) its strengths and weaknesses. The research concludes that while Pigai can somewhat enhance learners' writing skills and language competence, it does not significantly improve their humanities-related qualities. Yang et al.(2022) aimed to enhance Chinese college-level EFL learners' writing assessment literacy by integrating the automated evaluation system Pigai into language teaching. Involving 119 students in activities, the study found that through proper integration and guidance, learners improved their assessment literacy and effectively utilized AES feedback. The research underscores the importance of continued investigation in this area.

The studies collectively explore the integration and impact of the Pigai automated writing evaluation system in

English language education, highlighting its capabilities in providing feedback and scoring for ESL learners. They discuss the system's effectiveness in improving writing skills and its limitations compared to human feedback, emphasizing its role in enhancing assessment literacy and teacher efficiency in educational settings.

2.3 Writing Achievement

Zenouzagh et al. (2023) found that while text-based Computer-Mediated Communication (CMC) fosters greater learner autonomy, behavioral, and cognitive engagement, multimodal CMC enhances emotional and social engagement, with text-based CMC also leading to higher writing quality among Iranian EFL students. However, both groups noted negative judgments regarding the internet dimension affecting e-satisfaction. Bailey et al. (2021) found that intrinsic motivation for asynchronous collaborative writing in an online English course led to greater overall course satisfaction and positive behavioral intentions to use language learning technology, compared to video-synchronous speaking practice, highlighting different motivational impacts on learning engagement. Kerman et al. (2022) found that students' perceived usefulness and trustworthiness of peer feedback positively impact learning satisfaction in online learning environments, particularly in the context of argumentative essay writing. Implementing interactive courseware within a task-based learning approach for teaching English Writing for Business to Chinese students significantly improved post-writing performance and increased learning satisfaction. The courseware, developed under Mayer's multimedia learning theory and Chapelle's criteria for multimedia CALL, effectively integrated real-world tasks and language practice, enhancing both content knowledge and integrative language skills essential for business writing education.

2.4 Satisfaction

Zenouzagh et al. (2023) found that text-based Computer-Mediated Communication (CMC) fosters greater learner autonomy, behavioral, and cognitive engagement, as well as writing quality, while multimodal CMC enhances emotional and social engagement, with both groups noting dissatisfaction with internet quality, highlighting the need for context-specific considerations in online EFL learning environments. Caskurlu et al. (2020) conducted a meta-analysis revealing a moderately strong correlation between teaching presence and perceived learning, as well as satisfaction in online courses, highlighting variations influenced by course settings, target audience, course length, disciplinary area, and teaching presence scale, with implications for online course design and facilitation. Bailey et al. (2021) conducted a study exploring how intrinsic value, intrinsic motivation, and course satisfaction influence learners' engagement with asynchronous collaborative writing and video-synchronous speaking practices in a fully online foreign language English course, using structural equation modeling and cross-sectional survey data to highlight the mediating role of course satisfaction on behavioral intentions towards language learning technology. Kerman et al. (2022) investigated the impact of students' perceived usefulness and trustworthiness of peer feedback on learning satisfaction in online environments, using a pre-test and post-test research design with 135 undergraduate students at Wageningen University and Research, focusing on argumentative essay writing.

Online education highlights that text-based Computer-Mediated Communication enhances learner autonomy and cognitive engagement, while multimodal Computer-Mediated Communication enhances emotional and social engagement. Instructional presence is closely related to perceived learning and satisfaction in online courses and is influenced by various situational factors. In addition, course satisfaction plays a key role in shaping learners' engagement with online language learning technologies, underscoring the importance of user satisfaction in educational technology adoption.

3. Methodology

This study focuses on students and English teachers in a primary school(grades 1-6). The school has more than 3,000 students and 20 English teachers. Thereare 10 classes in each grade. There are about 50 students in each class. Considering only English writing, it comes out that there are 100 students who have a low average score. This study will involve 100 students divided into two classes and two teachers.Because the average score in both classes is very low.

This study adopts an experimental design to investigate the impact of technology-integrated teaching methods on students' writing achievement and the specific perspectives they form. The sample consists of two Grade 6 classes of 12-year-olds relatively small sample of 50 students per group, with low academic achievement. One class (experimental group) receives technology-integrated teaching, while the other (control group) follows traditional teaching methods. Both groups are matched in terms of academic ability. The methodology includes the use of digital tools such as the Seewo Whiteboard for interactive lessons and the Pigai online assessment tool for real-time

feedback on writing assignments. The study spans one semester, and data is collected via pre- and post-tests on writing achievement, as well as a series of student surveys to measure their perspectives on technology integration. The study will control for variables such as developmental stage, emotional recognition and management, and family influences, which may affect writing achievement. However, the experimental design and focused nature of this study ensure that the results are still meaningful in understanding the impact of technology on student learning outcomes.

4. Findings

4.1 Part 1. To Answer Research Objective 1

In the context of the continuous pursuit of innovation and optimization in education, the question of how to improve the English writing ability of primary school students more effectively has drawn extensive attention, and it has become the focus of many educational researchers. In particular, for sixth-grade primary school students in Guangdong, this study aims to verify how technology-integrated writing teaching compares with traditional teaching methods in enhancing students' writing achievements. Through rigorous experimental design, we intend to deeply analyze the differences between the two teaching approaches in improving students' English writing performance to provide targeted and guiding suggestions for teaching practice.

The experimental group was compared with the control group.

Table 1. F-Test Two-Sample for Variances

Compare the variance of class experimental and variance of class control					
Class	df	Mean	Variance	F	p-value
Experimental group (EXP)	49	31.14	3.27	0.91	0.37
Control Group (CON)	49	30.22	3.60		

Table 1 (F-Test section) presents a comparison of variances between the experimental group (EXP) and the control group (CON) based on pre-scores. The experimental group has a mean of 31.14 with a variance of 3.27, while the control group has a mean of 30.22 with a variance of 3.60. Both groups have 50 observations, leading to 49 degrees of freedom (df) each. The F-value calculated is 0.91, with a one-tailed p-value of 0.37. This p-value is higher than the critical one-tailed F-value of 0.62, indicating no significant difference in variances between the two groups. Therefore, we fail to reject the null hypothesis that the variances are equal.

Table 2. t-Test: Two-Sample Assuming Equal Variances

Class	Mean	Variance	df	t	p-value
Experimental group (EXP)	35.56	34.82	98	9.48	0
Control Group (CON)	32.08	25.07			

***** significant .05

Table 2 presented the results from the t-test indicate that the technology-integrated teaching method (experimental group) significantly improved students' writing achievement compared to the traditional teaching method (control group). The difference in mean post-test scores between the two groups is statistically significant, with the experimental group showing a higher mean score. Therefore, the research supports the hypothesis that technology-integrated teaching methods enhance students' writing performance more effectively than traditional methods.

4.2 Part 2. To Answer Research Objective 2

This section focuses on answering research objective 2. It explores sixth-grade primary school students' writing tests and learning experiences in Guangdong to understand of students and teachers satisfaction with technology-integrated teaching for writing improvement.

Pre-writing test experience: Less experienced students showed nervousness and helplessness due to weak basic

knowledge and lack of writing skills, resulting in poor test performance. Higher-experience students were calmer but had problems with writing details and speed. Most experienced students demonstrated confidence and solid skills, with high-quality performance. Perception of questions and requirements: Less experienced students had difficulty grasping questions and requirements, often deviating from the theme. Higher-experience students found questions lacking novelty and sometimes mechanically followed requirements. Most experienced students can dig out deep connotations and apply requirements flexibly. Opinion on test time: Less experienced students thought time was seriously insufficient due to their ability limitations. Higher-experience students felt the time was tight and hoped for more time to optimize their writing. Most experienced students thought time was relatively abundant and could use it effectively. Areas for writing improvement: Less experienced students wanted to improve grammar and vocabulary. Higher-experience students aimed to enhance sentence-structure diversity and vocabulary usage. Most experienced students strived for a unique personal style and in-depth theme exploration.

A detailed analysis of the questionnaire data of 3,000 students provides a deeper understanding of student's attitudes, perceptions, and satisfaction with technical integrated writing teaching. The following is a specific analysis of the survey results:

Table 3. Student Questionnaire Analysis

Item	*Mean*	*Standard Deviation*	Interpretation
1. How do you often use the internet to search for answers?	3.11	1.29	Moderation
2. How do you prefer teachers to introduce technology writing courses?	3.26	1.17	Moderation
3. How can technology writing courses enhance your interest in writing?	3.21	1.15	Moderation
4. How will you pay more attention to the technology writing courses?	3.54	1.38	High
5. How do you think the effect of technology writing courses is better?	3.53	1.08	High
6. How should you upload your article to the correct network?	3.45	1.07	High
7. How do you think a technology writing course is easier?	3.01	1.20	Moderation
8. How do you think the technology writing course is more space for you to write?	3.28	0.97	Moderation
9. How do you think peer evaluation is good for reflection?	3.71	1.36	High
10. How do you think peer evaluation is helpful to improve your writing level?	3.76	0.94	High
11. How do you think you prefer technology writing courses?	3.47	1.03	High
12. How are you satisfied with your school's technical equipment?	3.29	0.88	Moderation
Students	**3.39**	**1.15**	**Moderation**

Table 3 showed the overall (Mean=3.39 and Standard Deviation= 1.15). The differences in Attitudes and Behaviors: Judging from the student questionnaire data, in aspects such as students' use of the Internet to search for answers, their evaluation of the way teachers introduce courses, and their perception of course difficulty, the mean values are at a medium level, and the standard deviations are relatively large. This indicates significant differences in attitudes and behaviors within the student group. For example, in terms of using the Internet to search for answers, the degrees of dependence among different students vary greatly due to differences in knowledge reserves and learning habits. Regarding how teachers introduce courses, the diversity of teaching styles leads to different levels of student satisfaction. However, the mean values are relatively high in aspects such as the effectiveness of the course, support for uploading articles to the correction network, and recognition of the writing space. The standard deviations are small, reflecting that students 3.59 generally hold a positive attitude. Their opinions are relatively consistent, indicating that students in these aspects have widely recognized the technical writing course.

Expressions of Needs and Interests: Students have a high degree of attention and preference for the technical writing course, indicating strong interest in and anticipation. Regarding the need to improve writing abilities, most students recognize the need for peer evaluation in reflection and improving writing skills. They also aspire to enhance their writing interest and abilities through the course. Nevertheless, individual differences are still obvious. For example, in terms of the course's stimulation of writing interest, students have different feelings due to their different degrees of acceptance of new things. This suggests that teachers need to consider individual differences in teaching, meet the needs of different students, and optimize teaching strategies to improve teaching effectiveness.

Table 4. Teacher Questionnaire Analysis

Item	*Mean*	*Standard Deviation*	Interpret
1. How do you give a writing lesson every two weeks?	3.11	1.29	Moderation
2. How do you often assign compositions as production to exercise student writing ability?	3.26	1.17	Moderation
3. How do you attach great importance to the composition part in every exam?	3.21	1.15	Moderation
4. How do you think improving the student's writing level by peer-evaluation mode is helpful?	3.54	1.38	High
5. How do you set up an online class writing group?	3.53	1.08	High
6. How do you think it is not very difficult for you to make related documents?	3.45	1.07	High
7. How do you encourage students to look up writing words or materials through the Internet?	3.01	1.20	Moderation
8. How do you think network resources are more conducive to improving student reading ability?	3.28	0.97	Moderation
9. How do you have time to make or share some writing online resources with students after class?	3.71	1.36	High
10. How is it better to teach writing through technology writing teaching?	3.76	0.94	High
11. How do you prefer using multimedia devices or network resources to enhance student interest?	3.47	1.03	High
12. How have you used internet form (WeChat, E-mail) to review compositions?	3.29	0.88	Moderation
13. How do you think the introduction of technology writing teaching is more conducive to enriching the student's imagination?	2.42	1.05	High
Teachers	**3.59**	**1.18**	**High**

Table 4 claimed overall (Mean=3.59 and Standard Deviation= 1.18,). there are divergences in Teaching Behaviors and Concepts: Teachers' mean values in aspects such as the frequency of offering writing classes, the frequency of assigning compositions, and their views on the importance of compositions in exams are at a medium level, and the standard deviations are relatively large. This means there are significant divergences in teachers' teaching behaviors and concepts. The teaching characteristics of different disciplines and grades lead to different arrangements of writing classes. Differences in teaching concepts give teachers different degrees of emphasis on and choices of methods for composition training. However, the mean values are relatively high in aspects such as establishing online classroom writing groups, recognizing the value of scientific and technological writing teaching, and using multimedia resources to enhance students' interest. The standard deviations are relatively small, reflecting that teachers' behaviors and concepts in these aspects are relatively consistent. They are actively exploring the use of new technologies and new methods to improve teaching quality.

5. Conclusion

Part 1

The results of this study clearly demonstrate that the technology-integrated teaching method significantly enhances students' writing achievement compared to traditional teaching methods. The experimental group, which used technology-driven instruction, showed a greater and more consistent improvement in writing scores. The data indicates that the technology-integrated approach not only led to higher average scores but also produced more substantial progress, suggesting its effectiveness in improving writing skills for low-achieving students. These findings highlight the potential of using digital tools in educational settings to foster better learning outcomes and improve overall academic performance in writing.

Part 2

In terms of students' perspectives, the technology-integrated teaching method contributed to a shift in their attitudes toward writing. Students from the experimental group expressed more positive views on technology use, recognizing its role in boosting their writing interest and skills. They appreciated the interactive features and real-time feedback offered by digital tools. This positive perception further reinforced the importance of integrating technology into teaching, as students felt more engaged and motivated. However, challenges related to course difficulty and technological familiarity also emerged, pointing to areas where further optimization and support can enhance the effectiveness of technology integration in education. Howerver, there are significant divergences in teachers' teaching behaviors and concepts. The teaching characteristics of different disciplines and grades lead to different arrangements of writing classes. Differences in teaching concepts give teachers different degrees of emphasis on and choices of methods for composition training.

6. Discussions

Part 1 to answer research question no.1:

The technology-integrated teaching method has a more significant promoting effect on students' writing achievement than the traditional teaching method. In the experiment, the improvement in students' writing scores in the experimental group using technology-integrated teaching was more significant than in the control group using traditional teaching. The score improvement of students in the experimental group was relatively stable and remarkable, indicating that the technology-integrated teaching method is effective and repeatable in improving students' writing achievement and can provide strong support for enhancing students' writing ability. Wen and Walters (2022) conducted a meta-analysis on the impact of technology on students' writing performances in elementary classrooms. This supports the conclusion that the technology-integrated teaching method has a more significant promoting effect on students' writing achievement. Yılmaz (2021) studied the effect of technology integration in education on prospective teachers' critical and creative thinking, multidimensional 21st-century skills, and academic achievements. Although the research subjects are prospective teachers, it reveals the positive impact of technology integration on learners' comprehensive abilities and academic outcomes.

Part 2 to answer research question no.2:

The technology-integrated teaching method has led students to form specific perspectives on their writing test experiences, feelings about question requirements, opinions on test time, and the parts of writing they hope to improve. Students at different levels have different perspectives. Generally, positive perspectives of students, such as increased interest in technology-integrated teaching, recognition of its effectiveness, and affirmation of the role of peer - evaluation, will prompt them to provide more support and demand for the further integration of technology in teaching. At the same time, issues such as course difficulty and student feedback also provide directions for further optimization of technology integration in teaching. Addressing these issues makes it better to promote the in-depth application of technology in teaching. Teng (2021) researched interactive - whiteboard - technology - supported collaborative writing, exploring writing achievement, metacognitive activities, and co-regulation patterns. This is highly relevant to the conclusion that "the technology-integrated teaching method leads students to form specific perspectives."Lee et al. (2022) conducted a meta-analysis on the effects of technology-integrated classroom instruction on K - 12 English language learners' literacy development, providing support for the idea that "students' positive perspectives promote the further integration of technology, and students' feedback issues guide the optimization direction of technology integration." The meta-analysis synthesizes numerous related studies, indicating that at the K - 12 stage, students' experiences and gains in technology-integrated classrooms will affect their attitudes toward technology.

Teaching Practices and Perceptions of Competencies: Most teachers affirm the role of peer evaluation in improving students' writing skills, but there are differences in the depth of practice and perception of the effects. Teachers also have different views and behaviors regarding the difficulty of making relevant documents, the help of network resources in improving students' reading abilities, and the frequency of sharing online writing resources. Some teachers have strong information technology application abilities and can efficiently make documents and fully use network resources; some teachers lack this ability. In addition, teachers generally believe that scientific and technological writing teaching has limited effects in enriching students' imagination, which points out the direction for subsequent teaching improvement. Teachers need to strengthen the exploration and practice of cultivating students' imagination in teaching.

7. Recommendation

For Teaching Practice: The findings of this study can directly inform teaching practice. Teachers can draw on the successful experiences of the technical comprehensive writing teaching method, such as using multimedia to stimulate interest, leveraging online platforms for real-time feedback, and organizing group cooperation writing activities. At the same time, they can also learn from the challenges students face in this approach and provide more targeted support, like additional grammar instruction for those struggling with new writing platforms or more guidance on using technological tools effectively. For traditional teaching, the study highlights the importance of injecting more innovative elements to make it more engaging and better address the diverse learning needs of students.

For Curriculum Design: Curriculum designers can consider incorporating technological tools and innovative teaching strategies into the writing curriculum, for example, designing specific modules that focus on using mind mapping software for writing conception or integrating online writing platforms for regular writing practice and feedback. Also, based on analyzing students' needs at different levels, the curriculum can be stratified to offer different difficulty levels and challenges, ensuring that all students can progress in their writing abilities.

For School Resource Allocation: Schools can use the insights from this study to make decisions about resource allocation. Recognizing the importance of technological equipment in supporting writing teaching, schools can invest in upgrading and maintaining computer facilities, network resources, and relevant software. Additionally, providing professional development opportunities for teachers to improve their skills in using technological tools for teaching and guiding students in writing can also be prioritized to enhance the overall quality of writing instruction.

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