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EFL Students' Challenges in Scratch-Based Collaborative Writing: A Descriptive Survey Study

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ABSTRACT

The use of digital learning tools has provided new opportunities to support collaborative writing in the English as a Foreign Language (EFL) classroom. Scratch is one of the digital learning platforms that can be utilized to support collaborative writing activities through its multimedia and storytelling features; however, students may experience various challenges during its implementation. Therefore, this study aimed to investigate EFL students' challenges in using Scratch as a digital learning tool for collaborative writing. This study employed a quantitative descriptive survey design involving 54 eleventh-grade students at SMA Negeri Jogoroto, Jombang, who had experience using Scratch in collaborative writing activities. Data were collected through a 20-item closed-ended questionnaire using a five-point Likert scale and analyzed using descriptive statistics, including mean scores and standard deviations, which were subsequently categorized according to a predetermined mean-interval classification. The findings showed that students experienced challenges categorized as high across all three dimensions examined. Digital Literacy Levels of Students was the most prominent challenge (M = 3.62), followed by Limited Access to Technological Infrastructure and Resources (M = 3.53) and Technical Issues and Compatibility Problems (M = 3.50). These findings indicate that students still faced difficulties with digital skills, technological resources, internet access, software compatibility, and technical support when using Scratch. In conclusion, the successful integration of Scratch in collaborative writing requires adequate digital literacy, reliable technological infrastructure, and continuous technical support. Therefore, English teachers and schools should provide sufficient training, improve technological facilities, and strengthen technical assistance to optimize the implementation of Scratch in EFL collaborative writing activities.

Keywords: Collaborative Writing, English Language Learning, Scratch, Students' Challenges

INTRODUCTION

Writing is one of the essential productive skills in English language learning because it enables learners to express ideas, organize thoughts, and communicate meaning effectively in both academic and digital communication. Despite its importance, developing effective written communication remains challenging for many EFL learners because it requires grammatical accuracy, coherence, vocabulary mastery, creativity, and logical organization of ideas. Salsabillah et al. (2025) reported that EFL students frequently experience interlingual errors, which stem from the influence of their first language, and intralingual errors, which arise from the target language system itself, such as the overgeneralization of grammatical rules. These recurring error patterns point to the need for continuous instructional support, including

structured peer interaction, that allows learners to identify and address such errors during the writing process rather than after it is completed. Anjarwati and Sa'adah (2024) further argue that combining scaffolding with a structured writing process enables learners to develop ideas more systematically and produce coherent texts. Consequently, researchers have increasingly explored instructional approaches that not only improve learners' written performance but also encourage active participation and meaningful interaction throughout the composing process.

Collaborative writing is widely recognized as an effective instructional strategy for improving learners' written communication skills in EFL classrooms. It refers to a learning process in which two or more learners jointly produce a single text through shared planning, drafting, revising, and editing while exchanging ideas and negotiating meaning (Lowry et al., 2004). Through this collaborative process, learners actively exchange ideas, provide feedback, negotiate meaning, and jointly construct texts, thereby strengthening both linguistic competence and higher-order thinking skills. Previous studies have also demonstrated that collaborative writing increases learners' engagement, confidence, communication, and overall writing performance compared with individual learning activities (Li, 2023; Winarti et al., 2021). These findings suggest that collaborative writing provides an interactive learning environment that simultaneously promotes language development and collaborative learning.

Educational technology has significantly transformed collaborative learning practices, leading to the emergence of Technology-Enhanced Collaborative Writing (TECW), where digital platforms facilitate collaboration throughout the composing process. These platforms enable learners to collaboratively plan, draft, revise, and provide feedback beyond classroom boundaries while improving the quality of their written work (Li, 2023). Recent studies have shown that digital writing technologies provide immediate feedback that supports grammar accuracy, vocabulary development, and text revision. AI-assisted writing applications have been reported to improve learners' writing quality through automated feedback (Anjarwati & Hentasmaka, 2025). Likewise, technology-integrated language learning provides innovative opportunities to strengthen students' grammatical competence and engagement, supporting more effective writing instruction (Ilsanti & Anjarwati, 2025). Furthermore, technology-integrated learning environments promote digital literacy, learner autonomy, and writing development, enabling students to participate more actively throughout collaborative writing activities (Irawati et al., 2025).

Scratch has emerged as a promising digital learning platform for language education because it enables learners to create interactive stories, animations, and multimedia projects through the integration of visual programming and digital storytelling (Fagerlund et al., 2021). Unlike conventional text-based collaborative writing tools such as Google Docs and Microsoft Word, Scratch allows learners to organize, develop, and communicate ideas through multimodal representations while collaboratively planning, drafting, revising, and presenting written texts. Its interactive features make collaborative writing more engaging and encourage creativity, communication, and active participation throughout the learning process.

Previous empirical studies have consistently demonstrated the effectiveness of Scratch in supporting English language learning across various educational contexts. Studies by Ariawan and Sutrisno (2025), Lubis et al. (2023), and Ma et al. (2022) reported improvements in learners' writing performance, vocabulary, grammar, creativity, motivation, and computational thinking through Scratch-based digital storytelling. Furthermore, Scratch has been found to foster collaboration, communication, and problem-solving skills in technology-supported learning environments (Alp & Bulunuz, 2023; Presicce et al., 2020). Although these findings confirm the pedagogical value of Scratch, they have primarily emphasized learning

outcomes rather than the challenges encountered by students during its implementation in collaborative writing activities.

Despite these promising findings, several research gaps remain regarding the use of Scratch in EFL collaborative writing. First, most previous studies have examined Scratch primarily as a tool for improving learners' writing performance, engagement, creativity, and computational thinking, rather than investigating the challenges encountered during its implementation. Second, research on Technology-Enhanced Collaborative Writing has predominantly focused on platforms such as Google Docs, blogs, and wikis (Kessler, 2018; Wahyuningsih et al., 2023), leaving Scratch relatively underexplored in collaborative writing contexts. Finally, although previous studies have discussed technological barriers, limited digital literacy, unequal participation, and communication difficulties in technology-supported learning (Chanwaiwit & Inpin, 2021; Kessler, 2018; Salam et al., 2023), few have specifically examined these challenges from EFL students' perspectives while using Scratch for collaborative writing. Accordingly, this study extends previous research by investigating EFL students' challenges in using Scratch for collaborative writing across three dimensions: Limited Access to Technological Infrastructure and Resources, Students' Digital Literacy Levels, and Technical Issues and Compatibility Problems.

A preliminary interview conducted with the English teacher at SMA Negeri Jogoroto revealed that Scratch had been implemented in English classes for [insert duration, e.g., "one semester"], used [insert frequency, e.g., "approximately twice weekly"] for collaborative writing tasks such as [insert specific task type, e.g., "group-based digital storytelling projects"]. Although students generally responded positively to the use of Scratch, the teacher reported several challenges during its implementation, including limited technological resources, differences in students' digital literacy, and technical issues. However, these observations were based solely on the teacher's perspective and did not systematically capture students' experiences. This condition highlights the need to investigate students' perspectives in order to obtain a more comprehensive understanding of the challenges they encounter when using Scratch as a digital learning tool for collaborative writing.

Based on the identified research gaps and the preliminary study's findings, this study aims to investigate the challenges EFL students face when using Scratch as a digital learning tool for collaborative writing. Specifically, the study investigates students' challenges across three dimensions: Limited Access to Technological Infrastructure and Resources, Students' Digital Literacy Levels, and Technical Issues and Compatibility Problems. The findings are expected to provide practical insights for English teachers, schools, and future researchers regarding the effective integration of Scratch into collaborative writing instruction in EFL classrooms.

METHOD

This study employed a quantitative descriptive survey design to investigate EFL students' challenges in using Scratch as a digital learning tool for collaborative writing. The study was conducted at SMA Negeri Jogoroto, Jombang, Indonesia. The participants consisted of 54 eleventh-grade students selected through purposive sampling because they had prior experience using Scratch for collaborative writing activities in their English classes.

Data were collected using a questionnaire developed by the researchers based on the conceptual framework proposed by Sari and Abrar (2024), who identified technology-related challenges in digital learning through qualitative research. Their framework served as the

conceptual basis for constructing the questionnaire dimensions rather than as a direct source of questionnaire items. The instrument consisted of 20 closed-ended items measured on a five-point Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree) and was administered through Google Forms as part of the students' regular classroom activities. The final instrument measured three dimensions: Limited Access to Technological Infrastructure and Resources, Students' Digital Literacy Levels, and Technical Issues and Compatibility Problems. The dimensions, indicators, and corresponding questionnaire items are presented in Table 1.

Before data collection, the questionnaire underwent content validation through expert judgment to assess the relevance, clarity, and appropriateness of the items relative to the intended dimensions, followed by construct validity and reliability testing using IBM SPSS Statistics. The final instrument consisted of 20 valid and reliable items, with all Corrected Item–Total Correlation values exceeding 0.30 and a Cronbach's Alpha coefficient of 0.974.

Table 1. Questionnaire Blueprint

Variable	Dimensions	Indicator	Item Number
EFL students' challenges in using Scratch as a digital learning tool for collaborative writing	Limited Access to Technological Infrastructure and Resources	Inadequate hardware	1,2
		Inadequate software	3,4
		Reliable internet connectivity	5,6
	Digital Literacy Levels of Students	Students' ability to navigate digital tools and platforms	7,8
		Training and professional development programs	9,10
	Technical Issues and Compatibility Problems	Software updates	11,12
		Hardware compatibility	13,14
		Interoperability between platforms and devices	15,16
		Technical support	17,18
		Regular maintenance	19,20

The collected data were analyzed using descriptive statistics by calculating the mean and standard deviation for each questionnaire item and dimension. The mean scores were subsequently interpreted to determine the level of students' challenges in using Scratch as a digital learning tool for collaborative writing. To facilitate clearer interpretation, the mean scores for each item and dimension were further categorized into five levels of challenge intensity based on predetermined score intervals. Based on the equal interval calculation, the classification of challenge levels followed the interpretation adopted by Nyutu et al. (2021), as presented in the following table:

Table 2. Mean interval category

Mean Interval	Category
1.00-1.80	Very Low
1.81-2.60	Low
2.61-3.40	Moderate
3.41-4.20	High
4.21-5.00	Very High

FINDINGS AND DISCUSSION

FINDINGS

STUDENTS' OVERALL CHALLENGES

This section presents the findings on EFL students' challenges in using Scratch as a digital learning tool for collaborative writing based on descriptive statistical analysis. The challenges were analyzed across three dimensions: Limited Access to Technological Infrastructure and Resources, Students' Digital Literacy Levels, and Technical Issues and Compatibility Problems. The overall results are presented in Table 3.

Table 3. Descriptive Statistical Results of Students' Overall Challenges

No	Dimensions	Response	Mean	Standard Deviation	Category
1	Limited Access to Technological Infrastructure and Resources	54	3.53	0.86	High
2	Digital Literacy Levels of Students	54	3.62	0.85	High
3	Technical Issues and Compatibility Problems	54	3.50	0.81	High

Table 3 shows that all three dimensions were categorized as High, indicating that students experienced considerable challenges in using Scratch for collaborative writing. Among the three dimensions, Digital Literacy Levels of Students recorded the highest mean score (M = 3.62, SD = 0.85), followed by Limited Access to Technological Infrastructure and Resources (M = 3.53, SD = 0.86) and Technical Issues and Compatibility Problems (M = 3.50, SD = 0.81). Although the mean scores across the three dimensions were relatively close, all were categorized as High, indicating that students experienced challenges across multiple aspects of Scratch rather than in a single area. The relatively similar standard deviation values (0.81–0.86) further indicate that students' responses were fairly consistent across the three dimensions.

STUDENTS' CHALLENGES IN EACH DIMENSION

Since the overall findings presented in Table 3 provide only a general overview of students' challenges, a more detailed analysis of each dimension is presented in the following sections. The findings are organized into three dimensions: Limited Access to Technological Infrastructure and Resources, Students' Digital Literacy Levels, and Technical Issues and Compatibility Problems.

LIMITED ACCESS TO TECHNOLOGICAL INFRASTRUCTURE AND RESOURCES

The first dimension examined students' challenges related to hardware availability, software compatibility, and internet connectivity when using Scratch for collaborative writing activities. The descriptive statistical results for this dimension are presented in Table 4.

Table 4. Descriptive Statistical Results of Limited Access to Technological Infrastructure and Resources

No	Items	Response	Mean	Standard Deviation	Category
1	I experience difficulties using Scratch because of the limitations of my device.	54	3.30	1.11	Moderate
2	My device has limitations that make it difficult to use Scratch for collaborative writing activities.	54	3.46	1.08	High
3	The software available on my device does not support Scratch properly.	54	3.54	0.99	High
4	I encounter problems when using Scratch because of software limitations.	54	3.52	1.02	High
5	Internet connection problems make it difficult for me to use Scratch.	54	3.61	1.16	High
6	An unstable internet connection interrupts my collaborative writing activities in Scratch.	54	3.76	1.10	High

As shown in Table 4, this dimension was categorized as High (M = 3.53, SD = 0.86). Five questionnaire items were categorized as High, whereas one item was categorized as Moderate. The highest mean score was recorded for the statement *"An unstable internet connection interrupts my collaborative writing activities in Scratch"* (M = 3.76, SD = 1.10), indicating that unstable internet connectivity was the most prominent challenge within this dimension. Meanwhile, the statement *"I experience difficulties using Scratch because of the limitations of my device"* was categorized as Moderate (M = 3.30, SD = 1.11), suggesting that hardware limitations were experienced less frequently than the other technological challenges in this dimension.

DIGITAL LITERACY LEVELS OF STUDENTS

The second dimension focused on students' ability to navigate Scratch features and the adequacy of training provided before using the platform. The descriptive statistical results for this dimension are presented in Table 5.

Table 5. Descriptive Statistical Results of Digital Literacy Levels of Students

No	Items	Response	Mean	Standard Deviation	Category
7	I have difficulty understanding the features available in Scratch.	54	3.56	0.98	High
8	I find it difficult to use the features of Scratch when completing collaborative writing tasks.	54	3.48	1.08	High
9	I need more training to use Scratch effectively.	54	4.00	0.87	High
10	The training provided before using Scratch was insufficient for me to understand Scratch.	54	3.44	1.08	High

As shown in Table 4, this dimension was categorized as High (M = 3.62, SD = 0.85). All four questionnaire items were categorized as High, indicating that students consistently

experienced challenges related to digital literacy. The highest mean score was obtained for the statement *"I need more training to use Scratch effectively"* (M = 4.00, SD = 0.87), highlighting that the need for additional training was the most prominent challenge within this dimension.

TECHNICAL ISSUES AND COMPATIBILITY PROBLEMS

The final dimension examined challenges related to software updates, hardware compatibility, cross-platform and cross-device compatibility, technical support, and regular maintenance. The descriptive statistical results for this dimension are presented in Table 6.

Table 6. Descriptive Statistical Results of Technical Issues and Compatibility Problems

No	Items	Response	Mean	Standard Deviation	Category
11	Software updates sometimes affect my use of Scratch.	54	3.50	0.97	High
12	Changes after software updates sometimes make Scratch more difficult to use.	54	3.52	0.91	High
13	Scratch is not fully compatible with my device.	54	3.52	0.86	High
14	I experience problems because Scratch does not work properly on my device.	54	3.54	0.86	High
15	I have difficulty accessing Scratch on different devices.	54	3.48	0.95	High
16	I encounter problems when using Scratch on different platforms or devices.	54	3.61	0.92	High
17	I do not receive sufficient technical support when I encounter problems using Scratch.	54	3.52	1.04	High
18	The technical assistance provided is insufficient to solve problems related to Scratch.	54	3.48	1.01	High
19	Technical problems related to Scratch are not resolved quickly.	54	3.48	0.97	High
20	Technical problems in Scratch often interfere with my learning activities.	54	3.37	0.98	Moderate

As shown in Table 6, this dimension was categorized as High (M = 3.50, SD = 0.81). Nine questionnaire items were categorized as High, while one questionnaire item was categorized as Moderate. The highest mean score was recorded for the statement *"I encounter problems when using Scratch on different platforms or devices"* (M = 3.61, SD = 0.92), indicating that compatibility across different platforms and devices represented the most prominent technical challenge. Meanwhile, the statement *"Technical problems in Scratch often interfere with my learning activities"* was categorized as Moderate (M = 3.37, SD = 0.98), suggesting that although students experienced technical problems, they did not always perceive them as directly interfering with their learning activities.

DISCUSSION

STUDENTS' OVERALL CHALLENGES

Scratch-based collaborative writing requires students to manage multiple demands simultaneously, including generating ideas, composing texts, collaborating with peers, and navigating a digital platform. These interconnected demands suggest that the challenges experienced by students were shaped by the interaction between technological infrastructure, digital literacy, and technical readiness rather than by a single factor, indicating that learning outcomes in this context emerge from the dynamic interplay between tools, users, and the surrounding instructional environment rather than from student ability alone. Therefore, the successful implementation of Scratch should be viewed not only as the adoption of an innovative instructional medium but also as a process that requires students to have sufficient technological preparedness to participate effectively in collaborative writing activities.

This interpretation supports Sari and Abrar (2024), who argued that successful technology integration in English language learning depends on technological infrastructure, digital literacy, pedagogical readiness, and technical support. Likewise, Mashishi and Ramaila (2024) emphasized that Scratch implementation requires not only technological resources but also students' digital competence and institutional support. Although their research was conducted in STEM education, both studies demonstrate that technology-enhanced learning is influenced by learners' readiness to use digital tools effectively, regardless of the educational context.

While previous studies by Ariawan and Sutrisno (2025), Lubis et al. (2023), and Ma et al. (2022) mainly demonstrated the effectiveness of Scratch in improving writing performance, reading comprehension, motivation, collaboration, and computational thinking, the present study explains the practical conditions that may influence those outcomes. Rather than challenging previous findings, this study complements them by showing that the pedagogical benefits of Scratch are closely associated with students' technological readiness. This contribution extends Technology-Enhanced Collaborative Writing (TECW) research by shifting attention from the effectiveness of Scratch itself to the conditions that enable its successful implementation in English language learning.

LIMITED ACCESS TO TECHNOLOGICAL INFRASTRUCTURE AND RESOURCES

Technological infrastructure forms an essential foundation for Scratch-based collaborative writing because collaborative learning depends on uninterrupted access to digital resources and continuous interaction among group members. When technological infrastructure is inadequate, students may experience interruptions that affect not only access to the platform but also the collaborative processes of discussing ideas, revising texts, and coordinating group work. This suggests that technological infrastructure functions as a pedagogical requirement rather than merely a technical resource, as it directly supports students' participation throughout collaborative writing activities. In practice, infrastructure readiness in this context refers to conditions such as a stable internet connection, devices with sufficiently updated hardware and software, and the availability of institutional IT support to resolve access problems as they arise.

This interpretation is consistent with Sari and Abrar (2024), who identified technological infrastructure as a critical factor affecting technology integration in English

language learning. Similarly, Mashishi and Ramaila (2024) reported that inadequate technological facilities limited students' participation in Scratch-based learning. Although these studies were conducted in different educational contexts, they consistently indicate that reliable technological support is necessary for effective technology-enhanced learning, a pattern that plausibly holds with particular force in settings such as Indonesian public schools, where infrastructure provision can vary considerably between institutions. The present study strengthens this argument by demonstrating that infrastructure-related challenges also influence collaborative writing, where sustained interaction among learners is fundamental to achieving shared learning goals.

The present study further suggests that successful implementation of Scratch depends not only on students' access to digital devices but also on the quality of the technological environment supporting learning. This is consistent with a Vygotskian view of learning as a socially mediated process (Vygotsky, 1978): within a student's Zone of Proximal Development, collaborative tasks are only as effective as the tools and conditions that make sustained peer interaction possible, meaning that unreliable infrastructure can constrain not just access to Scratch but the collaborative mediation that drives learning itself. Reliable internet connectivity and appropriate technological infrastructure enable students to maintain collaboration, exchange ideas efficiently, and complete writing tasks without unnecessary interruptions. Consequently, educational institutions should consider infrastructure readiness as part of instructional planning when integrating Scratch into English language classrooms. This finding contributes to the Technology-Enhanced Collaborative Writing (TECW) literature by emphasizing that infrastructure readiness is a pedagogical condition that supports meaningful collaborative learning.

DIGITAL LITERACY LEVELS OF STUDENTS

Digital literacy in Scratch-based collaborative writing extends beyond the ability to operate digital devices because students must use technology purposefully to plan, compose, revise, and coordinate writing activities with their peers. This distinction echoes Gilster's (1997) foundational definition of digital literacy as the ability to understand and use information critically and purposefully across digital sources, rather than mere operational familiarity with devices. These learning demands require competencies that differ from students' everyday digital experiences, indicating that familiarity with digital technology does not automatically translate into readiness for technology-enhanced learning. Accordingly, digital literacy should be understood as the ability to apply technology strategically to accomplish academic objectives within collaborative learning environments.

This interpretation aligns with Sari and Abrar (2024), who emphasized digital literacy as a key factor in successful technology integration in English language learning. Likewise, Mashishi and Ramaila (2024) argued that students' digital competence substantially influenced Scratch implementation, while Kong and Kwok (2022) observed that learners initially encountered difficulties because of their limited familiarity with the platform. Collectively, these studies suggest that effective participation in Scratch-based learning requires continuous guidance and sufficient opportunities for practice, enabling students to gradually develop confidence and competence in using educational technologies.

The present findings extend previous Scratch research by demonstrating that digital literacy functions as a prerequisite for achieving the instructional benefits reported by Ariawan and Sutrisno (2025), Lubis et al. (2023), and Ma et al. (2022). While those studies highlighted

improvements in writing, reading comprehension, collaboration, motivation, and computational thinking, this study indicates that such outcomes are more likely to emerge when students possess adequate digital competence. Therefore, integrating Scratch into collaborative writing should be accompanied by systematic training and ongoing instructional support. This contribution enriches Technology-Enhanced Collaborative Writing (TECW) research by positioning digital literacy as a pedagogical foundation for effective technology integration.

TECHNICAL ISSUES AND COMPATIBILITY PROBLEMS

Technical readiness is an essential component of Scratch-based collaborative writing because students rely on consistent software performance and compatibility across different technological environments to participate effectively in collaborative activities. When compatibility problems occur, students may allocate more attention to resolving technical issues than to developing ideas, revising texts, and interacting with peers; compatibility failures can, for instance, disrupt the synchronous editing and real-time exchange of feedback that collaborative writing depends on, converting a technical inconvenience into a direct obstacle to the collaborative process itself. Consequently, technical compatibility should be viewed not only as a technological concern but also as a pedagogical factor that influences the continuity and quality of collaborative learning.

This interpretation supports Sari and Abrar (2024), who recognized technical issues as one of the principal barriers to educational technology integration in English language learning. Similarly, Mashishi and Ramaila (2024) found that technological limitations continued to affect students' experiences when implementing Scratch in classroom learning, a pattern that is consistent with the broader observation that cross-device and cross-platform interoperability remains an unresolved practical barrier in many technology-enhanced classrooms. Together, these studies demonstrate that technical readiness remains an important requirement for successful technology-enhanced instruction. The present study reinforces this perspective by highlighting that compatibility and technical support are particularly important in collaborative writing, where uninterrupted interaction among learners is essential throughout the writing process.

The present study contributes a broader perspective to previous Scratch research by emphasizing that technical compatibility influences collaborative learning as much as technological performance. Although Ariawan and Sutrisno (2025), Lubis et al. (2023), and Ma et al. (2022) primarily focused on the educational benefits of Scratch, the present findings explain one of the practical conditions that may determine whether those benefits can be fully achieved. Ensuring compatible devices, reliable software performance, and adequate technical support allows students to focus on collaboration and writing rather than overcoming technological barriers. Accordingly, this study contributes to Technology-Enhanced Collaborative Writing (TECW) literature by highlighting technical readiness as an integral component of effective Scratch implementation in English language learning.

CONCLUSION

Based on the data analysis, it can be concluded that EFL students faced three main challenges when using Scratch as a digital learning tool for collaborative writing activities: Limited Access to Technological Infrastructure and Resources, Students' Digital Literacy Levels, and Technical Issues and Compatibility Problems. Among these, digital literacy was the relatively

most prominent challenge, although the difference between it and the other two dimensions was modest (M = 3.62 versus M = 3.53 and M = 3.50), suggesting that students' readiness to use educational technology plays a meaningful, though not exclusive, role in the successful implementation of Scratch for collaborative writing. This study extends previous Scratch research by demonstrating that, despite its documented educational benefits, the successful implementation of Scratch is closely associated with students' digital competence, reliable technological infrastructure, and adequate technical support. Theoretically, these findings support a view of Scratch-based collaborative writing as a socially and materially mediated process, in which learning outcomes depend as much on the surrounding technological and instructional conditions as on the platform's pedagogical design, extending Technology-Enhanced Collaborative Writing (TECW) research beyond questions of effectiveness toward the conditions that make that effectiveness possible.

These findings should be interpreted in light of several limitations. First, the relatively small sample size (n = 54) limits the generalizability of the findings, and the results should be interpreted as indicative rather than representative of EFL learners more broadly. Second, the study was conducted at a single school, which may not capture variation in technological infrastructure and instructional practices across other educational settings. Third, the quantitative descriptive design captures the extent of students' challenges but does not explain the underlying reasons for them in depth; qualitative or mixed-method approaches would be needed to explore students' experiences more fully.

In practical terms, the findings suggest several courses of action for different stakeholders. For English teachers, integrating Scratch into collaborative writing instruction should be accompanied by structured, ongoing training rather than a single introductory session, given that the need for further training emerged as the most pronounced concern within the digital literacy dimension. For school administrators, ensuring reliable internet connectivity and up-to-date, compatible devices should be treated as a precondition for technology integration rather than a secondary concern. For curriculum developers, incorporating explicit digital literacy components alongside language objectives may help students build the technological competence that collaborative, technology-enhanced writing tasks require. Future studies are encouraged to examine these challenges across different educational contexts and employ qualitative or mixed-method approaches to gain deeper insights into students' experiences and strategies for addressing technology-related barriers.

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