



Writing pedagogy in higher education: The efficacy of mediating feedback with technology



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Background: Research in the field of writing pedagogy within higher education has extensively examined the significant roles that feedback plays in the development of students' writing skills. However, comparative studies that investigate the efficacy of teacher-provided written and oral feedback, both with and without the aid of technology, remain scarce. Such research is crucial for understanding the impact of different feedback modalities on student learning and could inform best practices in educational settings.

Objectives: This research, which was part of a larger study, specifically examined the impact of teacher-provided feedback—both written and oral—on the development of students' writing skills. We conducted this evaluation within the framework of the process-genre approach, comparing the outcomes of technology-facilitated feedback with traditional methods of delivery. The study sought to determine which forms of feedback, technology-mediated or otherwise, are the most effective in enhancing students' writing proficiency.

Method: It used a sequential explanatory design, selecting 28 first-year students from a veterinary international programme through purposive sampling. The participants were divided into control and experimental groups. Data collection methods included written and oral feedback surveys, pre-test and post-test evaluations, formative essay assessments, and participant interviews.

Results: The experimental group, receiving technology-mediated teacher feedback through *writeabout.com*, demonstrated significantly better writing skills compared to the control group with a conventional lesson plan. Students found the technology-mediated written feedback efficient and precise, but faced language proficiency challenges and sought more personalised interaction. There was a strong positive correlation between this feedback and various aspects of writing achievement, including task response, coherence, lexical resources, and grammatical accuracy.

Conclusion: The research highlights the significance of a balanced feedback provision strategy that accommodates the varied preferences of students.

Contribution: It adds to the wider conversation on efficacious writing pedagogy within Thai Higher Education, spotlighting the beneficial effects of technology-mediated feedback as part of the process-genre approach.

Keywords: technology-mediated feedback; Thai Higher Education; written feedback; oral feedback; process-genre approach.

Introduction

The intricate nature of writing as a cognitive and educational endeavour is emphasised by Hayes and Flower's (1979) cognitive model, which outlines the multifaceted process of writing that encompasses long-term memory, task environment, and cognitive processes such as planning, translating, revising, and monitoring. This model sheds light on the complexities inherent in writing, particularly for learners of English as a second language L2 (Ghoorchaei & Khosravi 2019). These individuals encounter unique challenges, including the task of articulating thoughts in a non-native language, which often leads to grammatical inaccuracies and a restricted range of vocabulary. Such difficulties stem from limited exposure to the target language, inadequate linguistic knowledge, and the disparities between the first language (L1) and L2 writing systems (Nguyen & Suwannabubpha 2021; Panmei & Waluyo 2023). These challenges necessitate the adoption of specialised pedagogical strategies designed to cater for the distinct needs of L2 learners. The study under consideration focuses on an English writing course within Thai Higher Education (THE) that seeks to address these challenges through the integration of both

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teacher-written and oral feedback, employing online platforms within the framework of the process-genre approach.

In Thailand, English holds the status of a foreign language within the education system, and is the most commonly taught language in schools (Noom-ura 2013). Despite students receiving 12 years of formal education, there remains a significant deficiency in English language competence, particularly in writing skills (Noom-ura 2013). This shortfall is largely attributed to the predominance of the Thai language in instructional settings, even within English classes, and a heavy reliance on assessment methods such as the General Aptitude Test (GAT), which primarily evaluates grammatical understanding and only semi-engages with writing skills (Nguyen 2018). The consequence of these educational practices is a postponement of formal English writing instruction until university level, severely limiting students' ability to express themselves in written English (Watcharapunyawong & Usaha 2013). At tertiary level, English writing instruction often adheres to a product-oriented approach, with a significant emphasis on summative assessments and examination scores, at the expense of fostering critical thinking and analytical skills (Nguyen & Suwannabubpha 2018). Despite the introduction of process-based and genre-based pedagogical approaches in the Thai English as a Foreign Language (EFL) context, which have shown to improve linguistic features and student attitudes, there remains a gap in demonstrating their efficacy in enhancing writing accuracy, organisation, and the expression of ideas. The role of feedback within these approaches has emerged as a focal point of interest in enhancing EFL writing education (Uzun & Zehir-Topkaya 2020; Jiang & Yu 2021).

This article emphasises the indispensable role of feedback in the domain of English writing education, acknowledging its integral contribution to the language learning process. The adoption of an integrated feedback approach, which includes both written and oral feedback, has been identified as a potential strategy for overcoming the inherent challenges in writing instruction, improving learners' self-efficacy, and fostering constructive teacher-student interactions (Dokchandra 2018; Uzun & Zehir-Topkaya 2020; Peungcharoenkun & Waluyo, 2023). While the value of these feedback mechanisms is recognised within the sphere of language education, the exploration into how technology can be synergistically integrated into the feedback remains relatively neglected. The momentum for incorporating technology in EFL writing instruction is growing, with digital platforms offering new avenues for collaborative writing, enhancing student motivation, and potentially transforming the writing process (Fonseca & Peralta, 2019; Rofiah et al. 2022; Sun & Qiu 2014). Despite ongoing debates about the extent of technology's impact on writing proficiency, platforms like *writeabout.com* present a promising holistic approach, suggesting that a combination of collaborative tools, writing prompts, integrated feedback,

and progress tracking could significantly bolster both motivation and writing competencies among learners.

The study investigates English writing instruction challenges for learners in THE, noting a significant gap in addressing issues such as limited English exposure, linguistic knowledge deficits, and differences between native and English writing systems. Despite adopting process and genre-based approaches, evidence of their effectiveness in enhancing writing skills – accuracy, organisation, and ideation – remains elusive. This article applied the process-genre approach to investigate the efficacy of a mixed written and oral feedback strategy in a THE English writing course. Additionally, it examines the potential benefits of integrating technology into feedback processes to improve writing outcomes, amid debates over its efficacy in writing proficiency. The article addresses the following questions:

- How do learning outcomes differ between the control group that adheres to a conventional lesson plan with thematic content and the experimental group that integrates technology-mediated teacher written and oral feedback according to the process-genre approach in THE?
- To what extent do students' perceptions, facilitated by technology, vary within the process-genre approach in THE?
- How can students' perceptions of teacher feedback (written and oral) that are mediated by technology, be correlated with their writing achievements in a process-genre approach in THE?

Literature review

Theoretical framework: Process-genre approach

The process-genre approach to writing integrates the stages of the writing process – prewriting, drafting, revising, editing, and publishing – with an understanding of the conventions and expectations of specific genres (Badger & White 2000). Writers begin by analysing the requirements and characteristics of the genre they are working within, then engage in prewriting activities to generate ideas and plan their approach. As they draft their text, they focus on adhering to genre conventions while effectively communicating their ideas, followed by a process of revision to improve clarity and coherence. Editing and proofreading ensure that the final product meets the standards of the genre, while ongoing reflection on the writing process and genre dynamics allows writers to refine their craft and produce texts that are both creative and contextually appropriate. This holistic approach incorporates language proficiency, contextual understanding, and genre-specific knowledge (Babalola 2012; Nordin 2017).

As seen in Figure 1, the pedagogical framework developed by Badger and White (2000) delineates a comprehensive four-step model aimed at enhancing students' writing competencies, particularly within the fields of EFL and English as a Second

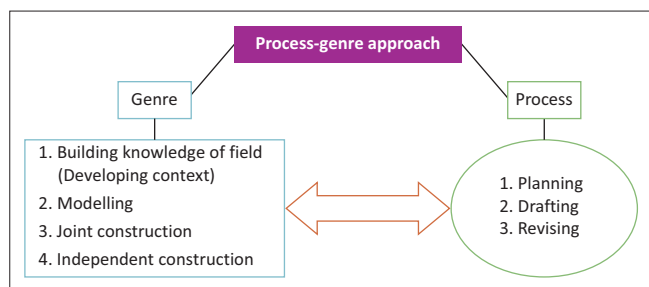


FIGURE 1: The process-genre approach teaching model (based on Badger and White [2000]).

Language (ESL) instruction. This model is systematically structured into phases that include ‘Building Field Knowledge’, which serves as a foundational stage for acquainting students with pertinent genre-specific contexts; ‘Modelling’, a phase dedicated to explicating the nuances and expectations inherent to various genres; ‘Joint Construction of Text’, which embodies a collaborative and process-oriented methodology towards text creation; and ‘Independent Construction of Text’, a stage that encourages students to autonomously implement the genre-based principles acquired through the preceding steps (Guo 2005; Ghufon 2016).

Empirical investigations conducted by scholars such as Guo (2005), Kim and Kim (2005), and Pujianto and Emilia (2014) have substantiated the efficacy of this model within EFL/ESL pedagogical settings. Their findings highlight the model’s capacity to integrate an array of writing components while simultaneously nurturing creativity and independence among learners. This approach has been consistently associated with marked improvements in writing skills across diverse EFL contexts – a claim supported by in-depth scholarly work, including but not limited to studies by Pujianto and Emilia (2014), Babalola (2012), and Kim and Paek (2020). Notwithstanding the valuable insights gleaned from these studies, there remains a pronounced need for further research aimed at dissecting specific elements within the process-genre approach. Such inquiries are essential for advancing our comprehensive understanding of effective writing pedagogy, particularly in terms of identifying and enhancing the mechanisms through which this approach facilitates the development of writing proficiency. This endeavour is critical for refining instructional strategies and, ultimately, for elevating the quality of writing education in EFL and ESL contexts.

Teacher-written feedback mediated by technology

The mediation of teacher-written feedback through technological means represents a pivotal element in the domain of second-language acquisition, particularly within the context of writing skill enhancement. Feedback, as delineated in scholarly literature, manifests in a variety of forms including but not limited to teacher-generated, peer-reviewed, oral, and written modalities. Each form of feedback contributes uniquely to the language learning process, covering critical areas such as grammar,

punctuation, vocabulary, and organisational structure, and plays a significant role in influencing learners’ motivational levels (Hyland 2003; Harmer 2007; Hattie & Timperley 2007; Ellis 2009; Waluyo & Apridayani 2021). While the provision of teacher-written feedback is acknowledged as a potent instrument for fostering writing development, the literature also cautions against the potential demotivating effects of excessive commentary (Lee & Schallert 2008; Mahfoodh 2017).

The advent of the COVID-19 pandemic and the resultant pivot towards online educational platforms instigated a notable transformation in feedback practices, particularly among Chinese instructors of EFL (Jiang & Yu 2021). The research conducted by Sherafati et al. (2020) in Iran on computer-mediated teacher feedback challenges entrenched perceptions by demonstrating its superior effectiveness over traditional feedback methodologies. This paradigm shift necessitates a revaluation of the role of technology in educational settings, transitioning from a mere vehicle for delivering feedback to a strategic facilitator of the teaching and learning process. Furthermore, the integration of digital platforms into the pedagogical strategy, as exemplified by Tran and Nguyen (2021) in Vietnam, stresses the significant impact of technology in ameliorating writing challenges and fostering collaborative learning environments. Conversely, the study by Wihastyanang et al. (2020) on the utilisation of Edmodo for teacher and peer feedback in Indonesia highlights the complexities and unforeseen outcomes associated with blending traditional teaching methods with technological interventions.

The investigation into blog-mediated writing initiatives by Chen (2014) in Taiwan reveals the transformative potential of Web 2.0 tools in redefining educational practices. Similarly, Ghufon’s (2016) examination of the interplay between teacher-written feedback, self-esteem, and the process-genre approach within the Indonesian context uncovers intricate dynamics that merit further scholarly exploration. This burgeoning area of research indicates the necessity of a more nuanced understanding of the interrelations among technology, feedback mechanisms, and established teaching methodologies, particularly within the ambit of the process-genre approach. Such inquiry is vital for delineating the designs of effective language instruction in the contemporary educational landscape.

Oral feedback mediated by technology

The efficacy of oral feedback in the domain of second-language instruction, particularly when mediated by technological platforms, constitutes a critical area of pedagogical research. The foundational work of Lyster and Ranta (1997) established oral feedback as a key mechanism for enhancing language writing skills, a premise further substantiated by Lyster and Saito’s (2010) meta-analysis, which highlighted the significant benefits of explicit oral

corrective feedback for learners with low proficiency and younger students. The adaptability of oral feedback in improving linguistic proficiency was demonstrated by Sobhani and Tayebipour (2015) through their work with low-intermediate EFL students in Iran, while Li (2010) explored its integral role in augmenting both fluency and accuracy among ESL learners. These studies collectively point out the multifaceted impact of oral feedback on language learning, emphasising its adaptability and the nuanced improvements it brings to the educational process.

In more recent years, the landscape of oral feedback has been further enriched by the integration of digital technologies, as evidenced by studies conducted across a spectrum of global educational contexts. Kiyamaz (2023) provided insights into the pedagogical effectiveness of oral feedback within online education in Turkey, complementing the evaluations of audio feedback by Macgregor et al. (2011) and the exploration of mobile-based dynamic assessment by Ebadi and Bashir (2021) in Iran, both of which accentuated the transformative potential of voice-based mediation. Concurrently, research from the United States and Ethiopia by Odo and Yi (2014) and Tesfie (2017) highlights the integration of oral feedback strategies within digital platforms and process-genre models, focusing on the dynamic interplay between traditional pedagogical methods and technological advancements. These studies not only reveal the evolving practices of providing feedback in language education, but also signal the urgent need for further scholarly exploration to fully understand the complexities and implications of technology-mediated oral feedback within diverse educational paradigms.

Research methods and design

Research design

This study, which was part of a larger study, integrated a sequential explanatory strategy, merging both quantitative and qualitative research methods, to thoroughly analyse the effects of technology-assisted written and oral feedback within the framework of the process-genre approach on the writing abilities of Thai learners of EFL. It began with a quantitative phase and subsequently moved to a qualitative inquiry, structuring the research design to offer a layered understanding of the phenomena (Creswell et al., 2003).

Moreover, a comparative analysis was conducted using a controlled experimental design (Achen 2021) to evaluate the efficacy of technology-enhanced feedback within the process-genre approach against traditional feedback mechanisms in THE. The goal of this study was to uncover a more detailed and critical perspective on how technology could be leveraged to improve writing skills among Thai EFL students, specifically within process-genre based learning.

Research sample

This study was conducted within the veterinary international programme at Walailak University. It involved 28 freshman

participants, consisting of 8 males, 14 female 5 LGBTQ+ students, and 1 participant who did not disclose a gender identity. The participants' ages ranged from 18 to 20 years old, and their duration of English learning varied between 2 and 17 years. Before the study commenced, all participants completed the 'Walailak University Test of English Proficiency (WUTEP)', which evaluated their English proficiency levels according to the Common European Framework of Reference (CEFR). The CEFR categorises proficiency levels into six bands: A1 (Beginner), A2 (Elementary), B1 (Intermediate), B2 (Upper Intermediate), C1 (Advanced), and C2 (Proficient).

The experimental group consisted of 14 students, with an average age of 18 years, comprising 4 male, 7 female, and 3 LGBTQ+ students. Their English proficiency levels spanned from A2 to B2 on the CEFR scale. The control group mirrored these demographics, also with 14 students aged 18 to 20, including 4 male, 7 female, 2 LGBTQ+ students, and 1 participant who did not disclose their gender identity. The language proficiency levels within the control group ranged across A1, A2, B1, and B2 on the CEFR scale, ensuring a balanced representation of language abilities within the study sample (Bernard 2017).

Instruments and measures

In the research, two distinct research instruments were utilised to gauge students' perceptions of teacher-written feedback and oral feedback, alongside two separate measures aimed at assessing writing outcomes.

Oral feedback survey instrument

The oral feedback survey, adapted from Ha et al. (2021), used a five-point Likert scale with three sub-scales: 1) 'Beliefs about the role of oral corrective feedback (OCF)' (three items); 2) 'Preferences for types of oral corrective feedback (OCF)' (three items); and 3) 'Preferences for the timing of oral corrective feedback (OCF)' (two items). Participants rated items from 1 to 5, where 1 indicated 'Completely disagree', and 5 represented 'Completely agree'. The pre-survey demonstrated a Cronbach's alpha value of 0.726, indicating high internal consistency. In the post-survey, Cronbach's alpha increased to 0.930, confirming the instrument's reliability.

Written feedback survey instrument

The survey for evaluating written feedback, adapted from Samuel and Akther (2021), employed a five-point Likert scale (from 'completely disagree' to 'completely agree'). This single-scale survey, consisting of five close-ended items, aimed to gauge students' perceptions of written corrective feedback (WCF). The pre-survey demonstrated robust internal consistency (Cronbach's alpha = 0.822), and the post-survey exhibited an even higher level of consistency (Cronbach's alpha = 0.953). These results highlight the survey's reliability in effectively assessing students' attitudes towards written feedback.

Evaluation of student writing through pre-tests and post-tests

This study incorporated pre and post writing assessments with prompts from International English Language Testing System (IELTS) Academic Writing Task 2. The pre-test preceded instructional sessions, and the post-test followed two process-genre approach cycles. Students composed a minimum of 250 words in a 40-minute timeframe, mirroring IELTS constraints. The assessment utilised the IELTS rubric, downloaded from the British Council Official website under IELTS section, encompassing dimensions such as task achievement, coherence, and cohesion, lexical resources, and grammatical range and accuracy, yielding scores from 0 to 9. To ensure objectivity, expert raters, recognised for their contributions to Q1 journals, evaluated the pre-tests and post-tests.

Integration of formative writing tasks

As an integral component of this study, both the control and experimental groups were tasked with two formative writing assignments, aligning with essay prompts adapted from IELTS Academic Writing Task 2. These assignments underwent individual assessment, utilising the IELTS Academic Writing Evaluation Rubric, with each category scored out of 9 for task response, coherence and cohesion, lexical resource, and grammatical range and accuracy. The evaluation of students' essays for formative writing task 1, presented in the third week, focused on the theme of relocating ocean creatures for amusement parks. Formative writing task 2, assigned in the fifth week, delved into the impact of Internet usage on social interaction. The teacher undertook the scoring of these formative writing tasks.

Interview

To address the research gap and gain comprehensive insights into students' perceptions of their learning experiences and outcomes, this study employed semi-structured one-on-one interviews. This qualitative research technique is widely recognised for its flexibility and ability to elicit spontaneous insights during the conversation. A carefully selected sample of seven students from the experimental group participated in these interviews, ensuring diverse perspectives were captured. The interview questions were crafted based on previous research, specifically drawing inspiration from studies conducted by Wang (2015) and Yu and Hu (2017) to explore students' viewpoints regarding different forms of feedback. These questions were designed to probe students' attitudes and experiences concerning the integration of technology and the process-genre approach in their learning journey.

The technology application: *writeabout.com*

Writeabout.com is an innovative online educational platform that revolutionises writing instruction by seamlessly integrating traditional methods with modern digital

collaboration. Founded by educators dedicated to creating engaging writing experiences, *writeabout.com* facilitates collaborative writing and provides educators with tools to track student progress beyond the classroom (Panmei & Waluyo 2021). The platform's key features include *Classes*, *Students*, *Ideas*, and *Posts*. Through *Classes*, instructors conduct user-friendly lessons that foster collaborative learning. The *Students* feature enables comprehensive activity monitoring and supports co-teaching arrangements. The *Ideas* feature on *writeabout.com* includes prompts on social issues and inspiring statements, sparking student creativity across various writing topics. It also empowers educators to craft unique prompts, fostering student creativity. Lastly, the *Posts* feature lets teachers review and categorise students' work, enhancing the overall learning experience (Panmei & Waluyo 2021). Figures 2 and 3 visually depict these features.

While previous research has hinted at the benefits for students by integrating *writeabout.com* into the teaching of writing for EFL, this study takes a more comprehensive approach. Safda and Refnaldi (2019) highlighted the potential of *writeabout.com* in addressing challenges related to idea generation and sentence construction among Indonesian high school students. Waluyo et al. (2023) demonstrated improvements in student learning outcomes by integrating ICT tools and innovative teaching approaches in a general English course in Thailand. However, empirical studies specifically focusing on the integration of *writeabout.com* into EFL writing classes, remain scarce. This study aims to

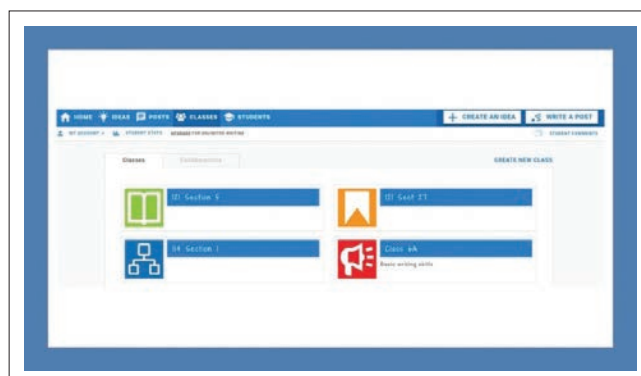


FIGURE 2: The interface of virtual classes portraying the functions, namely *Ideas*, *Posts*, *Students*, *Idea creation*, and *Post writing*.

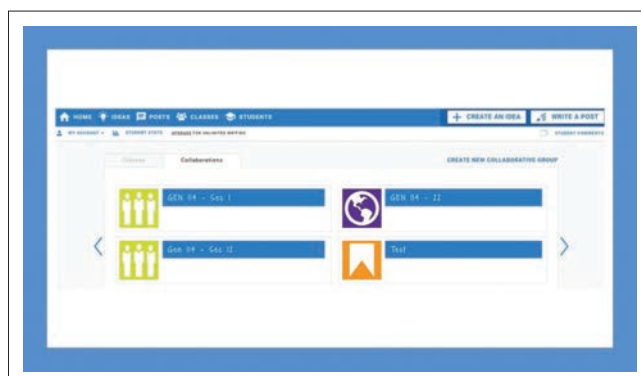


FIGURE 3: The interface of the teacher-student collaboration feature.

examine how *writeabout.com*, as a digital tool, can enhance the quality of feedback in EFL writing instruction under the process-genre approach. Specifically, it focuses on investigating the effectiveness of technology-mediated oral and written feedback on improving the student writing progress and overall learning outcomes.

Research implementation

The experimental group during the research's initiation underwent an initial assessment and survey in the first week, forming the foundation for subsequent investigations. Quantitative data were collected consistently from week 1 to week 6. Following this preliminary phase, educational sessions unfolded from week 2 to week 5, encompassing four weeks of instructional activities. In the sixth week, assessments and surveys were administered to evaluate the impact of the instructional intervention. Furthermore, qualitative interviews were conducted with students post assessment to glean nuanced insights.

Throughout the study duration, the focus was on two thematic areas: Nature and Environment, and Science and Technology. Each theme extended across two classes, with all instructional sessions adhering to the process-genre approach instructional model. All writing tasks were assigned and completed on the digital platform *writeabout.com*, fostering a collaborative digital learning environment. Additionally, students received both written and oral feedback from their educators through the same digital platform.

Figure 4 and 5 visually represent the research methodology and feedback mechanisms employed, respectively.

The control group, on the other hand, adhered to a traditional lesson plan with thematic content akin to that of the experimental group. Their involvement in the study commenced with pre-tests in the initial week, formatted similarly to IELTS Academic Writing Task 2, aligning with the process followed by the experimental group. The subsequent instructional sessions occurred from week 2 to week 5. This conventional teaching methodology was juxtaposed with the experimental group's utilisation of *writeabout.com*, facilitating a basis for comparative analysis.

Importantly, both groups received feedback encompassing both corrective and content-focused aspects during the course of the study. This feedback was integral to evaluating the efficacy of their respective instructional methods. Ultimately, post-tests were administered to both groups in the final week to assess the impact and effectiveness of the instructional interventions. Figure 6 provides a visual representation of the research methodology applied within the control group.

Ethical consideration

This study obtained ethical approval from the Institutional Review Board (IRB) overseeing human research at Walailak

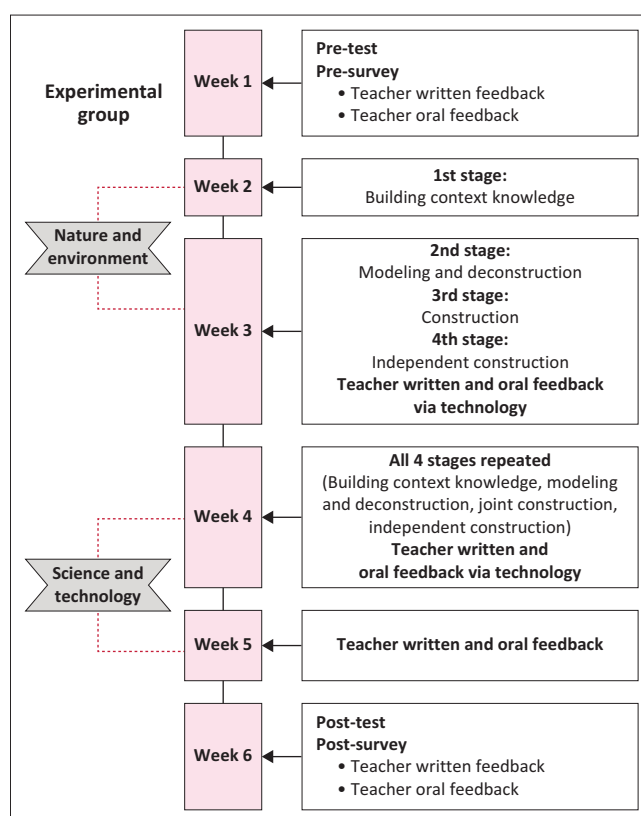


FIGURE 4: Research implementation in the experimental group.

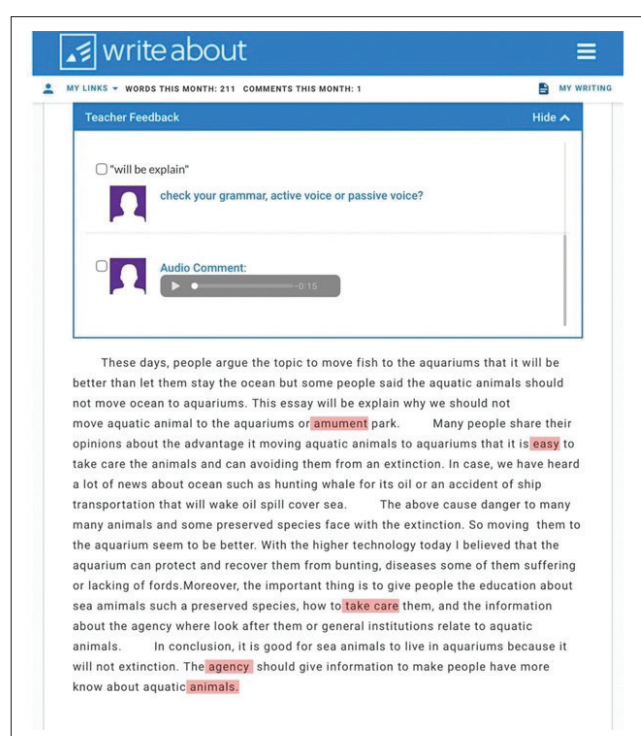


FIGURE 5: Feedback activities in the experimental group on *writeabout.com*.

University, Thailand, with the reference number WUEC 22-185-01. Participation in this research was voluntary, and the identities of participants were protected through anonymity. Ethical clearance was sought and granted by the same institution where the study was conducted.

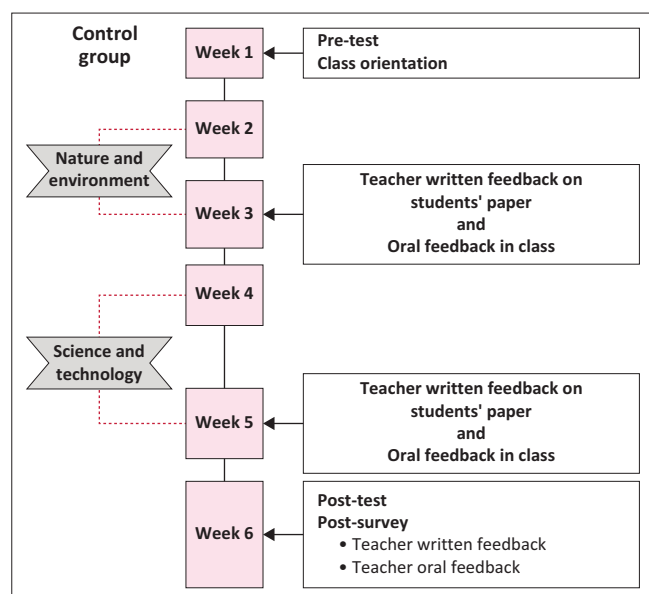


FIGURE 6: Research implementation in the control group.

Results

RQ 1: The disparities in learning outcomes between the control and experimental groups

By pre-test and post-test results

The first research question investigated learning outcome disparities in THE between a control group following a conventional lesson plan, and an experimental group incorporating technology-mediated teacher-written and oral feedback within the process-genre approach. A Wilcoxon signed-rank test was used to analyse pre-test and post-test scores, considering task response, coherence and cohesion, lexical resource, and grammatical range and accuracy criteria in both assessments. The significance was set at $p < 0.05$.

For the experimental group, significant improvement was observed between pre-test and post-test scores ($Z = -2.42$, $p = 0.02$), specifically in task response ($Z = -2.77$, $p < 0.00$) and lexical resource ($Z = -3.10$, $p = 0.02$), affirming the positive impact of technology-mediated feedback. However, coherence and cohesion ($Z = -1.00$, $p = 0.32$) and grammatical range and accuracy ($Z = -1.46$, $p = 0.145$) showed no substantial differences.

In the control group, no significant change was found in pre-test to post-test scores ($p = 0.132$). Notable differences were observed in task response ($Z = -2.487$, $p = 0.013$), reflecting the influence of the conventional lesson plan. Coherence and cohesion ($Z = -0.494$, $p = 0.621$), lexical resource ($Z = -0.618$, $p = 0.537$), and grammatical range and accuracy ($Z = -0.880$, $p = 0.379$) remained consistently non-significant, suggesting a stable performance despite thematic content similarities with the experimental group (see Table 1).

In this study, exploring writing abilities in both the control and experimental groups revealed a mix of significant and non-significant improvements. Focusing on significant changes in Table 2, the control group showed notable

TABLE 1: Result of the Wilcoxon signed-rank tests.

Post-test pre-tests tests	Control group		Experimental group	
	Z	Sig. (2-tailed)	Z	Sig. (2-tailed)
Overall	-1.508	0.132	-2.24	0.02
Task response	-2.487	0.013	-2.77	0.00
Coherence and cohesion	-0.494	0.621	-1.00	0.32
Lexical resource	-0.618	0.537	-3.10	0.00
Grammatical accuracy	-0.880	0.379	-1.46	0.145

enhancement, with mean scores rising from pre-test ($M = 3.78$) to post-test ($M = 4.15$), resulting in a substantial mean difference of 0.37. Detailed analysis highlighted significant improvements in task response ($\Delta M = 0.51$) and grammatical range and accuracy ($\Delta M = 0.28$), while enhancements in coherence and cohesion ($\Delta M = 0.11$) and lexical resources ($\Delta M = 0.25$) were modest.

Conversely, the experimental group demonstrated significant improvement, starting from a pre-test mean score of $M = 4.04$ and reaching $M = 4.58$ in the post-test, yielding a considerable mean difference of 0.54. Detailed examination revealed substantial improvements in task response ($\Delta M = 0.68$), coherence and cohesion ($\Delta M = 0.14$), lexical resources ($\Delta M = 0.74$), and notable improvement in grammatical range and accuracy ($\Delta M = 0.30$).

Comparing pre-test scores between groups, the control group started with a lower mean score of 3.78, while the experimental group had a higher mean score of 4.04. This initial difference highlighted a baseline dissimilarity. Despite progress in the control group, achieving a mean post-test score of 4.15, the experimental group not only maintained its initial advantage but also exhibited more substantial improvement, with a mean post-test score of 4.58. These disparities at the study's outset disclose the effectiveness of the experimental intervention in fostering improved writing abilities. These findings accentuate the critical role of feedback in an English writing course, highlighting the advantages of an integrated approach that combines written and oral feedback facilitated by *writeabout.com*.

By formative writing results

The Mann-Whitney-Wilcoxon test compared mean scores between formative writing tasks in the experimental group. No significant difference emerged between task 1 and task 2 ($p = 0.311$). However, a noteworthy improvement in task response was observed ($p = 0.038$). In the control group, the same test revealed no significant improvement between formative writing tasks 1 and 2 ($p = 0.662$). The assessment of task response, coherence and cohesion, lexical resource, and grammatical range and accuracy consistently yielded p -values above 0.05, indicating no substantial evidence for significant changes in these criteria between the two formative writing tasks.

RQ 2: Students' perceptions of learning experiences

The second research question delved into the depth of students' perceptions concerning their learning experiences

TABLE 2: Descriptive statistics of control and experimental groups' learning outcomes.

Writing proficiency score	Control group			Experimental group		
	Pre-test (<i>M</i>)	Post-test (<i>M</i>)	Difference (ΔM)	Pre-test (<i>M</i>)	Post-test (<i>M</i>)	Difference (ΔM)
Task response	4.04	4.89	0.85	4.32	5.32	1.00
Coherence and cohesion	3.64	3.75	0.11	4.07	4.21	0.14
Lexical resources	3.89	4.14	0.25	3.93	4.67	0.74
Grammatical range and accuracy	3.54	3.82	0.28	3.82	4.12	0.30
Total	3.78	4.15	0.37	4.04	4.58	0.54

within a writing class that implemented technology-mediated teacher-written and oral feedback, all within the context of the process-genre approach.

Categorisation of mean values

In this study, the categorisation of mean values adhered to a well-defined three-tiered framework. A mean value spanning from 1.00 to 1.66 signified a low level of students' perceptions. Conversely, a range of 1.67 to 3.33 indicated a moderate level of perception, while values falling between 3.34 and 5.00 were indicative of a high level of perception. This classification framework aligns seamlessly with established criteria within the field of English language teaching (Apridayani & Teo 2021).

Teacher oral feedback

Examining the descriptive statistics within the experimental group concerning the teacher oral feedback pre and post surveys, students initially exhibited a remarkably high level of perception towards oral feedback. The pre-survey mean ($M = 4.40$, $SD = 0.46$) and post-survey mean ($M = 4.15$, $SD = 0.72$) highlighted this positive perception. However, a discernible decline in perception emerged post intervention, particularly evident in Items 1, highlighting the importance of the teachers' oral corrective feedback for their writing development ($M = 4.86$, $SD = 0.36$), and Item 3, which emphasised its role in improving their essay revisions ($M = 4.71$, $SD = 0.47$). Particularly, Item 8 ($M = 4.43$, $SD = 0.76$) witnessed an increase in appreciation, indicating a heightened preference for succinct oral corrective feedback when addressing errors or mistakes in their essays. The oral feedback involved constructive comments and guidance from teachers to improve students' writing skills by addressing errors, suggesting revisions, and emphasising areas for improvement.

Teacher-written feedback

The descriptive statistics from the teacher-written feedback survey revealed robust perceptions among students regarding written feedback, both before and after the intervention. Initially, students exhibited an overall high perception, with a pre-survey mean of 4.60 and a standard deviation of 0.42, indicative of a consistent positive outlook. Post intervention, while the mean slightly decreased to 4.39, the standard deviation remained within an acceptable range at 0.79, maintaining a high level of perception. A closer examination of specific items revealed that students highly valued Item 3, expressing their belief that teachers' WCF clarified misconceptions about the use of verb tense (pre-survey: $M = 4.79$, $SD = 0.43$). However, this perception experienced a noticeable decrease after the intervention (post-survey: $M = 4.29$, $SD = 0.91$).

Comparative analysis

When comparing the two modalities, the findings suggest that oral feedback witnessed a decline in perception after the intervention, while written feedback consistently maintained a positive perspective. The increased preference for a brief spoken corrective feedback and the nuanced shift in perception towards specific aspects of a written feedback accentuate the intricacy of student responses to varied feedback formats.

RQ 3: Correlations

The correlation analysis, employing Spearman's rho (ρ), reveals a strong positive association between teacher oral feedback (TOF) and technology-mediated written feedback (TWF) within the experimental group ($\rho = 0.802$, $p < 0.001$). This highlights the consistent pattern of feedback provision through the online platform. TWF, facilitated by the online tool, demonstrates positive correlations with post-test scores in task response ($\rho = 0.635$, $p = 0.015$), coherence and cohesion ($\rho = 0.601$, $p = 0.023$), lexical resources ($\rho = 0.606$, $p = 0.022$), and grammatical range and accuracy ($\rho = 0.576$, $p = 0.031$), indicating its impactful role on overall language proficiency.

Additionally, TOF, facilitated by the online tool, correlates positively with grammatical accuracy in formative writing task 1 ($\rho = 0.548$, $p = 0.042$). Similarly, TWF, mediated by the online tool, shows a significant positive correlation with lexical resources in formative writing task 2 ($\rho = 0.725$, $p = 0.003$). These findings show the meaningful benefits of online-mediated feedback, with TOF impacting grammatical accuracy and TWF enhancing lexical resources within the experimental group.

Qualitative insights

Teacher-written feedback

Two themes emerged from inductive coding.

Effective feedback delivery and improved writing skills

Student S1 appreciated the use of technology, stating: 'I liked how quick and precise the feedback was. It made it much easier to understand where I went wrong'. Similarly, S2 highlighted the benefits, mentioning: 'The online platform made it convenient to access feedback and revisions, which helped me stay on track with my writing assignments'. Many students recognised the impact on their writing skills, as noted by S3, who said: 'I saw a noticeable improvement in my writing. The feedback helped me focus on my weaknesses and strengthen them'. Another student,

S4, added: 'The structured feedback guided me in making specific improvements, which I could see reflected in my grades'.

Individualised learning and motivation

Students valued the personalised feedback, with S5 emphasising: 'I felt like my teacher really knew my writing style. Her feedback was always spot-on to help me grow'. S6 concurred, saying: 'Even though it was an online course, I felt like the feedback was just for me, which was motivating'. Positive feedback and constructive criticism boosted their confidence, as shared by S7: 'Positive feedback made me believe in my writing abilities, and I became more willing to experiment with different styles'. The detailed advice contained in the feedback included specific suggestions to enhance their writing. For instance, students were often told: 'Your content was very good, but please add an example to enhance your argument.' This kind of feedback aimed to guide students on areas where they could improve their arguments, by providing concrete examples. However, some challenges existed, such as language proficiency, with S8 acknowledging: 'I struggled because my English wasn't strong. The feedback was helpful, but I wished I could have comprehended it better'. The desire for a balance between technology and human interaction was also evident, with S9 stating: 'The online platform was efficient, but I missed the personal touch of in-pers on discussions. It would have helped clarify doubts and deepen my understanding.'

Teacher oral feedback

Two themes emerged from the collected data.

Effective oral feedback delivery and interactive learning

Students highly valued the use of technology for oral feedback, as it facilitated a more personalised and interactive learning experience. As one student (S1) expressed: 'I would appreciate receiving more oral feedback from the teacher. It was highly beneficial and motivating. I could clearly understand what I needed to do to improve.' This sentiment was echoed by others who found that oral feedback delivered through technology provided immediate clarity on areas needing improvement. They particularly appreciated the ability to seek immediate clarification, with one student (S2) noting: 'If I didn't understand something, I could approach her immediately because she allowed time for us to revise based on her feedback.' The real-time nature of oral feedback, mediated by technology, allowed students to address questions and concerns promptly, enhancing their learning experience.

In-person vs technology-mediated feedback and desire for in-depth discussions

While technology-mediated oral feedback was beneficial for most, some students expressed a preference for in-person feedback, believing it to be more effective due to the personal touch and direct communication in the classroom setting. Concerns were raised about the quality of audio feedback, with one student (S3) suggesting that technology might impact the teacher's communication:

I think my teacher did better when she gave feedback to me in person or in class. She sounded very strange on *writeabout.com*. I think it was the microphone that made her sound annoying.

Some students desired more in-depth discussions with their teacher to delve deeper into their writing challenges. A student (S5) expressed this desire, saying: 'Oral feedback was delivered through *writeabout.com*, but it was somewhat brief. I would prefer to have a conversation with my teacher for a more in-depth discussion.' The feedback on *writeabout.com* was brief, focusing on specific areas like argument structure, vocabulary use, and paragraph transitions. Comments such as 'More evidence needed', 'Watch grammar errors', or 'Work on transitioning' aimed to guide students quickly without extensive explanations. Overall, while technology-mediated oral feedback was valuable, some students still saw merit in face-to-face interactions with their teachers.

Discussion

Efficacy of technology-mediated teacher feedback in EFL writing

This study examined the impact of technology-mediated feedback using *writeabout.com* in the process-genre approach on Thai EFL students' writing skills. The experimental group, receiving technology-mediated feedback, showed significant improvement in writing skills compared to the control group, supporting existing literature on the benefits of integrated feedback (Hyland & Hyland 2006; Küçükali 2017; Dokchandra 2018; Uzun & Zehir-Topkaya 2020). Despite initial pre-test score differences, the study contributes insights into technology-mediated feedback within structured approaches, especially in higher education. While previous studies (Williams & Beam 2019) suggested limited benefits from technology alone, this research demonstrates the efficacy of technology-mediated written and oral feedback, particularly within the process-genre approach. Findings align with similar studies in various contexts, providing new perspectives on applying the process-genre approach in higher education writing pedagogy.

Qualitative feedback from students emphasises the efficiency and precision of TWF, contributing to skill enhancement. However, challenges like language proficiency barriers and a desire for more personalised interaction were noted, emphasising the need for a balanced approach. This resonates with prior research, highlighting challenges in implementing teacher feedback (Ellis 2009; Mahfoodh 2017; Uzun & Zehir-Topkaya 2020; Jiang & Yu 2021). In terms of oral feedback, students valued its interactive and personalised nature, but expressed a preference for in-person feedback due to its depth. This accentuates the importance of a flexible approach in EFL writing instruction, leveraging technology's efficiency while preserving the benefits of personal interaction. Studies from China and Iran (Sherafati et al., 2020; Jiang & Yu 2021) reinforce the need for educators to deeply understand feedback dynamics in digital contexts.

Students' preferences for feedback modalities

This research further investigated the preferences of veterinary programme students for oral versus written feedback modalities within an EFL setting, initially noting a high regard for both. Post intervention, a slight decline in the perceived effectiveness of oral feedback, was observed, particularly regarding its impact on writing development and essay revision. Students expressed an increased preference for concise oral corrective feedback for error correction. In contrast, written feedback maintained its positive perception, especially for clarifying verb tense misconceptions, despite a marginal decrease post intervention. These findings highlight the complexity of student preferences towards feedback methods, indicating the need for refinement in oral feedback techniques, to better meet student expectations. The study contributes essential insights into optimising technology-mediated feedback in EFL writing instruction, emphasising the necessity of ongoing research in this dynamic field. While existing research predominantly focuses on either written or oral feedback independently (Li, 2010; Macgregor et al. 2011; Sobhani & Tayebipour 2015; Wihastyanang et al. 2020; Tran & Nguyen 2021; Kiymaz 2023), this study's findings support the positive impact of combining both modalities, while also highlighting specific areas of improvement in students' writing skills.

During interviews, students praised the quick, precise, and convenient nature of teacher-written feedback, noting its role in understanding errors and enhancing writing skills. Challenges emerged in language proficiency and a desire for more personal interaction, suggesting the need for a balanced approach that integrates technological benefits with personal engagement. This study extends previous observations, indicating high student appreciation for personalised, interactive technology-mediated oral feedback, aiding in clarifying improvement areas, and offering immediate clarification opportunities. However, a preference for in-person feedback was noted, emphasising the value of direct communication and deeper discussion in traditional settings. Concerns about audio quality and a desire for more comprehensive discussions suggest that while technology-mediated oral feedback is beneficial, face-to-face interactions hold significant value for some students, aligning with previous research (Macgregor et al. 2011; Ebadi & Bashir 2021).

Benefits of technology-mediated feedback in writing skill development

The correlation analysis in this study reveals significant and consistent patterns in the interconnectedness of TOF and TWF, when mediated by technology within the experimental group. A strong positive correlation between TOF and TWF points out the coherence of feedback provision, through the online platform. Additionally, TWF, facilitated by online tools, demonstrates positive correlations with various post-test scores, including task response, coherence and cohesion, lexical resources, and grammatical range and accuracy, underscoring its role in enhancing overall language

proficiency. Furthermore, TOF, when mediated by the online tool, correlates significantly with grammatical accuracy in the formative writing task 1, while TWF, also mediated by the online tool, exhibits a substantial positive correlation with lexical resources in the formative writing task 2. These findings align with previous research (Chen 2012; Sun & Qiu 2014; Tesfie 2017, Fonseca & Peralta 2019; Peungcharoenkun & Waluyo 2023), emphasising the benefits of technology-mediated feedback in specific aspects of students' writing skills, further highlighting the potential of integrated feedback approaches to foster comprehensive language development, within the context of EFL writing instruction.

Conclusion

This article elucidates the efficacy of incorporating technology-mediated feedback within the process-genre approach for enhancing the writing skills of Thai EFL students, demonstrating that both teacher-written and oral feedback delivered through technological means, significantly bolster writing proficiency. It reveals students' appreciation for the personalised learning experiences enabled by the efficiency and precision of technology-mediated feedback, while also identifying challenges such as varying language proficiencies and a preference for more personalised interactions, suggesting the importance of a judicious integration of technological and human elements in instructional strategies. The research aimed to understand student preferences, and observed nuanced shifts in perceptions towards oral feedback after the intervention, while attitudes towards written feedback remained consistently positive. These findings meet the research objectives, and offer useful insights for improving EFL writing instruction. However, the study's focus on immediate outcomes and the acknowledgment of initial disparities between experimental and control groups underline the necessity for future investigations into the long-term impacts of such interventions, and the establishment of balanced conditions at the onset. Additionally, while providing valuable qualitative insights from a specific cohort of Thai EFL students, the study advises against broad generalisations of its findings, emphasising the contextual sensitivity required in applying these.

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Competing interests

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Authors' contributions

T.P. carried out the research. T.P. wrote the manuscript with the support from B.D., and B.D. helped with the research concept and served as the research supervisor. T.P. and B.D. read and edited the manuscript.

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Data availability

The data that support the findings of this study are available on request from the corresponding author, T.P.

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