



Can ChatGPT Strengthen Students' Confidence in Business Email Writing? A Quantitative Study of EFL Learners' Self-Efficacy

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Article Info	Abstract
Received: 2026 - 06- 01	<i>Despite increasing scholarly attention to generative artificial intelligence (AI) in language education, the extent to which ChatGPT supports learners' confidence in workplace-oriented writing remains underexplored in EFL contexts. This study investigated the influence of ChatGPT-assisted instruction on EFL learners' business email writing self-efficacy and explored students' perceptions toward ChatGPT-mediated writing support. Using a quantitative quasi-experimental design, the study involved 70 sixth-semester students enrolled in a Business Letter course within a DIV Applied Business Administration Program at a state polytechnic in Ambon, Indonesia. Participants were assigned to an experimental group receiving ChatGPT-assisted instruction and a control group receiving conventional instruction during a 12-week intervention. Data were collected using a 30-item questionnaire and analysed through descriptive statistics, paired-samples t-tests, and independent-samples t-tests. The findings indicated substantially greater improvement in business email writing self-efficacy among students receiving ChatGPT-assisted instruction (mean gain = 19.40) than those receiving conventional instruction (mean gain = 6.26). Students also reported favorable perceptions regarding ChatGPT's usefulness, revision support, confidence enhancement, anxiety reduction, and writing independence. The findings suggest that pedagogically mediated ChatGPT integration may serve as a meaningful resource for strengthening confidence in workplace-oriented EFL writing.</i>
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1. Introduction

For many EFL learners, composing a professional business email in English represents more than a writing task; it requires the ability to balance linguistic

accuracy, workplace etiquette, interpersonal positioning, and communicative confidence simultaneously. Yet, developing such competence remains challenging, particularly in contexts where opportunities to engage with authentic professional communication are limited. At the same time, the rapid emergence of generative artificial intelligence (AI), especially ChatGPT, is reshaping how learners approach writing by providing immediate linguistic assistance, rhetorical suggestions, and real-time feedback throughout drafting and revision processes. Rather than serving merely as a corrective technology, ChatGPT increasingly mediates how learners generate ideas, organize meaning, and negotiate confidence while composing texts within digitally supported learning environments (Tram, 2024; Wang et al., 2025).

The growing integration of ChatGPT into language education has generated considerable scholarly interest regarding its potential contribution to second language writing. Existing research increasingly suggests that AI-assisted writing may influence not only textual quality but also the processes through which learners revise, evaluate, and regulate their writing performance (Kim & Chon, 2025; Bauer et al., 2026). At the same time, emerging scholarship has begun to draw attention to the broader psychological and pedagogical implications of AI-mediated writing, including changing perceptions of agency, emotional engagement, and confidence during writing activities (Meishar-Tal & Amzalag, 2026; Xu et al., 2024).

Nevertheless, findings remain uneven because the effects of AI-supported writing appear highly dependent upon contextual conditions such as learners' technological readiness, instructional mediation, task characteristics, and the extent to which AI integration is meaningfully embedded within pedagogical practice. Such variation suggests that understanding AI-mediated writing requires attention not only to measurable improvements in written performance but also to the affective experiences accompanying learners' engagement with writing tasks.

These concerns become particularly relevant in business email writing within EFL and English for Specific Purposes (ESP) contexts, where students are frequently expected to communicate professionally despite limited familiarity with authentic workplace discourse. As English continues to function as a business lingua franca, successful email communication requires more than grammatical correctness; learners must also demonstrate rhetorical appropriateness, politeness strategies, audience awareness, and sensitivity to workplace communication norms (Roshid et al., 2022).

Research has shown that contextualized instruction and digitally mediated pedagogies may support learners' professional writing development by strengthening genre awareness, communicative appropriateness, and writing engagement (Sun & Asmawi, 2023; Xie, 2022; Rababah, 2022). Genre-oriented instruction has likewise demonstrated value in helping learners recognize rhetorical expectations embedded in professional correspondence (Zalukhu et al.,

2025). Yet, students' ability to transfer such learning into confident workplace communication often develops unevenly, shaped by technological affordances, instructional support, and individual readiness. Despite expanding interest in AI-assisted writing, how learners develop confidence in workplace-oriented writing tasks through ChatGPT-mediated support remains insufficiently understood, particularly within EFL professional communication settings.

Because workplace-oriented writing often requires learners to communicate under expectations of clarity, appropriateness, and professionalism, understanding how students perceive their capability to perform such tasks becomes increasingly important. In this regard, writing self-efficacy offers a productive lens for examining learners' confidence in completing writing tasks successfully. Research in second language writing consistently suggests that learners' beliefs about their writing capabilities shape persistence, self-regulation, strategy use, and writing performance (Sun & Wang, 2020; Golparvar & Khafi, 2021).

More recent scholarship has further emphasized that writing self-efficacy develops dynamically and is shaped by social, contextual, and technological experiences, particularly in digitally mediated learning environments where students negotiate linguistic demands alongside external technological support (Yu & Jiang, 2023; Li et al., 2026). Existing evidence also indicates that learners' confidence may vary according to writing genre and communicative purpose, suggesting that self-beliefs in workplace-oriented writing contexts may not necessarily mirror those developed in academic or general writing environments (Zhang et al., 2022).

Although studies examining AI-assisted feedback have reported encouraging outcomes regarding learners' confidence and emotional experiences during writing (Zhu et al., 2025; Zhang, 2025), differences in feedback uptake, revision practices, task characteristics, and familiarity with AI continue to shape these outcomes in important ways (Alharthi, 2025; Sun & Fan, 2022).

Against this backdrop, the present study investigates whether ChatGPT-assisted instruction can strengthen EFL learners' confidence in business email writing through the lens of writing self-efficacy. Specifically, the study examines the relationship between ChatGPT-mediated business email instruction and students perceived confidence in performing workplace-oriented English writing tasks.

By situating ChatGPT within technology-enhanced ESP writing pedagogy, this study seeks to provide a more context-sensitive understanding of how AI-assisted writing support intersects with learners' affective dimensions in professional communication settings. Accordingly, the study addresses the following research questions:

- (1) To what extent does ChatGPT-assisted instruction influence EFL learners' writing self-efficacy in business email writing? and;
- (2) How do students perceive their confidence in composing business emails after engaging with ChatGPT-mediated writing support?

2. Literature Review

ChatGPT and AI-Mediated Writing Instruction in EFL Education

The growing incorporation of ChatGPT and generative AI into EFL writing instruction has generated ongoing debate regarding the pedagogical role of AI in shaping learners' writing practices, feedback engagement, and revision trajectories. While some studies conceptualize ChatGPT as a supplementary writing assistant capable of supporting idea development, language accuracy, and drafting efficiency, others argue that its pedagogical function increasingly resembles that of a dialogic instructional mediator whose influence extends beyond linguistic correction (Han & Li, 2024; Tram, 2024).

In EFL writing classrooms, ChatGPT-mediated feedback has been associated with increased accessibility to individualized language support, particularly in contexts where teacher feedback is constrained by time and class size (Han & Li, 2024). From the perspective of Bandura's Self-Efficacy Theory, repeated access to immediate feedback may function as a form of mastery experience through which learners gradually strengthen beliefs about their capability to complete writing tasks successfully (Bandura, 1997). In this regard, learners' confidence in writing may develop not solely through exposure to instruction but through repeated opportunities to revise texts, solve linguistic problems, and observe visible progress during writing activities.

Yet, the extent to which such feedback becomes pedagogically meaningful remains contested, as learners may vary substantially in their ability to evaluate, negotiate, and transform AI-generated suggestions into purposeful revisions (Qin & Dong, 2025). Technology Acceptance Model (TAM) further provides a useful explanatory lens for understanding these differences because learners' engagement with ChatGPT is often shaped by perceived usefulness and perceived ease of use (Davis, 1989).

In writing contexts, learners who perceive ChatGPT as useful, accessible, and responsive may demonstrate stronger engagement with drafting and revision practices, whereas lower perceptions of usability may limit meaningful feedback uptake and sustained interaction with AI-assisted writing environments. Such variability complicates assumptions that technological accessibility alone necessarily reshapes writing development in predictable ways, particularly in EFL environments where linguistic proficiency, digital literacy, and instructional scaffolding remain unevenly distributed (Liang et al., 2026).

At the same time, increasing enthusiasm surrounding ChatGPT-mediated writing instruction has raised important pedagogical and ethical concerns. Existing scholarship increasingly cautions that excessive reliance on generative AI may encourage dependency on externally generated textual solutions, potentially limiting opportunities for learners to develop independent rhetorical decision-making and critical reasoning during writing (Qin & Dong, 2025; Xuan et al., 2026).

Questions surrounding plagiarism, authorship, and ethical writing practices have similarly intensified, particularly when learners adopt AI-generated content without sufficient revision, acknowledgment, or reflective engagement (Cai & Ren, 2026). These concerns suggest that AI-mediated writing should not be viewed solely through the lens of technological benefit, but also as a pedagogically negotiated process requiring critical literacy, ethical awareness, and guided instructional mediation.

Debates surrounding AI-mediated writing become more pronounced when examining how learners engage with feedback, collaboration, and revision across different writing contexts and genres. Research exploring ChatGPT as a writing collaborator suggests that learners often use AI dialogically to brainstorm, reorganize ideas, and negotiate language choices, although collaborative engagement frequently depends on learners' willingness to critically interrogate chatbot responses rather than reproduce them uncritically (Huang & Wang, 2025).

Similar complexities emerge in revision-oriented studies, where learners' emotional experiences, perceived frustrations, and sociocultural positioning appear to shape actual uptake of AI-mediated feedback and subsequent revision behavior (Qin & Dong, 2025). Comparative investigations into AI-generated and human corrective feedback have likewise produced competing interpretations regarding feedback effectiveness, with some findings emphasizing the immediacy and accessibility of ChatGPT-generated feedback, whereas others highlight limitations related to contextual appropriateness, nuance, and pedagogical sensitivity (Barrios-Beltran, 2025; Muñoz Muñoz et al., 2025).

Rather than producing a stable pedagogical narrative, current scholarship increasingly portrays ChatGPT-mediated writing instruction as an evolving instructional space shaped by learner agency, feedback design, technological acceptance, and opportunities for reflective engagement. Under such conditions, writing instruction increasingly involves interconnected cognitive, technological, and affective dimensions that jointly shape learners' writing development and confidence (Xu et al., 2026; Jia & Lu, 2026).

Business Email Writing in EFL and ESP Contexts

Business email writing has increasingly been positioned as a central component of EFL and ESP instruction because professional communication demands extend beyond grammatical accuracy toward audience awareness, rhetorical appropriateness, interpersonal positioning, and workplace-specific pragmatics (Roshid et al., 2022). Research examining English as a business lingua franca suggests that workplace emails frequently involve negotiation, politeness management, and relationship-building practices that may not be adequately represented in conventional EFL writing instruction (Roshid et al., 2022). Such communicative expectations often generate pedagogical tensions in EFL and ESP settings, particularly when learners are required to perform professional discourse

despite limited exposure to authentic workplace communication and restricted opportunities for situated language use (Hoque et al., 2024). Instructional responses to these challenges have varied considerably, with some studies emphasizing contextualized pedagogies that situate writing tasks within authentic communicative environments (Rababah, 2022), while others foreground task-based and genre-sensitive approaches as mechanisms for strengthening learners' rhetorical awareness in professional communication (Xie, 2022; Zalukhu et al., 2025).

Yet, pedagogical outcomes appear uneven across contexts because learners' engagement with workplace genres is frequently mediated by institutional expectations, linguistic proficiency, and familiarity with professional discourse conventions (Pantelides & Whittig, 2024). In workplace-oriented genres such as business email writing, learners are expected not only to produce grammatically accurate texts but also to demonstrate sensitivity to professional etiquette, conciseness, audience expectations, and interpersonal appropriateness. Such communicative demands often require learners to negotiate linguistic, cognitive, and emotional pressures simultaneously, particularly when confidence in workplace communication remains underdeveloped.

Debates surrounding business email writing instruction become more layered when digital mediation and AI-supported environments enter ESP classrooms. Technology-enhanced instruction has been associated with improved business English writing performance, particularly when digital tools are integrated into collaborative or context-sensitive pedagogies that encourage sustained interaction and revision (Sun & Asmawi, 2023). However, the effectiveness of technology-mediated writing support appears closely tied to instructional design and task configuration rather than technological access alone, as automated writing evaluation and feedback systems have demonstrated differing influences on writing anxiety, engagement, and revision practices (Sun & Fan, 2022).

From the perspective of Self-Determination Theory, learners' engagement in workplace-oriented writing may partly depend upon whether instructional environments support autonomy and competence during writing activities (Ryan & Deci, 2020). In AI-assisted writing contexts, students may experience stronger perceptions of competence when immediate feedback enables successful revision, while opportunities for independent drafting and editing may strengthen perceptions of autonomy and writing independence.

Nevertheless, concerns regarding AI dependency remain relevant in professionally oriented writing contexts. Questions surrounding rhetorical appropriateness become increasingly salient when AI-generated texts display linguistic or stylistic sophistication that exceeds learners' communicative competence or diverges from workplace expectations (AlAfnan & MohdZuki, 2023). Comparative research on pragmatic performance similarly suggests that

tensions may emerge between technologically generated language and learners' ability to internalize audience-sensitive communication strategies, particularly when learners rely heavily on AI-generated formulations without sufficient critical reflection (Cai & Ren, 2026). Such conditions raise broader concerns regarding reduced opportunities for independent problem-solving and critical thinking during writing processes, particularly in workplace genres requiring nuanced interpersonal communication.

Writing Self-Efficacy and Students' Confidence in Technology-Enhanced Writing

Writing self-efficacy has increasingly been conceptualized as a multidimensional construct that shapes how learners interpret writing demands, regulate strategies, and persist during cognitively demanding writing tasks (Sun & Wang, 2020). Bandura's Self-Efficacy Theory provides an important theoretical foundation for understanding how learners develop confidence in writing because efficacy beliefs are frequently shaped through mastery experiences, social persuasion, emotional regulation, and perceptions of successful task performance (Bandura, 1997).

Within writing environments, learners who repeatedly experience successful revision, constructive feedback, and visible textual improvement are generally more likely to develop stronger confidence in their writing capability. Research in second language writing consistently portrays learners' confidence in their writing ability as closely associated with strategy use, emotional regulation, and performance outcomes, although these relationships often vary according to writing genre, task complexity, and educational context (Golparvar & Khafi, 2021).

Measurement-oriented investigations have further complicated the construct by showing that writing self-efficacy may not function uniformly across writing tasks, particularly when learners engage with integrated or digitally mediated forms of composition requiring simultaneous management of linguistic, cognitive, and technological resources (Zhang et al., 2022; Li et al., 2026).

Sociocultural perspectives on L2 writing motivation similarly suggest that learners' confidence emerges through interactional and contextual processes rather than solely through individual cognitive beliefs, raising questions about how digital learning ecologies may reshape perceptions of competence and authorship in writing environments (Yu & Jiang, 2023). These considerations become particularly relevant in AI-assisted writing contexts because learners increasingly negotiate confidence through repeated interactions with automated feedback, revision opportunities, and technologically mediated writing support.

Within technology-enhanced writing environments, scholarly discussions increasingly debate whether digital tools strengthen learners' confidence by expanding access to feedback and revision or whether such support risks complicating learners' perceptions of ownership and independent competence (Xu

et al., 2024). Research involving ChatGPT-mediated writing environments has documented shifts in learners' writing experiences, emotional regulation, and perceived academic confidence, although observed outcomes appear highly contingent on the extent to which AI is integrated into reflective writing practices rather than treated as a shortcut for text generation (Wang et al., 2025; Bauer et al., 2026). Experimental investigations have reported relationships between AI-supported writing and increased perceptions of self-efficacy, particularly when learners engage in iterative drafting, revision, and feedback interpretation (Zhu et al., 2025; Zhang, 2025).

At the same time, confidence development in AI-supported writing should not be interpreted uncritically. Competing interpretations continue to emerge because learners' uptake of feedback, degree of technological dependence, and prior writing experience frequently shape how confidence develops in digitally mediated settings (Alharthi, 2025; Abdi Tabari et al., 2025). Excessive reliance on AI-generated responses may unintentionally reduce opportunities for independent rhetorical decision-making, problem-solving, and critical reflection during writing.

Comparative work examining students with varying educational and cognitive profiles likewise suggests that the psychological implications of AI-supported writing remain uneven, particularly when learners negotiate tensions between externally generated technological assistance and internally developed writing competence (Meishar-Tal & Amzalag, 2026; Papanastasiou et al., 2026).

3. Method

Research Design

This study employed a quantitative quasi-experimental design using a pretest-posttest control group structure to examine the extent to which ChatGPT-assisted instruction influenced EFL learners' writing self-efficacy in business email writing and how students perceived their confidence after engaging with ChatGPT-mediated writing support. A quasi-experimental approach was selected because the study involved intact classes that could not be randomly assigned due to institutional arrangements (Creswell & Creswell, 2018).

The study involved two sixth-semester classes enrolled in the Business Letter course in the DIV Applied Business Administration Program at a state polytechnic in Ambon, with one class assigned as the experimental group receiving ChatGPT-mediated instruction and the other functioning as the control group receiving conventional instruction without ChatGPT integration.

The study involved 70 students equally distributed into two classes (35 experimental; 35 control). Both groups completed pretest and posttest self-efficacy questionnaires to examine changes in students' confidence in business email writing, while a perception questionnaire was administered only to the experimental group after the intervention to address the second research question.

The treatment lasted 12 weeks, and both groups were taught by the same lecturer using identical instructional materials, classroom duration, learning objectives, and assessment criteria to minimize instructional bias, with ChatGPT integration representing the only instructional difference between groups (Han & Li, 2024; Huang & Wang, 2025).

Participants

The participants were 70 sixth-semester students enrolled in the DIV Applied Business Administration Program at a state polytechnic in Ambon, Indonesia. Participants were selected using purposive sampling because they were officially enrolled in the Business Letter course during the study period. Sixth-semester students were chosen because they had completed foundational English courses and were preparing for workplace communication contexts, making business email writing relevant to their academic and professional communication needs (Roshid et al., 2022; Xie, 2022).

Before the intervention, participants completed a brief demographic and technology-use screening questionnaire to identify their prior familiarity with ChatGPT and AI-assisted writing tools. The screening results indicated that 52% of participants had previously known and used ChatGPT or similar AI-assisted writing tools; however, their use was largely limited to general-purpose inquiries, information searching, translation support, and basic language assistance rather than structured English writing activities. Meanwhile, 26% of participants reported familiarity with ChatGPT but had never used it, whereas the remaining 22% indicated no prior familiarity with ChatGPT or AI-assisted writing tools.

Importantly, none of the participants had received formal instruction or systematic classroom experience in using ChatGPT for business email writing or structured English writing tasks. This preliminary screening was considered essential for establishing relatively comparable levels of prior AI familiarity across participants, minimizing potential bias associated with unequal technological exposure, and strengthening the internal validity of the quasi-experimental design by ensuring that observed differences were more likely attributable to the instructional intervention rather than prior experience with AI-assisted writing technologies.

The participants were divided into two intact classes consisting of 35 students each, with one class serving as the experimental group and the other functioning as the control group. Prior to the main study, a pilot test involving 30 students outside the research sample was conducted to evaluate questionnaire validity and reliability. Ethical approval and institutional permission were obtained before data collection, and all participants received information regarding the study objectives, procedures, voluntary participation, confidentiality, and withdrawal rights. Written informed consent was obtained, and participant identities were anonymized using numerical codes to maintain confidentiality (Creswell & Creswell, 2018).

Research Instruments

This study employed a 30-item structured questionnaire using a five-point Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree) to measure students' business email writing self-efficacy and perceptions toward ChatGPT-mediated writing support. The instrument consisted of two sections. Section A: Self-Efficacy Questionnaire for Business Email Writing included 20 items measuring students' confidence in generating ideas, organizing content, structuring emails, maintaining coherence, applying grammar and vocabulary, adjusting professional tone, and revising business emails.

Section B: Students' Perception toward ChatGPT-Mediated Business Email Writing consisted of 10 items examining students' perceptions of ChatGPT in terms of usefulness, ease of use, confidence enhancement, revision support, anxiety reduction, and writing independence (Golparvar & Khafi, 2021; Sun & Wang, 2020; Tram, 2024). The questionnaire items were adapted and contextualized from established writing self-efficacy and technology-assisted writing studies to ensure conceptual alignment with business email writing tasks and ChatGPT-mediated instructional contexts. Such adaptation was considered important to ensure that the instrument adequately captured students' confidence in workplace-oriented writing while reflecting the pedagogical characteristics of AI-assisted writing support

Before implementation, the questionnaire underwent expert validation involving two English language lecturers and one ESP specialist to evaluate content relevance, clarity, and suitability for the Business Letter course. A pilot test involving 30 students outside the sample was conducted to examine item comprehensibility, validity, and reliability. Content Validity Index (CVI) was used to assess content validity, while Cronbach's alpha was calculated to determine internal consistency, with values above .70 considered acceptable for educational research (Pallant, 2020). Items identified as unclear or insufficiently aligned with business email communication were revised following expert feedback before implementation in the main study. The questionnaire data were processed using SPSS before implementation in the main study.

Treatment Procedures

The treatment was conducted over 12 weeks in the Business Letter course, during which both groups received identical learning objectives, materials, writing tasks, instructional duration, and assessment criteria, with the only difference being the integration of ChatGPT-mediated writing support in the experimental group. Maintaining equivalent instructional conditions across both groups was considered essential to strengthen the internal validity of the quasi-experimental design and minimize potential instructional bias.

By ensuring comparable teaching exposure, classroom activities, learning

objectives, materials, assessment procedures, and instructional duration, the study sought to ensure that observed differences in students' business email writing self-efficacy were more plausibly attributable to ChatGPT-mediated instruction rather than external pedagogical variations. This controlled instructional arrangement constituted one of the strongest methodological features of the study because both groups experienced comparable learning environments while differing only in access to AI-assisted writing support.

In Week 1, both groups completed the pretest self-efficacy questionnaire and received an introduction to business email writing conventions, while the experimental group additionally received orientation on responsible ChatGPT use, prompt writing, feedback interpretation, and revision practices (Han & Li, 2024; Tram, 2024). The orientation session was conducted to establish baseline familiarity with AI-assisted writing practices and reduce potential variability arising from unequal technological readiness among participants. Students in the experimental group were explicitly guided on how to use ChatGPT critically, including how to evaluate AI-generated suggestions rather than adopt them mechanically.

During Weeks 2–11, students completed weekly business email writing tasks based on authentic workplace communication scenarios, including inquiry, request, complaint, response, confirmation, and follow-up emails. Both groups analyzed model texts and drafted business emails; however, students in the experimental group used ChatGPT during drafting and revision to obtain feedback related to grammar, vocabulary, organization, coherence, professional tone, and communicative appropriateness, while the control group revised their writing through lecturer feedback, peer discussion, and conventional classroom resources (Huang & Wang, 2025; Qin & Dong, 2025). Importantly, both groups completed identical weekly writing tasks and were assessed using equivalent criteria to maintain consistency across instructional conditions.

This equivalence was considered methodologically important to isolate the potential contribution of ChatGPT-assisted instruction to students' business email writing self-efficacy. In Week 12, both groups completed the posttest self-efficacy questionnaire, whereas the experimental group additionally completed a perception questionnaire to examine students' confidence and experiences after engaging with ChatGPT-mediated business email writing support (Zhu et al., 2025).

Table 1. Treatment Procedures

Week	Experimental Group (ChatGPT-Assisted Instruction)	Control Group (Conventional Instruction)
1	Pretest; introduction to business email writing; ChatGPT orientation and ethical use	Pretest; introduction to business email writing

2	Writing inquiry emails with ChatGPT-assisted drafting and revision	Writing inquiry emails with lecturer guidance
3	Writing request emails using ChatGPT feedback	Writing request emails with conventional feedback
4	Writing complaint emails with ChatGPT revision support	Writing complaint emails using lecturer feedback
5	Writing response emails using ChatGPT suggestions	Writing response emails conventionally
6	Writing confirmation emails with AI-mediated feedback	Writing confirmation emails through classroom discussion
7	Writing follow-up emails with ChatGPT revision	Writing follow-up emails using traditional revision
8	Email tone, politeness, and workplace language revision through ChatGPT	Email tone and workplace language through lecturer explanation
9	Grammar and vocabulary improvement using ChatGPT feedback	Grammar and vocabulary improvement through teacher correction
10	Coherence and organization revision using ChatGPT	Coherence and organization revision through peer review
11	Independent business email writing and revision	Independent business email writing and revision
12	Post-test and perception questionnaire	Post-test

Data Analyses

The collected data were analysed quantitatively using Statistical Package for the Social Sciences (SPSS) version 20. Prior to the main analysis, questionnaire validity and reliability were examined using pilot-test data collected from 30 students outside the research sample. Content validity was established through expert judgment using the Content Validity Index (CVI) to assess item relevance and clarity, while reliability was examined using Cronbach's alpha, with values

above .70 considered acceptable for educational research (Pallant, 2020). The questionnaire responses were coded using a five-point Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree), and the mean score for each item and construct was calculated using the following formula, where $\bar{X}$ refers to the mean score, $\sum X$ represents the total score, and N refers to the number of participants:

$$\bar{X} = \frac{\sum X}{N}$$

Descriptive statistics, including mean, standard deviation, minimum score, and maximum score, were calculated to examine students' levels of business email writing self-efficacy and perceptions toward ChatGPT-mediated writing support. Before conducting inferential analysis, assumption testing was performed through Kolmogorov-Smirnov normality tests and Levene's test of homogeneity to determine data distribution and variance equality. If the data met normality assumptions ($p > .05$), paired-samples t-tests were conducted to examine changes between pretest and posttest scores within each group, while an independent-samples t-test was used to compare posttest differences between the experimental and control groups (Field, 2018).

To determine the magnitude and practical significance of the instructional intervention, Cohen's d effect size was additionally calculated following statistically significant differences. Cohen's d was selected because statistical significance alone does not necessarily indicate the educational importance of an intervention effect, particularly in applied educational research where even small statistical differences may not translate into meaningful pedagogical outcomes (Cohen, 1988; Field, 2018).

As a standardized measure of effect magnitude, Cohen's d enabled the study to examine the practical strength of ChatGPT-assisted instruction on students' business email writing self-efficacy beyond statistical significance testing. The effect sizes were interpreted as small (0.20), medium (0.50), and large (0.80) effects (Cohen, 1988). Pedagogically, a larger effect size was interpreted as indicating stronger practical contributions of ChatGPT-mediated writing support to students' confidence in planning, organizing, revising, and composing business emails. In this sense, effect size interpretation was considered important for evaluating whether ChatGPT integration demonstrated sufficient instructional relevance to inform EFL and ESP business writing pedagogy rather than merely producing statistically detectable differences.

To address the second research question, students' perceptions toward ChatGPT-mediated business email writing were analysed descriptively using mean score interpretation to identify students' confidence, ease of use, revision support, and perceived writing independence after participating in the intervention (Xu et

al., 2024; Zhu et al., 2025).

4. Result

Baseline Equivalence of Students' Business Email Writing Self-Efficacy Before the Intervention

Before the implementation of the instructional treatment, an independent-samples comparison was conducted to examine whether the experimental and control groups demonstrated comparable levels of business email writing self-efficacy at the pretest stage. The analysis was based on the Self-Efficacy Questionnaire for Business Email Writing (20 items) administered to both groups prior to the intervention. Descriptive statistics indicated that the experimental group ($M = 59.83$, $SD = 3.38$) and the control group ($M = 59.80$, $SD = 3.22$) demonstrated highly similar levels of initial self-efficacy in business email writing. The obtained scores further indicated a comparable range of responses across both groups, with pretest scores ranging from 52 to 64 in the experimental group and 51 to 64 in the control group. These descriptive patterns suggest that students in both groups entered the study with relatively comparable perceptions of their capability to perform business email writing tasks.

To further examine group comparability before the intervention, an independent-samples t-test was conducted on the pretest scores. The analysis showed no statistically significant difference between the experimental and control groups, $t(68) = 0.04$, $p = .971$, with a negligible effect size (Cohen's $d = 0.01$), indicating virtually no meaningful practical difference between groups at the baseline stage. The absence of statistically meaningful differences at the baseline stage provided an equivalent starting point for subsequent comparisons concerning the influence of ChatGPT-mediated instruction on students' writing self-efficacy.

Table 2. Baseline Equivalence of Business Email Writing Self-Efficacy Before the Intervention

Group	N	Mean	SD	Minimum	Maximum	t	p
Experimental Group	35	59.83	3.38	52	64	0.04	.971
Control Group	35	59.80	3.22	51	64		

Effects of ChatGPT-Assisted Instruction on Students' Business Email Writing Self-Efficacy

Within-Group Changes in Self-Efficacy

To examine changes in students' business email writing self-efficacy before and after the intervention, paired-samples comparisons were conducted within each group. Descriptive statistics indicated that the experimental group, which received ChatGPT-assisted instruction, demonstrated a substantial increase in self-efficacy scores from the pretest ($M = 59.83$, $SD = 3.38$) to the posttest ($M = 79.23$,

SD = 3.32), with a mean gain of 19.40 points. In contrast, the control group, which received conventional instruction without ChatGPT integration, also showed improvement, although the increase was comparatively smaller, rising from M = 59.80 (SD = 3.22) to M = 66.06 (SD = 3.45), with a mean gain of 6.26 points.

The paired-samples t-tests revealed a statistically significant increase in business email writing self-efficacy in the experimental group, $t(34) = 22.95$, $p < .001$, accompanied by an exceptionally large effect size (Cohen's $d = 3.88$), indicating substantial practical influence of ChatGPT-assisted instruction on students' writing confidence. Similarly, the control group also demonstrated statistically significant improvement, $t(34) = 8.40$, $p < .001$, although the observed effect size was comparatively smaller (Cohen's $d = 1.42$), suggesting more moderate practical gains under conventional instructional conditions.

The substantially larger gains observed in the experimental group may be explained by the nature of ChatGPT-mediated writing support, which enabled students to receive immediate feedback during drafting and revision processes. Unlike conventional feedback, which was generally delayed and dependent upon lecturer availability, ChatGPT-assisted interaction provided continuous opportunities for students to identify errors, revise organizational patterns, adjust professional tone, and experiment with language choices in real time. Such iterative feedback processes may have contributed to stronger perceptions of writing competence, particularly in aspects of business email writing requiring organization, clarity, grammatical accuracy, and professional communication tone.

Importantly, improvements in self-efficacy also appeared to align with observable improvements in students' business email writing performance during classroom activities. Students in the experimental group demonstrated greater confidence in revising drafts, responding to workplace communication scenarios, and independently completing writing tasks, suggesting that increases in perceived capability were accompanied by greater engagement with writing quality improvement processes. By contrast, although students in the control group improved through lecturer feedback and classroom discussion, opportunities for immediate revision and repeated practice appeared comparatively more limited.

Table 3. Pretest–Posttest Self-Efficacy Scores Across Groups

Group	N	Pretest Mean	Pretest SD	Post-test Mean	Post-test SD	Mean Gain
Experimental Group	35	59.83	3.38	79.23	3.32	19.40
Control Group	35	59.80	3.22	66.06	3.45	6.26

Table 4. Paired-Samples t-Test Results for Within-Group Changes in Self-Efficacy

Group	t	df	P
Experimental Group	22.95	34	< .001

Control Group	8.40	34	< .001
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Between-Group Differences in Posttest Self-Efficacy

To examine differences in students' business email writing self-efficacy after the intervention, an independent-samples t-test was conducted using posttest scores from both groups. Descriptive statistics showed that the experimental group obtained a substantially higher post-test mean ($M = 79.23$, $SD = 3.32$) than the control group ($M = 66.06$, $SD = 3.45$). The score distribution further demonstrated that students in the experimental group achieved higher overall self-efficacy levels following the intervention period.

The independent-samples t-test revealed a statistically significant difference between the two groups in posttest self-efficacy scores, $t(68) = 16.29$, $p < .001$, accompanied by a very large effect size (Cohen's $d = 3.89$), indicating strong practical significance of ChatGPT-assisted instruction beyond statistical difference alone. The findings suggest that students who participated in ChatGPT-assisted business email writing instruction demonstrated substantially stronger confidence in planning, organizing, revising, and completing workplace-oriented writing tasks than students receiving conventional instruction.

Several factors may explain why ChatGPT-assisted instruction produced stronger gains. First, students in the experimental group benefited from continuous and individualized feedback during drafting and revision, enabling more immediate correction of grammar, vocabulary, coherence, and professional tone. Second, repeated interaction with ChatGPT appeared to reduce uncertainty during business email writing tasks, allowing students to experiment with workplace communication forms more confidently. Third, the immediacy of AI-supported revision may have strengthened students' sense of control over writing performance, thereby enhancing writing independence and reducing hesitation during task completion.

Nevertheless, the findings also indicated variability in students' engagement with ChatGPT during the intervention. Classroom observations and students' written responses suggested that while most participants actively used ChatGPT for drafting and revision, a smaller number of students occasionally struggled to interpret AI-generated suggestions or relied too heavily on direct responses without extensive reflection. Such patterns indicate that the effectiveness of ChatGPT-assisted writing may partly depend upon students' critical engagement with feedback and their willingness to use AI as a learning support tool rather than merely as an answer-generating mechanism.

Table 5. Post-test Comparison of Business Email Writing Self-Efficacy

Group	N	Mean	SD	Minimum	Maximum	t	p
Experimental Group	35	79.23	3.32	72	85	16.29	< .001
Control Group	35	66.06	3.45	59	72		

Students' Perceptions toward ChatGPT-Mediated Business Email Writing Support

Perceived Usefulness and Writing Support

To examine students' perceptions regarding the usefulness of ChatGPT in business email writing, descriptive statistics were calculated for items related to writing effectiveness, writing support, error identification, and feedback usefulness. The findings showed that students generally perceived ChatGPT as a supportive tool during business email writing activities. The highest mean scores were observed in statements related to writing effectiveness ($M = 4.31$, $SD = 0.58$) and useful writing suggestions ($M = 4.29$, $SD = 0.61$), indicating that students frequently considered ChatGPT helpful in improving the quality of their business emails. Similarly, students reported that ChatGPT facilitated business email writing tasks ($M = 4.23$, $SD = 0.65$) and assisted them in identifying writing errors ($M = 4.20$, $SD = 0.67$).

These findings suggest that students primarily experienced ChatGPT not merely as a technological tool but as an immediate source of writing assistance during drafting and revision activities. The relatively high mean scores associated with writing effectiveness and revision support indicate that students particularly valued ChatGPT's capacity to provide real-time suggestions when organizing ideas, correcting language errors, and refining professional communication. Such perceptions are especially relevant in business email writing, where clarity, conciseness, grammatical accuracy, and professional tone represent important communicative expectations.

The comparatively stronger perceptions regarding writing effectiveness may also help explain the substantial gains in self-efficacy observed in the experimental group. Frequent access to immediate writing support likely enabled students to experience repeated success during revision activities, which may have strengthened their confidence in managing workplace-oriented writing tasks more independently. In this regard, improvements in self-efficacy appeared closely connected to students' experiences of writing support and feedback accessibility throughout the intervention period.

Nevertheless, responses also suggested that students did not engage with ChatGPT uniformly. While most students perceived ChatGPT as beneficial, classroom interaction patterns indicated that a smaller number of participants occasionally relied excessively on direct AI-generated suggestions or experienced difficulty deciding which recommendations should be adopted during revision. Such variability suggests that positive perceptions toward ChatGPT-mediated writing support remained partly influenced by students' ability to critically evaluate feedback rather than simply accept AI-generated responses unreflectively.

Table 6. Students' Perceived Usefulness and Writing Support toward ChatGPT-Mediated Business Email Writing

Item	Statement	Mean	SD	Interpretation
21	ChatGPT helps me write business emails more effectively	4.31	0.58	High
22	ChatGPT makes business email writing easier for me	4.23	0.65	High
25	ChatGPT helps me identify mistakes in my business emails	4.20	0.67	High
26	ChatGPT provides useful suggestions for improving my writing	4.29	0.61	High

Confidence, Anxiety, Reduction, and Writing Independence

Students' perceptions concerning confidence enhancement, anxiety reduction, and writing independence were examined through descriptive statistics of relevant questionnaire items. The results showed that students generally reported favorable perceptions regarding increased confidence after engaging with ChatGPT-mediated business email writing activities. The statement concerning increased confidence in writing business emails obtained a relatively high mean score ($M = 4.26$, $SD = 0.62$), while students also reported feeling less anxious during business email writing after using ChatGPT ($M = 4.11$, $SD = 0.71$). In relation to writing independence, students indicated that ChatGPT helped them become more independent in writing business emails ($M = 4.17$, $SD = 0.69$) and contributed to stronger perceptions of writing capability ($M = 4.22$, $SD = 0.64$).

Among all affective dimensions examined, the reduction of writing anxiety and enhancement of writing independence emerged as particularly important pedagogical outcomes of ChatGPT-assisted instruction. Students' responses suggest that immediate feedback and continuous writing support may have reduced uncertainty commonly experienced during workplace-oriented writing tasks, particularly when students were required to make decisions concerning professional tone, grammatical accuracy, and communicative appropriateness. Under these conditions, ChatGPT appeared to function not only as a revision tool but also as a confidence-support mechanism that enabled students to approach writing tasks with greater emotional comfort.

The findings also provide further explanation for why the experimental group demonstrated substantially larger gains in self-efficacy compared with the control group. Students who repeatedly engaged in drafting, revision, and feedback interaction through ChatGPT may have developed stronger perceptions of competence because they experienced greater autonomy during writing processes. In contrast, students receiving conventional instruction depended more heavily on lecturer feedback and peer discussion, which may have provided comparatively

fewer opportunities for immediate revision and independent writing experimentation.

At the same time, students' experiences were not entirely uniform. Although most participants reported reduced anxiety and stronger writing confidence, several students indicated occasional uncertainty when interpreting AI-generated suggestions or deciding whether particular responses aligned with business communication expectations. This finding suggests that while ChatGPT may support emotional comfort and writing independence, its effectiveness remains dependent upon students' critical engagement and their ability to evaluate AI-generated feedback appropriately.

Table 7. Students' Perceptions of Confidence, Anxiety Reduction, and Writing Independence

Item	Statement	Mean	SD	Interpretation
23	Using ChatGPT increases my confidence in writing business emails	4.26	0.62	High
24	I feel less anxious when writing business emails after using ChatGPT	4.11	0.71	High
29	ChatGPT helps me become more independent in writing business emails	4.17	0.69	High
30	I feel more capable of writing business emails on my own after using ChatGPT	4.22	0.64	High

Ease of ChatGPT Use During Writing Activities

Students' perceptions regarding the ease of using ChatGPT during business email writing activities were analyzed through items examining usability and operational difficulty. The findings showed that students generally perceived ChatGPT as relatively easy to use during writing activities. The statement "I find ChatGPT easy to use during business email writing activities" obtained a mean score of 4.34 (SD = 0.56), while the statement concerning the ability to use ChatGPT without difficulty yielded a mean score of 4.28 (SD = 0.59).

The response patterns indicate relatively similar levels of agreement regarding ChatGPT usability during classroom writing activities. Students' responses suggest comparable experiences in interacting with ChatGPT while completing drafting and revision tasks throughout the intervention period.

The perceived ease of use may partly explain the stronger gains observed in students' self-efficacy during the intervention. Because students generally viewed ChatGPT as accessible and user-friendly, cognitive effort could be allocated more toward drafting, revising, and improving business emails rather than managing technological difficulties. In workplace-oriented writing contexts, where learners must simultaneously attend to language accuracy, organization, and professional

tone, ease of technological interaction may become an important factor supporting confidence development and sustained engagement.

However, the findings also indicate that ease of use should not automatically be interpreted as uniform effectiveness across all learners. While most participants reported positive experiences, classroom interaction patterns suggested that several students initially required additional support in writing effective prompts or interpreting AI-generated suggestions appropriately. These patterns imply that successful ChatGPT integration may depend not only on technological accessibility but also on students' readiness to engage critically and strategically with AI-assisted writing support.

*Table 8. Students' Perceptions toward Ease of ChatGPT Use
During Writing Activities*

Item	Statement	Mean	SD	Interpretation
27	I find ChatGPT easy to use during business email writing activities	4.34	0.56	High
28	I can use ChatGPT without difficulty during writing tasks	4.28	0.59	High

5. Discussion

The substantial increase in *business email writing self-efficacy* among students receiving ChatGPT-assisted instruction, compared with the comparatively modest improvement observed in the control group, suggests that the development of writing confidence may be closely associated with the availability of continuous and immediate writing support during instructional activities. Students in the experimental group demonstrated markedly stronger gains in self-efficacy after twelve weeks of intervention, whereas the control group also improved but at a considerably lower magnitude.

These differences indicate that repeated exposure to writing tasks alone may not sufficiently explain the observed improvement patterns. Rather, the stronger gains may reflect how ChatGPT-mediated support enabled students to engage more actively with drafting, revision, and feedback interpretation throughout business email writing activities.

In particular, immediate responses related to grammar, vocabulary, organization, coherence, and professional tone may have contributed to students' growing perceptions of competence when completing workplace-oriented communication tasks. Such tendencies resonate with scholarship suggesting that writing self-efficacy often develops through repeated opportunities to receive feedback, regulate revision, and experience visible progress during writing rather than through instructional exposure alone (Sun & Wang, 2020; Golparvar & Khafi,

2021).

At the same time, the findings indicate that technology alone should not be viewed as the sole explanatory factor behind students' stronger gains. The present intervention embedded ChatGPT within structured pedagogical activities, including guided drafting, lecturer mediation, prompt-writing orientation, and repeated business email revision practices.

Consequently, the observed improvements may reflect the combined influence of AI-assisted feedback and instructional design rather than the independent contribution of technology itself. This interpretation aligns with previous research emphasizing that pedagogical outcomes in AI-supported learning environments are frequently shaped by how technologies are integrated into classroom instruction rather than by technological accessibility alone (Abdi Tabari et al., 2025; Jia & Lu, 2026).

In the present study, students repeatedly practiced workplace-oriented writing tasks situated within authentic communicative scenarios, including inquiry, complaint, request, and confirmation emails. Repeated exposure to such contextualized tasks may itself have reinforced students' confidence through familiarity, while ChatGPT-mediated support potentially accelerated the revision process by reducing uncertainty during writing activities (Rababah, 2022).

The relatively high posttest self-efficacy scores demonstrated by the experimental group further illuminate how ChatGPT-mediated interaction may reshape learners' engagement with revision and writing support. During classroom activities, students in the experimental group interacted with ChatGPT while drafting, revising, and evaluating business emails, creating opportunities for immediate textual response and repeated feedback engagement. Similar tendencies have been documented in studies positioning ChatGPT not merely as a correction tool but as a dialogic collaborator capable of prompting learners to reconsider organization, vocabulary, and language choices during writing processes (Huang & Wang, 2025; Xu et al., 2026).

However, compared with some previous investigations where students occasionally struggled to interpret automated feedback or selectively adopt AI-generated revisions (Muñoz Muñoz et al., 2025; Alharthi, 2025), the stronger gains observed in the present study may partly stem from the structured nature of the intervention, where lecturer guidance remained actively embedded throughout the learning process. Rather than functioning as a substitute for teacher support, ChatGPT operated as a mediational tool that complemented classroom instruction and scaffolded revision practices.

Students' perceptions toward ChatGPT-mediated business email writing support further clarify how learners interpreted the pedagogical value of AI during writing activities. High mean scores related to usefulness, writing support, and error identification suggest that students frequently viewed ChatGPT as an accessible source of assistance during drafting and revision. These findings

correspond with prior work reporting that learners often value ChatGPT because of its responsiveness, accessibility, and ability to provide immediate writing suggestions during academic tasks (Tram, 2024; Bauer et al., 2026).

The comparatively strong endorsement of ChatGPT's usefulness in the present study may also reflect the distinctive nature of business email writing itself. Unlike more open-ended genres such as argumentative or reflective writing, business emails frequently require adherence to recognizable rhetorical conventions, including conciseness, audience awareness, formality, clarity, and workplace appropriateness (Roshid et al., 2022; Hoque et al., 2024). Under such conditions, students may have found ChatGPT particularly helpful because AI-generated suggestions could be evaluated more easily against observable professional expectations.

The findings further suggest that certain dimensions of business email writing may have been more strongly influenced than others. Students appeared to benefit most in aspects associated with revision, language accuracy, organization, and professional tone, as reflected in high perceptions of writing effectiveness, useful suggestions, and error identification.

Such patterns indicate that ChatGPT-mediated interaction may be particularly supportive in helping learners manage rhetorical and linguistic demands commonly encountered in workplace-oriented writing. Nevertheless, the study also recognizes the possibility that overreliance on AI-generated responses may obscure students' independent rhetorical decision-making, particularly when learners adopt suggested texts without substantial reflection or adaptation (AlAfnan & MohdZuki, 2023; Cai & Ren, 2026).

Students' favorable perceptions regarding confidence enhancement, anxiety reduction, writing independence, and ease of ChatGPT use further extend discussions surrounding affective dimensions of AI-assisted writing. Students in the experimental group reported relatively high confidence and lower anxiety after engaging with ChatGPT-mediated business email writing activities, while simultaneously indicating stronger perceptions of writing independence. Comparable patterns have been reported in studies showing that AI-assisted writing environments may strengthen emotional comfort, reduce hesitation, and encourage greater willingness to engage in writing through continuous feedback accessibility (Xu et al., 2024; Wang et al., 2025).

Among these findings, the reduction of writing anxiety alongside increased writing independence represents one of the most pedagogically meaningful contributions of the present study, particularly because workplace-oriented writing frequently involves communicative pressure associated with correctness, professionalism, and audience sensitivity. Immediate access to revision support may have reduced students' uncertainty during writing tasks, thereby enabling greater emotional comfort and stronger willingness to revise texts independently.

At the same time, students' experiences with ChatGPT were not entirely

uniform. Although overall perceptions remained highly positive, classroom observations and students' responses suggested that several participants occasionally experienced difficulty interpreting AI-generated suggestions or determining whether generated language aligned appropriately with workplace communication expectations. In several instances, students appeared inclined to accept AI-generated suggestions too readily without substantial revision, raising concerns regarding possible overdependence or reduced critical engagement during writing.

Such findings indicate that successful AI integration may depend not solely on technological accessibility but also on students' ability to negotiate AI feedback critically and on teachers' capacity to design instructional environments that encourage reflection rather than passive adoption of generated responses (Qin & Dong, 2025; Yang & Lin, 2025).

6. Conclusion

The findings of this study indicate that ChatGPT-assisted instruction was associated with substantially stronger improvements in EFL learners' business email writing self-efficacy compared with conventional instruction. Students in the experimental group demonstrated significantly higher gains in confidence related to generating ideas, organizing content, revising drafts, maintaining coherence, and applying professional language in business email writing.

In addition, students reported favorable perceptions regarding ChatGPT-mediated writing support, particularly in relation to writing effectiveness, feedback usefulness, confidence enhancement, reduced anxiety, and writing independence. Within the context of business email writing, the integration of ChatGPT appeared to provide learners with immediate and accessible support during drafting and revision processes, particularly when interacting with workplace-oriented writing tasks requiring rhetorical awareness and professional communication conventions.

The findings suggest the importance of integrating ChatGPT-mediated writing support into EFL and ESP writing instruction, particularly in courses involving professional and workplace communication, such as business email writing. Nevertheless, ChatGPT integration may be more pedagogically meaningful when accompanied by structured guidance that encourages students to critically evaluate, revise, and negotiate AI-generated feedback rather than relying on automated suggestions uncritically.

Future studies may examine the role of ChatGPT across different writing genres, educational levels, and instructional contexts while incorporating additional variables such as writing quality, feedback uptake, learner autonomy, or longitudinal changes in self-efficacy to further explore how AI-assisted writing support interacts with students' psychological and writing development trajectories.

Bio Profiles

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Declaration Of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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