EDUVELOP
JOURNAL OF ENGLISH EDUCATION AND DEVELPMENT
Nationally Accredited Journal Decree No. 10/C/C3/DT.05.00/E5/2025 (Sinta 2)

**Volume 9, No. 1,** March 2026 • **Page: 361 - 377**
**DOI:** https://doi.org/v9i1.5980
**ISSN** 2597-713X (print)
**ISSN** 2597-7148 (online)

**OPEN ACCESS: Research Article**

# Integrating Digital Literacy into English for Business Communication Materials for Economics Students

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| **Received :** 2025-04-12 | **Accepted :** 2026-06-03 |
| **Revision :** 2026-05-18 | **Published :** 2026-03-31 |

**Abstract**
The rapid transformation of digital business environments has reshaped the communication competencies required of economics graduates. In this context, English for Business Communication (EBC) should be supported by digital literacy because professional communication increasingly occurs through digital platforms. However, many EBC materials used in Indonesian higher education remain text-based and provide limited exposure to authentic digital business communication. This study aimed to develop and evaluate digital literacy-integrated EBC instructional materials for economics students. Using a Research and Development design based on the ADDIE model, the study involved needs analysis, material design, expert validation, classroom implementation, and evaluation. Data were collected through questionnaires, expert appraisal forms, pre-test and post-test assessments, and student feedback. The findings showed an overall performance improvement of 17.9%, particularly in vocabulary accuracy, email coherence, business language use, and task appropriateness. Students also responded positively to the clarity, relevance, and interactivity of the developed materials. These findings indicate that integrating digital literacy into ESP-based EBC materials can strengthen students' business communication competence and connect classroom learning with authentic digital workplace practices. Future material development should include richer multimodal resources, digital simulations, and context-based tasks to support more authentic and sustainable learning outcomes.

**Keywords:** *Digital Literacy; English For Business Communication; ESP Materials; Instructional Design; Economics Students*

DOI: https://doi.org/v9i1.5980

## 1. Introduction

The rapid digitalization of global economic systems has transformed communication practices across business sectors. In contemporary workplaces, business communication is increasingly mediated through digital platforms, including email, virtual meetings, collaborative documents, business dashboards, and online transaction systems. This transformation has encouraged scholars in English for Specific Purposes (ESP) and digital education to argue that language learning should not only develop linguistic accuracy but also prepare learners to communicate effectively in multimodal and technology-mediated environments. However, previous studies on digital literacy in language education have often focused on general EFL learning, learner engagement, or the use of digital tools as media, while paying less attention to how digital literacy is systematically integrated into discipline-specific communication tasks. Similarly, studies on ESP materials have emphasized needs-based instruction, but many have not fully explained how digital competencies are translated into concrete learning objectives, classroom activities, and assessment indicators for English for Business Communication (EBC). This reveals both a conceptual and methodological gap. Conceptually, the relationship between digital literacy and EBC competence remains insufficiently operationalized. Methodologically, limited studies have developed, validated, implemented, and evaluated digital literacy-integrated EBC materials through a systematic instructional design model. Therefore, economics students need instructional materials that move beyond traditional text-based content and provide structured opportunities to access, evaluate, and produce business communication through authentic digital practices.

Digital literacy, as articulated by (Ng, 2012) involves technical, cognitive, and social-emotional competencies that allow individuals to operate effectively in digital environments. These competencies are essential for economics students who will navigate complex information systems and global communication networks. In the context of language education, digital literacy supports learners in interpreting online texts, analyzing multimodal business messages, and producing digital content that meets professional standards. Research in English language teaching (ELT) consistently emphasizes the need for integrating digital skills to enhance relevance, learner autonomy, and engagement(Ahmad, 2020) Without explicit integration of digital literacy, students may master linguistic forms but struggle to communicate effectively in digitally mediated business spaces.

Recent studies in Indonesian EFL and ESP contexts have emphasized the importance of integrating digital resources into language instruction to ensure that learning remains relevant to contemporary communicative practices. Mahmud et al. (2023), for example, found that digital-literacy activities help students navigate multimodal English input and promote autonomy in digital learning environments. However, the integration of digital literacy in ESP materials should not be limited to the

DOI: https://doi.org/v9i1.5980

use of digital tools as supplementary media. In English for Business Communication (EBC), digital literacy needs to be operationalized into specific communicative constructs, including the ability to access credible business information, evaluate multimodal business messages, compose professional digital correspondence, participate appropriately in virtual communication, and produce task-based business texts through digital platforms. This operationalization connects digital literacy with the linguistic, pragmatic, and multimodal dimensions of EBC competence. Although previous studies have acknowledged the value of digital resources in language learning, fewer studies have explained how digital literacy can be systematically translated into learning objectives, classroom tasks, material design, and assessment indicators for business communication. Therefore, the present study addresses this gap by developing EBC materials that embed digital literacy not merely as technological support, but as an integral component of ESP-based business communication competence.

Despite the growing importance of digital literacy, many instructional materials used in English for Specific Purposes (ESP) programs—particularly in business and economics faculties—remain anchored in static formats. Studies indicate that conventional materials often fail to reflect the communicative realities of economic sectors, where digital tools underpin almost all business processes. (Sari & Lestari, 2023), for example, found that learners respond more positively to ESP materials that incorporate authentic digital business tasks, yet such resources are limited and unevenly implemented across Indonesian institutions. Similarly, (Kurniawan, 2022) shows that higher education often lags behind in providing digital platforms that mirror professional communication settings. These findings highlight a persistent gap between classroom materials and workplace demands.

At the same time, a growing body of literature has examined digital literacy in ELT, but few studies focus specifically on economics students learning EBC. Existing research tends to address digital literacy in general EFL contexts e.g., (Ahmad, 2020), or explore online learning tools without connecting them to the specialized communicative needs of business learners. Furthermore, many studies emphasize technology adoption rather than pedagogical integration, resulting in materials that use digital tools superficially without embedding them into purposeful business communication tasks. This gap suggests the need for instructional materials that align digital literacy with the linguistic and pragmatic demands of business communication.

Needs-analysis research in ESP has shown that discipline-specific English instruction must be aligned with the professional communication realities of the target field. (Nasution et al., 2021), for example, demonstrated that ESP learners in specialized fields require materials tailored to their specific academic and professional needs. The same pattern is evident in economics and business programs, where students require English materials that reflect workplace-based digital practices rather than generic academic English. This confirms that EBC learning materials must incorporate digital

DOI: https://doi.org/v9i1.5980

literacy as an essential competency rather than an optional enhancement. However, existing materials tend to lag behind technological developments, creating an urgent need for instructional design interventions.

From a theoretical standpoint, the development of digital-literacy-integrated EBC materials draws upon several concepts: (1) digital literacy theory, which provides a foundation for identifying relevant digital competencies; (2) ESP principles, which emphasize needs-based and context-specific instructional materials; and (3) communicative competence frameworks, which highlight the integration of linguistic, pragmatic, and strategic skills in real communication. Ng's (2012) framework supports the integration of cognitive and technical digital skills into business communication tasks (Basturkmen, 2010). ESP principles underscore the importance of designing materials based on learner needs and the communication practices of target fields, such as economics. Meanwhile, communicative competence theories help contextualize how digital tasks can support learners in producing clear, coherent, and purposeful business messages.

A conceptual relationship emerges when these frameworks are synthesized. Digital literacy provides the tools and competencies necessary for navigating online environments; ESP principles ensure that these competencies are contextualized within the communicative practices of economic sectors; and communicative competence frameworks clarify how learners can apply these skills to produce effective digital business communication. This conceptual integration enables the development of instructional materials that not only strengthen language skills but also prepare learners for the multimodal, technology-driven settings of contemporary business interactions.

The present study positions itself within the broader international discussion on the digital transformation of ESP instruction by addressing the limited availability of English for Business Communication (EBC) materials that systematically integrate digital literacy for economics students. While previous studies have acknowledged the value of digital resources in ESP learning, many of them have focused primarily on technology adoption, online learning platforms, or learner engagement. Such studies are important, but they often provide a limited explanation of how digital literacy can be pedagogically embedded into business communication tasks that reflect authentic workplace practices. In response to this gap, the present study develops EBC materials that integrate digital literacy into technology-mediated, multimodal, and task-based business communication activities. The novelty of this study lies not in introducing digital technology as a tool, but in operationalizing digital literacy as part of ESP material design, learning activities, and communicative performance assessment. By doing so, this study contributes to international scholarship on technology-mediated ESP, multimodal literacy, and digital business communication, while also offering a contextually grounded model for economics students in Indonesian higher education.

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Given these considerations, the study aims to design, develop, and evaluate EBC instructional materials that integrate digital literacy to support economics students in higher education. By grounding the development process in the ADDIE model, the study ensures that the materials are relevant, systematically designed, and pedagogically sound.

**The objectives of this study are:**

1. To analyze the digital literacy needs of economics students in learning English for Business Communication;
2. To design and develop digital-literacy-integrated EBC instructional materials using the ADDIE model;
3. To evaluate the effectiveness of the materials through expert validation, implementation, and student performance analysis.

## 2. Methods

This study was conducted from March to July 2024 at a private higher education institution in South Sulawesi, Indonesia, specifically within the Economics Study Program, where the English for Business Communication (EBC) course is offered. The institutional setting was chosen because economics students increasingly engage with technology-driven economic activities but still rely on traditional, text-based English materials that do not reflect digital business practices. The study employed a Research and Development (R&D) approach using the ADDIE model—Analysis, Design, Development, Implementation, and Evaluation—to produce instructional materials that integrate digital literacy into EBC learning. The ADDIE framework was selected for its systematic, iterative nature, which allows continuous refinement of materials to address the pedagogical gap identified in the introduction (Branch, 2009).

### 2.1.Research Design

The R&D design guided the sequential process of identifying student needs, constructing digital-literacy-integrated materials, validating the developed materials through expert review, and testing their effectiveness through limited classroom implementation. The design emphasized the alignment between learner needs, instructional objectives, digital literacy constructs, and business communication tasks that reflect authentic workplace practices. In the Analysis phase, the study examined students' digital literacy needs and EBC learning problems. In the Design and Development phases, learning outcomes, digital tasks, multimodal resources, and assessment indicators were constructed based on the dimensions of digital literacy and the communicative demands of EBC. In the Implementation phase, the materials were applied to a limited group of students, while the Evaluation phase examined expert validation results, student performance improvement, and student feedback. This procedure was intended to ensure that the developed materials were not only pedagogically relevant but also empirically evaluated.

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### 2.2. Types and Sources of Data

The study used both quantitative and qualitative data to obtain a comprehensive understanding of the development and implementation process. Quantitative data consisted of:

(1) needs-analysis questionnaire responses from 105 economics students,

(2) expert validation scores from three validators consisting of ESP and instructional design specialists, and

(3) pre-test and post-test scores from 30 students who participated in the limited implementation.

The pre-test and post-test measured four indicators of EBC performance: vocabulary accuracy, email coherence, business language use, and task appropriateness. Qualitative data were obtained from semi-structured interviews, reflective notes, and open-ended student feedback. These data were used to support the interpretation of quantitative findings, identify students' perceptions of the developed materials, and determine aspects of the materials that required revision.

### 2.3. Data Collection Techniques

Data were collected using multiple instruments aligned with the ADDIE phases. In the Analysis phase, a needs-analysis questionnaire was administered online through Google Forms. The questionnaire was adapted from Ng's (2012) digital literacy framework and covered technical, cognitive, and socio-emotional dimensions of digital literacy in relation to EBC learning. Before distribution, the questionnaire was reviewed by two experts to examine content relevance, item clarity, and construct alignment. A pilot test was then conducted with students who had similar characteristics to the target participants.

The results of the pilot test were used to revise ambiguous items and improve the clarity of the instrument. The reliability of the questionnaire was examined using Cronbach's alpha to ensure internal consistency. In the Development phase, expert validation was conducted using structured validation sheets. The validation rubric covered four aspects: content relevance, linguistic accuracy, pedagogical suitability, and digital literacy integration.

Three experts evaluated the materials independently. Their ratings were compared to examine the consistency of judgments, and inter-rater agreement was calculated to support the credibility of the validation results. Suggestions from the validators were used to revise the materials before classroom implementation. During the Implementation phase, pre-test and post-test instruments were used to measure students' EBC performance before and after using the developed materials.

The test tasks required students to perform authentic business communication activities, such as composing professional emails and interpreting multimodal business messages. Qualitative data were collected through semi-structured interviews, reflective notes, and open-ended feedback at the end of the implementation period. These

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qualitative instruments were used to explore students' experiences, perceived usefulness of digital tasks, and confidence in using English for digital business communication.

### 2.4. Data Analysis Techniques

Quantitative data were analyzed using descriptive and inferential statistics. The needs-analysis questionnaire was analyzed using frequency, percentage, and mean scores to identify students' digital literacy needs and EBC learning problems. The internal consistency of the questionnaire was examined using Cronbach's alpha. Expert validation scores were analyzed using mean scores and category interpretation to determine the feasibility of the developed materials. In addition, inter-rater agreement was calculated to examine the consistency of expert judgments regarding content relevance, linguistic accuracy, pedagogical suitability, and digital literacy integration.

The effectiveness of the developed materials was analyzed by comparing students' pre-test and post-test scores across four indicators: vocabulary accuracy, email coherence, business language use, and task appropriateness. A paired-sample t-test was used to determine whether the difference between pre-test and post-test scores was statistically significant. In addition to statistical significance, Cohen's d was calculated to determine the effect size of the intervention. This analysis was used to show the magnitude of students' improvement beyond the reported percentage gain. Qualitative data from interviews, reflective notes, and open-ended feedback were analyzed thematically. The analysis involved data familiarization, initial coding, theme identification, and interpretation.

The themes were used to explain students' responses to the digital tasks, the clarity of material instructions, the perceived authenticity of business communication activities, and students' confidence in using English in digital business contexts. The integration of quantitative and qualitative findings provided a more comprehensive explanation of how digital literacy-integrated EBC materials contributed to students' learning outcomes.

## 3. Results and Discussions

This section presents the findings obtained from needs analysis, expert validation, pre-test and post-test assessment, and student feedback. The discussion not only reports the numerical improvement but also interprets how the design of digital literacy-integrated EBC materials contributed to students' performance. Particular attention is given to the improvement in business language use, which showed the highest gain among the assessed indicators. This section also considers possible factors that may have influenced the results, including task design, exposure to authentic digital business input, scaffolded learning activities, teacher support, students' prior digital experience, and possible test familiarity. By addressing these aspects, the discussion aims to move beyond descriptive comparison and provide a more analytical explanation of how the developed materials supported students' English for Business

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Communication competence.

### 3.1. Needs Analysis Results: Digital Literacy Gaps and Learner Expectations.

The needs analysis revealed that economics students were highly familiar with digital platforms in their daily academic and personal activities. However, this familiarity did not automatically indicate sufficient competence in professional digital business communication. Most students reported difficulties in composing professional digital emails, identifying credible online business sources, and interpreting multimodal business messages.

They also expected EBC materials to include real-world digital tasks, such as email simulations, business case analysis, and interpretation of digital infographics. These findings suggest a distinction between students' everyday digital familiarity and their professional digital communication competence. Students may be accustomed to using digital platforms for social and academic purposes, but they still require structured guidance to use English appropriately in workplace-oriented digital communication.

**Table 1.** Reliability of the Needs-Analysis Questionnaire

| Dimension | Number of Items | Cronbach's Alpha | Interpretation |
|---|---|---|---|
| Technical digital literacy | 8 | 0.86 | Good |
| Cognitive digital literacy | 8 | 0.88 | Good |
| Socio-emotional digital literacy | 8 | 0.84 | Good |
| Overall questionnaire | 24 | 0.89 | Good |

The reliability analysis showed that the needs-analysis questionnaire had good internal consistency. The technical digital literacy dimension obtained a Cronbach's alpha of 0.86, the cognitive digital literacy dimension obtained 0.88, and the socio-emotional digital literacy dimension obtained 0.84. The overall Cronbach's alpha was 0.89, indicating that the questionnaire was reliable for identifying students' digital literacy needs in relation to English for Business Communication learning.

Therefore, the needs analysis confirms that digital literacy in EBC should not be treated merely as technical ability, but as a communicative competence that involves accessing information, evaluating digital content, producing professional messages, and responding appropriately to multimodal business texts. This finding supports the need for instructional materials that embed digital literacy directly into ESP-based business communication tasks rather than positioning it as an additional or decorative component.

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### 3.2. Expert Validation Results: Pedagogical and Digital Suitability of the Materials

Expert validation was conducted to assess the relevance, clarity, and pedagogical suitability of the digital-literacy-integrated EBC materials. Three experts in ESP and educational technology evaluated the materials based on content appropriateness, digital task relevance, linguistic accuracy, pedagogical suitability, and instructional design.

The experts rated the materials as highly appropriate, particularly in terms of authentic business scenarios, integration of digital tasks, and alignment with economics students' needs. The suggestions mainly concerned the refinement of task instructions and the expansion of multimodal examples.

**Table 2**. Inter-Rater Agreement among Expert Validators

| Validation Aspect | Number of Validators | ICC Value | Interpretation |
|---|---|---|---|
| Content relevance | 3 | 0.86 | Good agreement |
| Linguistic accuracy | 3 | 0.82 | Good agreement |
| Pedagogical suitability | 3 | 0.84 | Good agreement |
| Digital literacy integration | 3 | 0.88 | Good agreement |
| Overall expert validation | 3 | 0.85 | Good agreement |

To strengthen the credibility of expert validation, inter-rater agreement was calculated using the Intraclass Correlation Coefficient (ICC). The results showed good agreement among the three validators across all validation aspects. Content relevance obtained an ICC value of 0.86, linguistic accuracy obtained 0.82, pedagogical suitability obtained 0.84, and digital literacy integration obtained 0.88. The overall ICC value was 0.85, indicating that the experts had consistent judgments regarding the feasibility and suitability of the developed EBC materials.

The validation results indicate that the developed materials had sufficient pedagogical and contextual suitability before classroom implementation. More importantly, the expert feedback confirmed that digital literacy was not inserted as a separate technological feature, but was embedded into EBC tasks through email writing, business case analysis, multimodal text interpretation, and digital communication practices.

This supports Basturkmen's (2010) view that ESP materials should be developed from learners' target needs and real communicative contexts. In this study, expert validation strengthened the alignment between ESP principles, digital literacy constructs, and business communication tasks.

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### 3.3. Student Performance Improvement: Pre–Post Test Results

The effectiveness of the developed materials was examined through pre–post testing involving 30 students. Results as shown in Table 1 found substantial improvements across four major skill indicators.

**Table 3.** Comparison of Pre-Test and Post-Test Scores

| Skill Area | Pre-Test | Post-Test | Mean Gain | % Increase |
|---|---|---|---|---|
| Vocabulary Accuracy | 68.4 | 79.2 | 10.8 | 15.8% |
| Email Coherence | 65.0 | 76.5 | 11.5 | 17.7% |
| Business Language Usage | 61.2 | 74.3 | 13.1 | 21.4% |
| Task Appropriateness | 69.1 | 80.6 | 11.5 | 16.6% |
| **Overall Average** | **65.9** | **77.7** | **11.8** | **17.9%** |

The overall improvement of 17.9% indicates that the integration of digital literacy into EBC materials supported students' business communication competence. The highest increase was found in business language usage, which improved from 61.2 in the pre-test to 74.3 in the post-test, with a gain of 13.1 points or 21.4%.

**Table 4**. Effect Size of Students' Performance Improvement

| Skill Area | Pre-Test Mean | Post-Test Mean | Mean Gain | % Increase | Cohen's d | Effect Interpretation |
|---|---|---|---|---|---|---|
| Vocabulary Accuracy | 68.4 | 79.2 | 10.8 | 15.8% | 1.17 | Large |
| Email Coherence | 65.0 | 76.5 | 11.5 | 17.7% | 1.17 | Large |
| Business Language Usage | 61.2 | 74.3 | 13.1 | 21.4% | 1.30 | Large |
| Task Appropriateness | 69.1 | 80.6 | 11.5 | 16.6% | 1.15 | Large |
| Overall Average | 65.9 | 77.7 | 11.8 | 17.9% | 1.33 | Large |

Cohen's d was calculated to determine the magnitude of students' performance improvement. The results showed large effect sizes across all assessed indicators. Vocabulary accuracy obtained a Cohen's d value of 1.17, email coherence obtained 1.17, business language usage obtained 1.30, and task appropriateness obtained 1.15. The overall effect size was 1.33, indicating a large instructional effect of the developed digital literacy-integrated EBC materials on students' performance.

The largest effect was found in business language usage, with a Cohen's d value of

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1.30. This finding is consistent with the descriptive result showing that business language usage had the highest percentage increase, rising from 61.2 in the pre-test to 74.3 in the post-test. This improvement may be attributed to repeated exposure to authentic business expressions, scaffolded digital communication tasks, email simulations, and contextualized business case activities.

This result requires further interpretation because business language usage improved more substantially than vocabulary accuracy, email coherence, and task appropriateness. The greater improvement in business language usage can be attributed to the design of the learning tasks. The developed materials exposed students to repeated practice in using business expressions, professional tone, formal email phrases, and workplace-related vocabulary through digital communication tasks. Email simulations, business case analysis, and multimodal business messages provided students with contextualized input and opportunities to apply business language in meaningful situations.

In addition, scaffolded task sequences helped students move from recognizing business expressions to producing them in appropriate communicative contexts. Therefore, the improvement was not merely caused by the presence of digital tools, but by the integration of authentic input, guided practice, and task-based digital communication activities.

The gains in email coherence and task appropriateness also indicate that students became more capable of organizing messages and responding to business communication purposes. However, these indicators improved slightly less than business language usage, possibly because coherence and task appropriateness require more complex discourse-level control.

These skills may need longer instructional time and more extended writing practice to develop fully. Thus, the findings suggest that digital literacy-integrated EBC materials are particularly effective in improving students' use of business language, while higher-level discourse organization may require longer and repeated intervention.

### 3.4. Student Feedback: Perceived Usefulness and Engagement

Student feedback was collected through post-implementation surveys and reflective journals. Students rated the clarity, relevance, and interactivity of the digital materials highly, with an average satisfaction score of 4.4 out of 5. This positive response supports the quantitative finding that students' performance improved after using the developed materials. Students highlighted three major benefits. First, they gained a better understanding of real digital business practices, particularly through email simulations, digital case studies, and multimodal business texts. Second, they reported increased motivation and engagement because the tasks were interactive and connected to communication practices that they recognized in contemporary digital environments. Third, they developed greater confidence in navigating digital communication platforms commonly used in business contexts. These responses help explain why

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business language usage showed the highest improvement. The materials provided repeated exposure to business expressions and allowed students to practice them in realistic digital contexts. In other words, students did not only learn business vocabulary as isolated language items; they used it in communicative tasks that required purpose, audience awareness, and professional tone. The feedback also indicates that authenticity and interactivity played an important role in supporting both cognitive and affective learning outcomes.

Students highlighted three key benefits:

1. Improved understanding of real digital business practices, especially through email simulations and digital case studies.
2. Increased motivation and engagement thanks to interactive multimedia and practical tasks.
3. Greater confidence in navigating digital communication platforms commonly used in business environments.

These findings resonate with (Reinders & White, 2016), who argue that digital tools can improve learner autonomy and engagement when they reflect authentic communication tasks.

The finding that digital-literacy-integrated materials enhanced students' engagement and performance is consistent with previous research on digital media use in ELT. For instance, a study by (Arsyad & Rijal, 2023) demonstrated that digital platforms such as TikTok significantly improved university students' engagement and vocabulary acquisition through multimodal exposure. Although their study focused on vocabulary learning rather than business communication, the underlying pedagogical mechanism is similar: digital environments stimulate learners' attention, increase participation, and provide authentic exposure to language use. This alignment reinforces the idea that integrating digital resources into English for Business Communication (EBC) learning is not merely supplementary, but essential for creating learning experiences that mirror how communication unfolds in contemporary digital ecosystems.

The results of this study echo trends observed in earlier research showing that technology-supported language learning can strengthen both cognitive and affective learner outcomes. By embedding digital resources and multimodal tasks into EBC materials, this study provides further empirical support for the integration of digital environments in ESP instruction. Future research should explore how discipline-specific digital tools—such as business analytics dashboards or digital negotiation platforms—can be incorporated into advanced EBC modules.

Digital tasks must not be decorative but embedded meaningfully to reflect workplace expectations. When aligned with ESP objectives, digital literacy enhances both engagement and communicative competence.

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### 3.5. Integrated Discussion: Alignment with Previous Studies and Theoretical Implications

Overall, the integrated findings address the problem highlighted in the introduction: the disconnect between traditional EBC materials and digitally mediated business communication demands.

The results show that when digital literacy is systematically embedded into instructional design, students can improve not only their linguistic performance but also their ability to communicate in digital business contexts.

The findings support Ng's (2012) framework, which views digital literacy as involving technical, cognitive, and socio-emotional dimensions. In the developed materials, the technical dimension was represented through platform navigation and digital task completion; the cognitive dimension appeared in students' ability to evaluate online information and interpret multimodal business messages; and the socio-emotional dimension was reflected in their confidence and appropriateness in digital communication.

From an ESP perspective, the study also supports Basturkmen's (2010) view that instructional materials should be grounded in learners' target needs and professional communication contexts. The improvement in students' business language usage suggests that digital literacy integration can strengthen business register mastery when students are given authentic input and scaffolded opportunities to use language for workplace-related purposes.

This finding extends previous ESP research by showing that digital literacy is not only a supporting skill, but also a component that can shape communicative performance in EBC.

Nevertheless, several possible influencing factors should be acknowledged. First, teacher support during the implementation may have contributed to students' understanding of the tasks and their ability to complete them. Second, students' previous exposure to digital platforms may have helped them adapt more easily to the digital components of the materials. Third, familiarity with the pre-test and post-test format may have influenced performance improvement.

Therefore, while the 17.9% overall gain indicates a positive learning outcome, the result should be interpreted as the effect of both the developed materials and the instructional conditions surrounding their implementation.

Future studies should involve larger samples, longer implementation periods, and more controlled designs to examine the long-term impact of digital literacy-integrated EBC materials.The study extends the literature by showing that:

1. Digital literacy integration enhances business register mastery, not just general English skills.
2. Economics students respond positively to authentic digital simulations, confirming the need for context-based ESP materials.

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3. Instructional design models (ADDIE) remain effective for aligning digital competencies with language objectives.

The findings indicate that well-designed digital instructional materials directly lead to measurable improvements in students' English for Business Communication competence.

In addition to linguistic gains, students also reported improvements in confidence, which aligns with (Rafiqa & Fitriani, 2023) findings that psychological factors such as self-efficacy play a significant role in students' communicative performance. The integration of real digital tasks, such as email simulations and online business case analyses, likely contributed to this increased confidence by providing learners with relevant and achievable challenges drawn from workplace communication.

Nevertheless, several possible influencing factors should be acknowledged. First, teacher support during the implementation may have contributed to students' understanding of the tasks and their ability to complete them. Second, students' previous exposure to digital platforms may have helped them adapt more easily to the digital components of the materials. Third, familiarity with the pre-test and post-test format may have influenced performance improvement. Therefore, while the 17.9% overall gain and large effect size indicate a positive learning outcome, the result should be interpreted as the effect of both the developed materials and the instructional conditions surrounding their implementation.

The results imply that English for Business Communication curricula need to be redesigned into digital-rich learning ecosystems to adequately prepare graduates for communication demands in modern digital business environments.

## 4. Conclusion

This study concludes that systematically integrating digital literacy into English for Business Communication (EBC) materials can enhance economics students' ability to perform authentic business communication tasks in digital contexts. The materials developed through the ADDIE model showed positive results in improving students' vocabulary accuracy, email coherence, business language use, task appropriateness, and confidence in navigating digital business platforms.

These findings indicate that digital literacy-integrated EBC materials can help bridge the gap between traditional text-based instruction and the communication demands of contemporary digital workplaces.

The theoretical contribution of this study lies in its attempt to operationalize digital literacy as an integral component of ESP-based business communication competence. Rather than treating digital literacy as a separate technical skill or supplementary learning medium, this study positions it as part of the linguistic, pragmatic, multimodal, and task-based dimensions of EBC learning.

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In this sense, the study contributes to ESP scholarship by showing how digital literacy can be translated into learning objectives, instructional materials, classroom tasks, and performance assessment for business communication.

Despite these contributions, several limitations should be acknowledged. First, the implementation involved a relatively small sample of students (n = 30), which limits the generalizability of the findings. Second, the intervention was conducted within a short instructional period, so the long-term impact of the developed materials on students' business communication competence could not be fully examined. Third, the study was limited to one institutional context in Indonesian higher education, which means that the results may not fully represent EBC learning conditions in other universities or educational settings.

In addition, students' prior digital experience, teacher support during implementation, and familiarity with the test format may have influenced the observed improvement. Future research should involve larger and more diverse samples, longer implementation periods, and comparative or experimental designs to examine the sustained impact of digital literacy-integrated EBC materials. Further studies may also explore the integration of institutional learning technologies, digital simulations, business analytics dashboards, and online negotiation tasks to strengthen the authenticity of EBC instruction in digitally mediated professional contexts.

## 5. Acknowledgement

The author extends sincere appreciation to Institut Turatea Indonesia for providing academic support and facilitating the research activities conducted in this study. Gratitude is also directed to the expert validators and faculty members who contributed insightful feedback during the development of the instructional materials. Special thanks are conveyed to the students who participated in the implementation phase and generously shared their experiences, which greatly enriched the findings. No external funding was received for this research.

## 6. Author Contributions

A.S.A. conceptualized the research focus, designed the instructional framework, developed the digital-literacy-integrated EBC materials, and prepared the initial draft of the manuscript. M.B. contributed to the methodological refinement, supervised the design and validation procedures, and provided substantive revisions related to technology-enhanced language learning. S. supported the analysis and interpretation of linguistic and pedagogical data, contributed to the evaluation instruments, and assisted in strengthening the theoretical and ESP-related arguments. All authors reviewed and approved the final version of the manuscript.

## 7. Conflicts of Interest

The authors declare no conflict of interest. The research was conducted independently, and the funders had no role in the study design, data collection, analysis, interpretation, manuscript preparation, or decision to publish.

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