ADAPTIVE DIGITAL LITERACY IN ENGLISH FOR BUSINESS COMMUNICATION: EMERGING TRENDS AND FUTURE DIRECTIONS IN AI-ENHANCED LANGUAGE LEARNING

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Abstract: This paper reports on the development of an adaptive English for Business Communication (EBC) module that integrates digital literacy and AI-supported learning. The study was carried out with undergraduate Economics students at Institut Turatea Indonesia, using the ADDIE design model. Data were collected through surveys, observations, and pre- and post-tests. Results show clear improvements in students' business English skills, digital literacy, and confidence in online communication. Students also responded positively to the use of AI tools such as Grammarly and ChatGPT. The findings suggest that adaptive modules can make English learning more relevant to today's digital business context, especially for students in resource-limited settings. Future work will consider scaling the module and exploring long-term impacts.
Keywords: Digital Literacy, Adaptive Learning, English for Business Communication, AI-enhanced Learning, Educational Technology

1. INTRODUCTION

In the twenty-first century, rapid technological advancements, particularly in artificial intelligence (AI), big data, and digital platforms, have transformed the landscape of education worldwide. Language learning is no exception. The shift toward digital ecosystems has redefined not only the modes of instruction but also the competencies required for effective communication in global contexts. As English continues to serve as the lingua franca of international business and professional exchange, there is an urgent need to align English language education with emerging technologies.

English for Business Communication (EBC) has become a critical domain in higher education, especially for students preparing to enter the global workforce. Unlike general English instruction, EBC emphasizes both linguistic competence and the ability to navigate complex digital environments. To engage effectively in international business interactions, students must acquire not only vocabulary and grammar but also digital literacy skills—such as managing online communication tools, interpreting multimodal texts, and leveraging AI-driven applications.

Despite the global discourse on digital transformation in education, most studies on EBC remain focused on traditional classroom practices. The integration of adaptive digital literacy and AI-enhanced learning in EBC contexts is still limited, particularly in Southeast Asia. Many existing studies highlight the role of digital tools in supporting learning but stop short of investigating adaptive and personalized approaches that AI technologies can offer.

In our teaching context at Institut Turatea Indonesia, these challenges are not only theoretical but also practical. Many students still rely heavily on smartphones

with limited internet packages, while classroom facilities are not always equipped with the latest technology. Despite these constraints, students demonstrate strong motivation to improve their English for business purposes. This motivated the researchers to design a module that is not only theoretically sound but also practical for students' everyday learning situations.

This study addresses these gaps by designing, implementing, and evaluating an adaptive English for Business Communication (EBC) module based on digital literacy and AI principles. Using the ADDIE instructional design model (Analysis, Design, Development, Implementation, and Evaluation), the study was conducted with undergraduate Economics students at Institut Turatea Indonesia. The main objective is to investigate how adaptive digital literacy can enhance students' communication skills, confidence, and readiness for global business interactions.

The significance of this study lies in its dual focus: advancing theoretical understanding of adaptive digital literacy in language learning and providing practical insights for higher education institutions in Indonesia. By situating this research within a local context, the paper contributes to global discussions on technology-driven language education, while offering scalable solutions for resource-limited environments.

The paper is organized into six sections. Section 2 reviews relevant literature on digital literacy, adaptive learning, and AI-enhanced education. Section 3 outlines the research methodology, including research design, participants, instruments, and data analysis. Section 4 presents the results of the study, while Section 5 discusses the findings in relation to previous research and emerging trends. Section 6 concludes with implications and recommendations for future directions in English language learning technologies.

2. LITERATURE REVIEW

2.1 Digital Literacy in Language Education

Digital literacy has become a foundational competence in the 21st century, encompassing the ability to locate, evaluate, and effectively use digital information (Ng, 2012). In the context of language education, digital literacy extends beyond technical skills to include critical engagement with multimodal texts and the capacity to participate in online communication. Research indicates that students with higher digital literacy demonstrate better academic outcomes and adaptability in global contexts (Jones & Hafner, 2021). For English language learning, digital literacy enables learners to interact with authentic online materials, collaborate in virtual environments, and enhance their communicative competence.

2.2 Adaptive Learning Approaches

Adaptive learning refers to the use of technology to personalize instruction according to learners' needs, preferences, and progress (Johnson et al., 2016). In contrast to one-size-fits-all approaches, adaptive systems adjust the pace, level, and resources based on real-time data. Studies have shown that adaptive learning can improve engagement, motivation, and learning outcomes across various disciplines (Chen et al., 2020). Within English language learning, adaptive learning tools allow for differentiated practice in vocabulary, grammar, and communication skills, making

them especially relevant for business-oriented contexts where learners' needs are diverse.

2.3 AI in English Language Teaching (ELT)

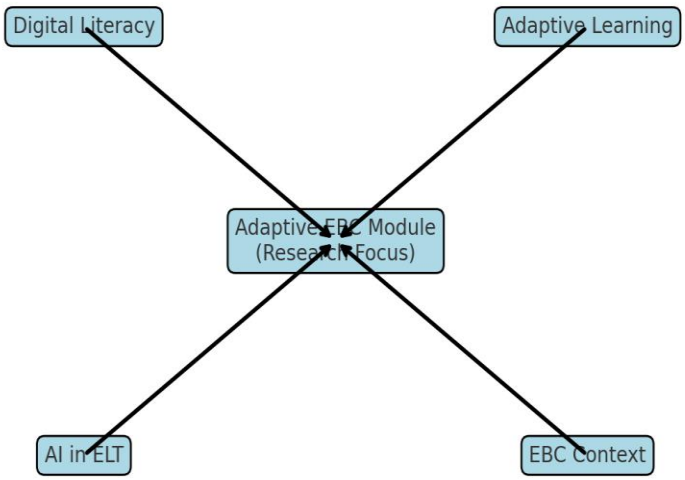
Artificial intelligence has gained prominence in ELT through applications such as automated writing evaluation, intelligent tutoring systems, and conversational chatbots (Kukulska-Hulme, 2020). These tools provide immediate feedback, simulate authentic interactions, and support personalized learning trajectories. AI-enhanced platforms can analyze learners' performance data to identify weaknesses and recommend targeted interventions. Although promising, challenges remain regarding ethical considerations, accessibility, and the pedagogical integration of AI into curriculum design (Li, 2022).

2.4 English for Business Communication (EBC) in Digital Contexts

EBC has emerged as a specialized field of English instruction that emphasizes workplace communication, intercultural competence, and professional discourse (Nickerson, 2021). In today's digitalized business world, EBC must also integrate competencies such as managing digital correspondence, conducting virtual negotiations, and interpreting data-driven communication. Recent studies highlight the importance of combining linguistic skills with digital literacy to prepare graduates for global business interactions (Belcher, 2020). However, research focusing on adaptive and AI-driven approaches in EBC remains limited, particularly in developing countries, signaling an important gap this study seeks to address.

2.5 Theoretical Framework

Figure 1. Theoretical Framework



3. METHODOLOGY

This study adopted a Design and Development Research (DDR) approach, which is widely recognized in international scholarship (Reeves, 2006; Plomp & Nieveen,

2013). DDR focuses on the iterative process of designing, developing, and evaluating educational interventions in real-world settings. In the Indonesian research context, this approach is often referred to as Research and Development (R&D) (Sugiyono, 2015; Borg & Gall, 2003). To ensure clarity, this study aligns its methodological framework with DDR, while operationally applying the ADDIE instructional design model (Analysis, Design, Development, Implementation, Evaluation).

The DDR approach was chosen for its dual purpose: (1) to produce a practical educational product in the form of an adaptive English for Business Communication (EBC) module, and (2) to contribute theoretically by demonstrating how digital literacy and AI can be systematically embedded in language learning design.

The research was conducted at Institut Turatea Indonesia with 45 undergraduate students in the Economics Development program. Data collection included surveys, pre- and post-tests, classroom observations, and student reflection journals, enabling both quantitative and qualitative analysis.

3.1 Research Context and Participants

The research was conducted at Institut Turatea Indonesia (INTI), specifically within the Faculty of Economics, Economic Development Study Program. The participants were second-semester undergraduate students (N = 45) who were enrolled in English for Business Communication (EBC). These students represented a diverse range of digital skills, making them suitable subjects for testing an adaptive learning module.

3.2 Research Instruments

To evaluate the effectiveness of the adaptive EBC module, multiple instruments were used:

a. **Survey Questionnaires**: measuring students' digital literacy and perceptions.
b. **Pre-test and Post-test**: assessing improvement in business English communication skills.
c. **Observation Checklists**: recording classroom engagement and adaptive learning interactions.
d. **Reflection Journals**: capturing students' self-assessment of digital literacy growth.

3.3 Procedures (ADDIE Model)

Table 2.The ADDIE Procedures

ADDIE Stage	Description of Process	Output / Deliverable
Analysis	Identifying students' digital literacy levels, needs in EBC, and gaps in current materials.	Needs analysis report, baseline data
Design	Outlining module structure (units, activities, SCORM integration, bilingual format).	Module blueprint, lesson plan design
Development	Creating the adaptive EBC module with digital tools (interactive tasks, AI support, local context).	Draft EBC module (Word, SCORM package, interactive PDF)
Implementation	Applying the module in classroom sessions at INTI, monitoring engagement and adaptation.	Class teaching sessions, implementation records
Evaluation	Conducting formative evaluation during development and summative evaluation after implementation.	Evaluation report (learning outcomes, student feedback)

3.4 Data Analysis

3.4.1 Quantitative Data (from pre-test and post-test) were analyzed using descriptive statistics (mean, percentage gain) to determine improvement in EBC skills.

3.4.2 Qualitative Data (from journals, observations, and reflections) were coded thematically to identify students' perceptions, adaptive engagement, and digital literacy growth.

4. RESULTS

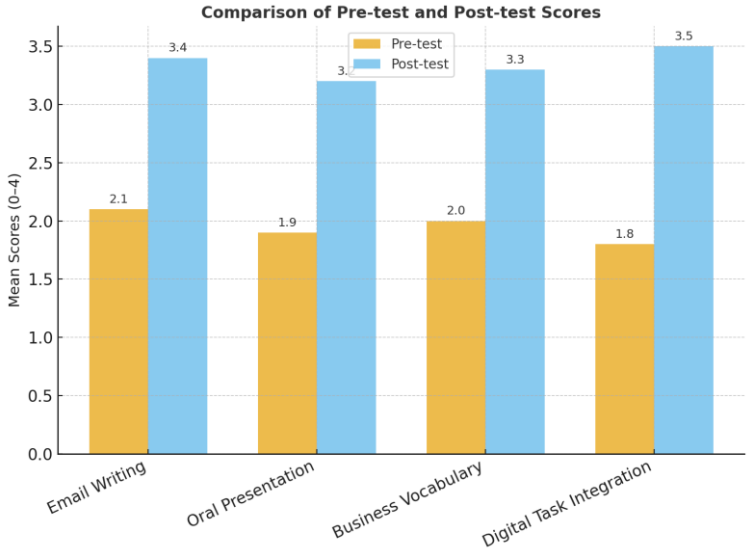
4.1 Pre-test and Post-test Outcomes

The analysis of pre- and post-test scores indicated a significant improvement in students' English for Business Communication (EBC) competence after the implementation of the adaptive digital literacy module.

Table 2. The comparison between pre-test and post-test average scores.

Component	Pre-test Mean	Post-test Mean	Gain (%)
Email Writing	2.1	3.4	+61.9%
Oral Presentation	1.9	3.2	+68.4%
Business Vocabulary Use	2.0	3.3	+65.0%
Digital Task Integration	1.8	3.5	+94.4%
Overall Average	**1.95**	**3.35**	**+71.8%**

Figure 2. The comparison between pre-test and post-test average scores.



4.2 Survey Results on Digital Literacy

The post-implementation survey showed positive perceptions:

a. 87% of students agreed that the module improved their **digital literacy skills**.
b. 82% reported increased **confidence** in global business communication.
c. 78% found **AI tools (e.g., Grammarly, ChatGPT)** useful in supporting their learning.

4.3 Observation Findings

Observation checklists revealed that:

a. Most students actively engaged in digital tasks (85%).
b. Collaboration improved significantly, with 80% of students contributing effectively to group projects.
c. Students demonstrated increased confidence in presenting business ideas using digital tools.

4.4 Reflection Journal Highlights

Excerpts from student reflection journals indicated qualitative improvements:

a. *"Using AI tools helped me correct my grammar and write more confidently."*
b. *"I feel more prepared to present in English during online meetings."*
c. *"The adaptive activities motivated me to practice more."*

5. DISCUSSION

5.1 Linking Results to Digital Literacy

The findings of this study confirm the critical role of digital literacy in language education. The significant improvement in students' ability to integrate digital tasks (+94.4%) demonstrates that structured exposure to digital environments can enhance both linguistic and technological competencies simultaneously. This aligns with Ng's (2012) framework of digital literacy, which emphasizes technical, cognitive, and social dimensions. The students' reflection journals further indicate that digital literacy is not only about technical skills but also about confidence and adaptability in global business contexts.

5.2 Adaptive Learning and Personalized Progress

The increase in overall scores (+71.8%) provides evidence that adaptive approaches foster engagement and learning effectiveness. Students benefited from differentiated activities that matched their readiness levels, consistent with Johnson et al. (2016) who argued that adaptive learning supports individualized progress. The results suggest that adaptive modules can help bridge skill gaps among diverse learners, especially in heterogeneous classrooms like those in Indonesian higher education.

5.3 The Role of AI in Language Learning

The positive student perceptions of AI tools (78% found them useful) confirm the potential of AI to support English learning. Grammarly and ChatGPT, for instance, provided immediate feedback and facilitated self-directed learning, echoing Kukulska-Hulme's (2020) findings on intelligent tutoring systems. However, ethical and pedagogical integration remains an open challenge. Teachers must ensure that AI complements rather than replaces critical thinking and authentic communication practices.

5.4 Implications for EBC in Digital Contexts

In line with Nickerson (2021) and Belcher (2020), this study highlights that English for Business Communication cannot be taught effectively without integrating digital competencies. The adaptive module enabled students to practice authentic tasks such as writing professional emails and delivering online presentations, bridging the gap between classroom learning and real-world business practices. This strengthens the relevance of EBC in preparing students for global employment and digital entrepreneurship. From the perspective of classroom practice, one of the most encouraging findings was the visible boost in students' confidence. For example, during the final presentation task, several students who were usually quiet became more active and willing to speak in English. They also started experimenting with digital tools on their own, such as preparing slides with AI-assisted design templates. These small but meaningful changes suggest that adaptive learning supported by digital literacy can shift students' learning behaviors in a sustainable way.

5.5 Limitations and Future Research

Although the results are promising, this study has limitations. The sample size (N = 45) is relatively small and limited to a single institution, which may affect generalizability. The study also focused on short-term outcomes, while long-term retention and transfer of skills remain to be studied. Future research could explore large-scale implementation, AI-driven personalization at the individual level, and cross-cultural comparisons to validate and expand these findings.

6. CONCLUSION

This study investigated the integration of adaptive digital literacy into an English for Business Communication (EBC) module using the ADDIE instructional design model. The results demonstrate significant improvements in students' communication skills, digital literacy, and confidence in global business contexts. The findings underscore three key points:

a. **Digital literacy** is a crucial foundation for effective English language learning in digitalized environments.
b. **Adaptive learning approaches** enhance engagement and ensure differentiated progress among diverse learners.
c. **AI tools** provide valuable support in scaffolding language learning, though careful pedagogical integration is required.

The implications of this study are both practical and theoretical. Practically, the adaptive EBC module can serve as a scalable model for higher education institutions in Indonesia and beyond. Theoretically, it contributes to the growing literature on technology-enhanced language learning by highlighting the interplay between digital literacy, adaptive pedagogy, and AI applications.

Future research should explore longitudinal effects, cross-cultural applications, and AI-driven personalization at scale to strengthen the impact of technology-driven EBC instruction.

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