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Original Article

AI-Based English Module for Accounting Students

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Abstract

Artificial Intelligence (AI) has significantly transformed education and language learning by creating more interactive, personalized, and adaptive learning environments. Within the field of English for Specific Purposes (ESP), especially for accounting students, there is an increasing need for learning modules that combine discipline-based content with advanced educational technology. However, existing resources remain limited and often fail to meet the specific linguistic and professional demands of vocational learners. This study aimed to design and evaluate an AI-based English module tailored to the needs of accounting students. Employing a Research and Development (R&D) approach using the ADDIE model (Analysis, Design, Development, Implementation, and Evaluation), the research involved need analysis, expert validation, small-group testing, and field implementation. The findings revealed that the module achieved a high feasibility rating from experts (87.2%), significantly improved students' English achievement (from a pre-test mean of 62.4 to a post-test mean of 80.7, $p < 0.05$), and received positive responses from users. Most students reported improved comprehension of accounting terms, enhanced confidence in professional communication, and satisfaction with AI-integrated features such as chatbot interaction and speech recognition. These results indicate that the AI-based module is pedagogically effective, technologically interactive, and contextually relevant to vocational English education. Theoretically, this study contributes to ESP pedagogy, while practically, it offers a model for integrating AI-assisted learning in higher education contexts.

Keywords: Accounting Students, AI-Assisted Learning, Educational Technology, ESP Pedagogy, Module Development.

1. Introduction

The advancement of technology in the era of Industry 4.0 has significantly influenced higher education, particularly in language learning. English for Specific Purposes (ESP) has become crucial in preparing students for professional contexts. For accounting students, English proficiency is essential in understanding international financial reports, writing professional correspondence, and delivering presentations in global business contexts (Al-Tamimi & Shuib, 2009).

Artificial Intelligence (AI) provides new opportunities to enhance English language learning through features such as chatbots, speech recognition, and automated feedback. Studies have shown that AI-based tools support adaptive and interactive learning environments. For example, Hegelheimer & Tower (2004) found that AI-supported platforms, such as chatbots and text-to-speech applications, significantly improve speaking and listening skills. Similarly, Maspufah et al. (2024) emphasized that AI can provide fast and accurate

feedback on grammar and pronunciation errors, helping students correct mistakes immediately.

Furthermore, a study highlighted that AI enables the use of big data analytics to monitor students' progress and tailor learning pathways according to individual needs (Tapalova & Zhiyenbayeva, 2022). In the broader field of ESP, Belcher (2009) emphasized that AI-supported instruction enhances reading and writing skills through exposure to discipline-specific content, while the several studies also revealed practical value of AI-based simulations in improving communication within professional settings such as financial reporting and business negotiations (Kuaiber et al., 2024; Sreseli, 2023). More recently, Xu & Warschauer (2019) and Luckin (2017) confirmed that AI-driven adaptive systems can provide dynamic, personalized feedback that promotes learner autonomy.

Unlike these previous studies, which primarily explored AI applications in general or business-oriented English contexts, the present research situates AI within the vocational domain of accounting education, focusing on the development of an AI-assisted English module that integrates both linguistic competence and professional relevance. This synthesis not only extends existing findings but also bridges the gap between AI-based language innovation and ESP pedagogy for vocational learners.

Although previous studies have demonstrated the potential of AI in language learning, few have focused on developing ESP modules specifically designed for vocational accounting students. Most existing research either examines ESP without technological integration or explores AI applications within general English instruction. This leaves a significant gap in providing profession-oriented learning materials that merge ESP pedagogy with AI technology.

To address this gap, the present study introduces an AI-assisted English module that integrates chatbot-based conversational practice, speech recognition for pronunciation training, and automated feedback systems for grammar and vocabulary within an ADDIE-based pedagogical framework. Furthermore, the study's systematic validation process involving expert judgment, small-group testing, and field implementation ensures that the innovation is not only conceptually novel but also empirically grounded in the context of vocational English education. Therefore, this study aims to develop and evaluate an AI-integrated English for Specific Purposes (ESP) module for accounting students through three stages: needs analysis, design and development, and effectiveness testing.

2. Literature Review

2.1. English for Specific Purposes (ESP) and the Needs of Accounting Students

English for Specific Purposes (ESP) has long been recognized as a branch of English language teaching that focuses on developing language competence relevant to particular professional or academic contexts. Hutchinson & Waters (1987) described ESP as a learner-centered approach that adapts language instruction to specific disciplinary or occupational needs. In professional fields such as accounting, English proficiency is essential for comprehending international financial reports, drafting business correspondence, and communicating effectively in global contexts (Al-Tamimi & Shuib, 2009).

Dudley-Evans & John (1998) emphasized that ESP is not merely about teaching technical vocabulary but about integrating communicative competence within real-world tasks. Therefore, ESP for accounting should simulate authentic professional scenarios, such as report writing, auditing discussions, and presentations. Despite this, many existing ESP

materials remain generic and fail to address the complex linguistic and professional needs specific to accounting students. This creates a pedagogical gap between classroom instruction and workplace expectations.

2.2. The Role of Artificial Intelligence in Language Learning

Artificial Intelligence (AI) has revolutionized education, particularly in language learning, by fostering adaptive and interactive environments. Hegelheimer & Tower (2004) demonstrated that AI-supported platforms, including chatbots and text-to-speech systems, promote learner autonomy and significantly enhance speaking and listening proficiency. Similarly, a systematic review showing that AI enables real-time error correction through automated feedback, which helps students improve grammar and pronunciation accuracy (Kristiawan et al., 2024).

Besides, AI leverages big data analytics to personalize learning trajectories, monitor student progress, and tailor content to individual learner profiles (Tapalova & Zhiyenbayeva, 2022). Moreover, AI-driven adaptive systems have been shown to offer efficient and personalized feedback, which contributes to deeper learner engagement (Luckin, 2017; Xu & Warschauer, 2019). These systems can dynamically adjust learning materials to match the learner's level, pacing, and cognitive needs making AI an essential component of modern language pedagogy.

2.3. AI Integration in ESP Contexts

While much of the current research focuses on AI in general English instruction, its potential for ESP remains underexplored. Belcher (2009) noted that the integration of AI within ESP can strengthen disciplinary literacy by linking linguistic skills to professional contexts. Further, a report has identified how AI-based business simulations enhance communication training in business and accounting environments by providing context-rich, interactive experiences (Sreseli, 2023).

However, despite these advances, few studies have concentrated on developing AI-enhanced ESP modules tailored to vocational students, particularly in accounting programs. Existing materials rarely incorporate AI features such as chatbots or speech recognition that could support specific learning goals, such as mastering accounting terminology or preparing for professional communication. Consequently, there is a clear need for research that combines ESP pedagogical frameworks with AI-based technologies to support accounting students in acquiring both linguistic and professional competencies.

The Research and Development (R&D) approach is widely used in educational innovation to design, validate, and implement instructional products systematically. It integrates research-oriented inquiry with product-oriented development to ensure that learning materials are both theoretically grounded and empirically tested (Bennett et al., 1984). The model typically involves iterative stages such as analysis, design, development, implementation, and evaluation allowing continuous refinement of the product based on expert and user feedback (Sugiyono, 2017).

One of the main advantages of the R&D approach lies in its practical relevance and empirical rigor. It produces educational products that are directly applicable to classroom contexts, and its cyclical nature ensures that the outcomes are validated through multiple testing stages (Branch, 2009). Furthermore, R&D aligns well with technology-enhanced learning because it allows developers to incorporate feedback loops essential for refining AI-integrated tools.

However, several limitations must also be acknowledged. The process is often time-consuming and resource-intensive, requiring multiple phases of validation and revision (Gall

et al., 2007). The sample sizes used in developmental testing are typically small, which may limit the generalizability of the results. Additionally, researchers may face technical or implementation constraints when integrating AI-based elements, especially in low-resource educational settings.

Despite these challenges, the R&D approach remains suitable for this study because it emphasizes systematic design, user validation, and iterative improvement, aligning with the goal of developing an AI-assisted English module that is both pedagogically sound and contextually relevant for vocational learners.

2.4. Previous Research

Several studies have explored AI-based learning in broader educational contexts. Luckin (2017) argued that AI contributes to assessment accuracy and learner motivation by providing timely, personalized feedback. Further, AI-mediated teacher-student interaction enhances engagement and facilitates individualized instruction (Zhang, 2025). These findings align with Xu & Warschauer (2019) assertion that AI tools can promote autonomous learning, a key principle in ESP instruction.

Despite these promising findings, the application of AI in ESP particularly in vocational education remains limited. Many prior projects have focused on the general English classroom rather than profession-specific needs. This gap underscores the importance of developing AI-based modules that not only integrate adaptive learning technologies but also contextualize them within professional disciplines like accounting.

3. Methods

This study employed a Research and Development (R&D) approach with the purpose of designing and testing an English learning module integrated with Artificial Intelligence (AI) for accounting students. The development process followed the ADDIE model, which consists of five stages including Analysis, Design, Development, Implementation, and Evaluation. This model was selected because it provides a systematic framework for instructional product development, ensuring that each stage is carefully planned and validated before moving to the next (Branch, 2009).

The research was conducted at Politeknik Negeri Malang, PSDKU Lumajang, with accounting students as the main participants. During the early stage, a needs analysis was carried out through questionnaires and interviews with students, lecturers, and accounting practitioners. The aim of this analysis was to identify specific linguistic competencies required in the accounting field, including mastery of financial terminology, report writing, and business communication in English. The results of the needs analysis then became the foundation for designing the module content and selecting the most relevant AI-based features. The qualitative data collected from interviews, open-ended questionnaire responses, and student feedback were processed and analysed using thematic analysis. The data were first transcribed verbatim, then coded inductively to identify recurring patterns and themes related to learners' needs, perceptions, and challenges in using AI-assisted materials. To ensure credibility, data triangulation was employed by comparing responses from students, lecturers, and practitioners. The emerging themes were then categorized under broader constructs such as learning needs, AI usability, and pedagogical effectiveness, which were later integrated into the interpretation of the quantitative results.

The design stage focused on preparing instructional materials and interactive components of the module. The content was developed around authentic accounting contexts such as financial reporting, professional correspondence, and business presentations. AI tools,

including chatbot-based conversation practice, speech recognition for pronunciation training, and automated feedback systems for grammar and vocabulary, were integrated into the module. The development stage then produced a digital prototype of the module, which was internally reviewed to ensure technical functionality, accuracy of content, and pedagogical appropriateness.

Once the prototype was ready, the implementation stage began with two levels of testing. A small group trial was conducted with 10 Accounting students to obtain initial feedback on usability and interactivity. After revisions based on expert and user input, the revised module was implemented in a larger field trial involving 30 students. During this stage, students were given pre-tests and post-tests to measure their progress in English proficiency, and their perceptions were collected through questionnaires and interviews.

The final stage was evaluation, which included both formative and summative assessments. Formative evaluation was conducted throughout the design and development stages, incorporating feedback from experts in English, accounting, and educational technology. Summative evaluation was conducted after the field trial, focusing on the effectiveness of the module in improving student learning outcomes. Quantitative data were analyzed using descriptive statistics and paired-sample t-tests to compare pre-test and post-test scores, while qualitative data from expert reviews and student responses were used to provide additional insights into the practicality and effectiveness of the module.

4. Results and Discussion

4.1. Need Analysis

The need analysis phase aimed to identify the specific linguistic and professional competencies required by accounting students in their academic and workplace contexts. Data were collected through questionnaires distributed to 40 students, semi-structured interviews with 3 English lecturers, and consultations with 2 accounting practitioners to ensure comprehensive input from both academic and industry perspectives.

The results revealed that 85% of students considered English proficiency essential for understanding financial reports and communicating in business correspondence, while 78% indicated difficulties in using appropriate accounting terminology during oral presentations. Additionally, 72% of respondents expressed a need for interactive practice using AI-based features such as chatbots for speaking and speech recognition for pronunciation. Qualitative feedback from interviews emphasized the lack of learning materials that integrate real accounting cases with English communication practice.

Overall, these findings confirm that accounting students require ESP materials focusing on accounting-related contexts and enhanced with AI-assisted interactivity. The identified needs became the foundation for the design and development of the AI-based English module, ensuring that the content is both pedagogically relevant and professionally applicable.

4.2. Module Design and Development

The design and development stage focused on constructing instructional materials and interactive components aligned with the needs identified in the previous phase. Guided by the ADDIE model, this process involved systematic steps to ensure both pedagogical and technological validity.

The design phase began with mapping learning objectives to specific accounting communication skills, such as writing financial reports, composing professional emails, and

conducting business presentations. Authentic accounting documents such as balance sheets, invoices, and audit reports were integrated to strengthen contextual learning.

In the development phase, AI technologies were embedded to enhance learner engagement and autonomy. The module included:

1) Chatbot-assisted conversation tasks, enabling students to simulate dialogues with virtual clients and supervisors;
2) Speech recognition tools that provided instant feedback on pronunciation accuracy; and
3) Automated grammar and vocabulary feedback systems, which analyzed students' written input and offered corrective suggestions in real time.

The module prototype was built using an online learning platform accessible via desktop and mobile devices. User interface testing was performed internally to ensure technical stability and user-friendliness. Expert validators from the fields of English language teaching, accounting, and educational technology reviewed the prototype and provided recommendations for refinement particularly suggesting the inclusion of additional English-based financial report examples and simplified navigation instructions. These inputs were incorporated into the final version before proceeding to the implementation phase.

Table 1. Expert Validation Results

Aspect	Score (%)	Category
Content Validity	88.5	Very Feasible
Language Clarity	86.0	Very Feasible
Layout & Design	87.0	Very Feasible
Average	87.2	Very Feasible

Table 2. Students' Learning Outcomes (Pre-test and Post-test)

Test Type	Mean Score	N	SD	Sig (2-tailed)
Pre-test	62.4	30	7.85	
Post-test	80.7	30	6.42	$p<0.05$

4.3. Expert Validation

The developed module was validated by a panel of three experts representing different fields of specialization: one ESP lecturer, one accounting practitioner, and one educational technology specialist. The validation process aimed to assess the module's content accuracy, linguistic clarity, instructional design, and technical functionality. Each expert reviewed the module using a structured evaluation form with a five-point Likert scale ranging from 1 (very poor) to 5 (excellent).

The results indicated a very high level of feasibility, with an overall mean score of 87.2%, categorized as *very feasible*. The content component obtained an average score of 4.5, emphasizing the module's relevance to accounting contexts and appropriateness of language level. The design and interactivity components achieved an average of 4.4, reflecting effective integration of AI-based features. Meanwhile, the technical aspect scored 4.3, showing that the platform was functional and user-friendly.

Experts also provided qualitative suggestions for improvement. They recommended the addition of more English-based financial reporting examples, refinement of navigation menus for easier access, and simplification of some technical instructions for first-time users. These revisions were incorporated into the final prototype before conducting the student trials, ensuring that the module was both pedagogically robust and technically reliable.

4.4. Small Group Trial

The small group trial was conducted to evaluate the usability, interactivity, and initial effectiveness of the AI-based English module before large-scale implementation. The trial involved 10 Accounting students from Politeknik Negeri Malang (PSDKU Lumajang), selected purposively based on their varying levels of English proficiency to ensure diverse user feedback. During the trial, participants completed learning activities using the module's key AI features, including chatbot-based conversation tasks, speech recognition exercises, and automated grammar feedback. Afterward, they were asked to fill out a user experience questionnaire and participate in a brief group interview.

Quantitative results showed that 90% of participants rated the module as *easy to use* and *highly engaging*, while 85% agreed that AI features helped them improve pronunciation and vocabulary mastery. Additionally, 88% indicated that the learning materials were relevant to real accounting tasks. Qualitative feedback reinforced these findings. Students appreciated the interactive chatbot, describing it as "helpful for practicing professional conversations in English," and several noted that the instant feedback "made grammar learning more practical." However, some challenges were reported, primarily related to internet connectivity and device compatibility, which occasionally disrupted the use of AI features. Overall, the small group trial confirmed that the module was pedagogically effective, user-friendly, and technologically functional, providing a strong foundation for further refinement and large-scale field implementation.

4.5. Field Trial

The field trial was conducted to comprehensively evaluate the effectiveness of the AI-based English module in improving students' language competence and learning engagement. The trial involved 30 Accounting students from Politeknik Negeri Malang (PSDKU Lumajang) who had not participated in the previous small group test. The implementation lasted for four weeks, covering key ESP topics such as financial reporting, professional correspondence, and business presentations.

Students completed a pre-test and post-test to measure their English proficiency before and after using the module. The mean score increased from 62.4 (pre-test) to 80.7 (post-test), showing a significant improvement in students' performance. Statistical analysis using a paired-sample t-test confirmed the difference as significant at $p < 0.05$, indicating that the module effectively enhanced learners' English competence in accounting-related contexts. In addition to the test results, a student perception survey was administered to evaluate user satisfaction and learning experiences. The data revealed that 85% of students reported a better understanding of accounting terminology, 78% felt more confident in professional communication, and 82% found the AI-based features particularly chatbot interaction and speech recognition very helpful in supporting autonomous learning.

Qualitative feedback further supported these results. Many students described the chatbot as "a safe and motivating way to practice English," while others appreciated the instant feedback on pronunciation and grammar accuracy. However, several respondents mentioned intermittent internet connection issues, suggesting that future versions of the module should include offline functionality to ensure smoother access. Overall, the field trial demonstrated that the AI-based module was effective, engaging, and pedagogically aligned with the professional and linguistic needs of Accounting students, confirming its practicality for wider implementation in vocational English education.

4.6. Discussion

The findings of this study affirm that integrating Artificial Intelligence (AI) into English for Specific Purposes (ESP) instruction can significantly enhance language learning outcomes, particularly for vocational students in accounting-related fields. The improvement in students' test scores and their positive perceptions of AI-assisted tools indicate that the module effectively supported both cognitive and affective dimensions of learning.

AI promotes learner autonomy by enabling students to control their learning pace, receive personalized feedback, and engage in independent practice beyond classroom settings. The chatbot feature, for instance, allowed learners to simulate authentic accounting-related dialogues, thereby reducing anxiety and promoting confidence in professional communication. Meanwhile, speech recognition and automated grammar feedback fostered self-correction and reflective learning which are key components of autonomous learning in ESP contexts. These results align with Xu & Warschauer (2019) assertion that adaptive AI systems can scaffold individualized learning experiences, supporting diverse learner needs.

Moreover, the integration of AI enhanced interactivity and discipline-specific learning. By embedding authentic accounting materials, such as financial reports and correspondence templates, the module contextualized language use within real-world professional tasks. This aligns with Belcher (2009) view that ESP instruction must balance linguistic form with disciplinary relevance. Through AI, students were not only exposed to language but also to simulated professional scenarios, bridging the gap between classroom practice and workplace communication.

Despite these promising outcomes, several limitations should be acknowledged. The study involved a relatively small sample size (n = 30), which may restrict generalizability. Additionally, the module's dependence on stable internet connectivity posed technical challenges during implementation, particularly in rural or limited-bandwidth contexts. Addressing these issues through offline or hybrid AI solutions would increase accessibility and usability. For future research, longitudinal studies are recommended to examine the long-term impact of AI-assisted ESP modules on learners' professional communication skills. Further investigation into AI-driven assessment analytics could also provide deeper insights into learner progress and engagement patterns over time. Expanding the module for other vocational disciplines, such as business administration or tourism, could validate its adaptability and contribute to broader AI integration in vocational English education.

In summary, this study demonstrates that AI integration within ESP pedagogy not only enhances learning effectiveness but also promotes autonomy, interactivity, and disciplinary relevance. It offers both theoretical contributions to the field of technology-enhanced ESP learning and practical guidance for the future design of AI-assisted instructional materials in vocational higher education.

5. Conclusion

This study developed and evaluated an AI-based English module tailored for Accounting students in vocational higher education. The results confirmed the module's pedagogical effectiveness and technological interactivity, as reflected in improved English performance, enhanced confidence, and positive learner perceptions. Its success can be attributed to the integration of chatbot-based interaction, speech recognition, and automated feedback, which fostered learner autonomy, engagement, and contextual relevance to accounting communication. These adaptive and discipline-specific features demonstrate how AI can

meaningfully transform ESP learning into a more personalized and profession-oriented process.

Pedagogically, the study emphasizes that AI-assisted learning strengthens ESP instruction by promoting independent learning, authentic practice, and responsive feedback. Although the study was limited by its small sample size and single institutional setting, the findings provide valuable insights for the future development of AI-integrated ESP materials across various vocational fields. Future research should expand implementation contexts and explore the use of AI analytics for tracking long-term learning progress. Overall, this study contributes to the growing body of knowledge on AI-assisted ESP pedagogy, highlighting how technology can bridge linguistic learning with vocational relevance in higher education.

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