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

Volume 9, No. 1, September 2025 • **Page:** 205 - 226
DOI: https://doi.org/v9i1.5432
ISSN 2597-713X (print)
ISSN 2597-7148 (online)

OPEN ACCESS: Research Article

Artificial Intelligence-Supported English Language Instruction: Impacts on Student Achievement

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Received : 2025, June
Revision : 2025, July
Accepted : 2025, Agustus
Published : 2025, September

Abstract

In the rapidly evolving digital era, mastery of English in professional contexts has become an essential requirement, particularly for accounting students who are required to understand technical terminology and effectively communicate financial information. This study aimed to examine the effectiveness of using artificial intelligence (AI) technology in enhancing English for Accounting learning within the English for Specific Purposes (ESP) framework. The study employed a quasi-experimental design with a pretest-posttest control group model, involving two classes of accounting students. One group received conventional instruction, while the other group participated in AI-assisted learning. The results show that the experimental group experienced significant improvements in technical vocabulary mastery, ability to understand financial documents, as well as writing and communication skills in accounting contexts compared to the control group. Additionally, the use of AI proved capable of reducing students' cognitive load while simultaneously increasing learning motivation. These findings confirm the importance of systematic integration of AI technology into the ESP curriculum, accompanied by training for lecturers to optimize its use. The research results also demonstrate that AI-based learning can create a more adaptive and interactive learning environment suited to students' professional needs. This study provides empirical evidence that AI integration in ESP, particularly English for Accounting, functions not only as a supporting tool but also as an adaptive pedagogical strategy aligned with current industry demands.

Keywords: English for Specific Purposes; English for Accounting; Artificial Intelligence; Technology-Based Learning

DOI: https://doi.org/v9i1.5432

1. Introduction

Proficiency in English within a professional context, particularly for accounting students, has become a crucial need that cannot be overlooked. In the global job market, accounting students are expected to master English not only in general aspects but also in understanding technical terminology and effectively communicating financial information. Accounting students at universities are required to have a comprehensive understanding of the technical terms used in financial reports, tax regulations, and international business communication. Adequate mastery of English in this context is a determining factor for their readiness to enter an increasingly global professional world. Research by Abduh (2020), indicates that Indonesian students face significant challenges in learning English for accounting, particularly in understanding the technical terms necessary for effective communication in the workplace. This aligns with findings by Nugroho (2020) that show the implementation of the Content and Language Integrated Learning (CLIL) method (Amelia, 2024; Plumley, 2021) in English for Accounting courses can help students integrate language learning with specific accounting materials, better preparing them to meet the professional demands in this field (Amelia, 2024; Plumley, 2021).

Moreover, the development of innovations in English language learning for accounting, such as the team-based project e-modules developed by Nugroho (2020) also significantly contributes to enhancing students' understanding of accounting materials in English. Students can engage in hands-on learning by participating in projects, which enables them to put their knowledge into practice. Farahsani (2022) also suggested that the use of learning technology such as MYKLASS can be an effective solution in improving students' mastery of English in a structured and applicable manner, as well as supporting their language skills in a professional context. Furthermore, Smith (2020) emphasizes the importance of using corpora in the learning of accounting vocabulary, which enables students to understand and recall technical terms more easily and efficiently.

Accounting students frequently face challenges in mastering the English language essential for their careers. Therefore, it is vital to develop innovative

learning materials that leverage technology to enhance their learning experience. The use of artificial intelligence (AI) in English education specific to accounting shows promise in enhancing learning outcomes as technology progresses (Abduh, 2020; DeHond, 2020; Kihn, 2024). AI technology is capable of providing personalized learning experiences, which tailor learning paths to the individual needs of students (Yatri, Anugerahwati, & Setyowati, 2023). With the ability to adapt content and learning pace based on student performance and preferences, AI can increase student engagement and motivation. This is especially important in mastering vocabulary and concepts specific to certain fields such as accounting (Betaubun, Laila Rokhmah, & Budiasto, 2023; Sari, Farida, Astuti, Karimah, & Sarapil, 2022).

In addition, the use of AI-based tools in learning can improve communication skills that are indispensable in professional settings. These tools provide an interactive platform to practice speaking, listening, reading and writing skills. These skills are crucial in professional contexts, including in accounting, where effective communication is required to explain complex concepts (Rusmiyanto et al., 2023). Through the simulation of real-world scenarios, AI tools allow students to apply their language skills in practical situations, which in turn enhances their abilities (Negrila, 2023).

The development of digital communication also demands changes in the ESP curriculum to accommodate new forms of interaction, such as the use of online collaborative tools and multimedia resources (Tang, 2023). The growing digital communication requires students to have new skills that are in line with the demands of the modern workforce (Batubara, Silitonga, & Sipayung, 2022). In this regard, AI can provide access to a variety of digital content and collaborative platforms that enrich the learning experience and prepare students for workplace challenges (Hafner & Pun, 2020). However, while the benefits of AI in ESP education are immense, there are still concerns about the need for further research to fully understand its long-term impact as well as optimal integration strategies in language learning environments. Balancing technology with traditional teaching methods remains a challenge that educators need to consider.

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Numerous research projects have investigated the use of artificial intelligence in teaching English, but there are still areas that require further exploration, particularly in the field of English for Specific Purposes (ESP) within accounting. Most of the existing studies focus more on the use of AI in general English learning, such as speaking and writing skills, but very few studies explore its application in the context of ESP for accounting. Investigation by Lee (2024) shows that AI can improve writing skills in various contexts, but specific applications for accounting are less explored.

In addition, the majority of existing research is experimental in nature with a short duration, which neglects long-term analysis of the impact of AI in English language learning. Research by Zarate & Eden (2024) indicates that while AI can improve motivation and learning outcomes in the short term, these effects are not necessarily sustained after the learning period is over. There is a call for long-term studies to assess the lasting effectiveness of AI. While some research suggests that AI can improve general English language proficiency, comprehensive studies examining its influence on specialized accounting skills such as understanding financial statements and terminology are notably scarce. Paola et al. (2024) reveal the potential use of AI in accounting education at the secondary school level, but this research is limited to secondary education and has not covered higher or professional education levels that are more relevant to the needs of accounting practitioners.

Conceptually, this research centers on the Computer-Assisted Language Learning (CALL) approach, highlighting the pivotal role of technology in enhancing the language learning experience. In the context of ESP, CALL allows content adaptation based on specific areas of expertise, in this case accounting. In addition, the task-based learning approach is also used to explain how AI can create task-based learning activities that are relevant to real-world practices. By combining the two approaches, AI is expected to not only be a technical tool, but an integral part of contextualized instructional design. AI offers a unique chance to develop individualized learning experiences that are customized to fit the specific requirements, speed, and preferences of every learner. Maghsudi et al.

(2021) explains that AI is able to analyze student learning data and provide specific feedback, so that students can learn more efficiently. This personalized learning then leads to increased learning engagement and motivation, two important aspects in the successful acquisition of technical English for the accounting profession (Van der Vorst & Jelicic, 2019). When students feel that the learning materials are relevant and appropriate to their needs, there will be an intrinsic drive to understand more deeply.

In the context of ESP for accounting, such engagement is crucial as students are required to master technical terminology as well as understand typical professional communication situations. AI allows students to engage in context-based simulations, such as exercises in reading financial statements, writing business memos, or conducting audit presentations in English (Negrila, 2023). Moreover, AI enhances students' skills in crafting professional sentence structures and grasping the subtle nuances of language essential for formal communication in the accounting field (Hasan, 2021). With the mastery of these skills, students are expected to be able to face real professional situations, such as working in a multinational environment or writing international standard financial reports.

Still, this change demands a transformation in the ESP curriculum, especially in accounting, so that the integration of AI is not just an add-on, but an integral part of the learning process. Along with great potential come ethical and practical challenges such as data privacy issues, over-reliance on technology, and reduced human interaction in the learning process (Hasan, 2021). A mini-synthesis of previous studies shows that AI has high potential to improve learning outcomes and student motivation (Betaubun et al., 2023; Yatri et al., 2023), but its impact in specific contexts such as accounting is still not clearly mapped (Lee, 2024; Paola et al., 2024). This research aims to create a practical and sustainable AI-based English for Specific Purposes (ESP) teaching model using CALL and task-based learning frameworks, focusing on the needs of the digital workplace and accounting professionals.

Although the potential of AI in language education has been widely researched in a general context, there is still a significant gap in its application specifically in

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the context of English for Accounting. Based on the aforementioned background and identification of research gaps, this study aims to explore the effectiveness of artificial intelligence (AI) integration in English for Specific Purposes (ESP) learning in accounting, specifically in improving learning achievement and mastery of technical terminology by students in higher education.

2. Materials and Methods

2.1. Research Methodology

The research utilizes a quantitative experimental method with a quasi-experimental design, specifically using a non-equivalent control group design. This particular design was selected because the researcher is analyzing two groups (an experimental group and a control group) that were not randomly selected but have relatively equivalent characteristics, specifically students with similar initial English proficiency. This design is relevant to the research issue focused on evaluating the effectiveness of using Artificial Intelligence (AI) in English for Accounting (ESP) learning.

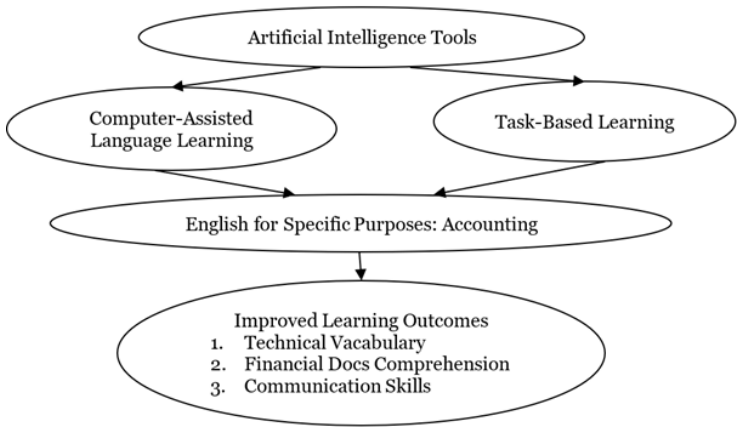

Figure 1. Conceptual Framework

As shown in Figure 1, Artificial Intelligence is integrated into the Computer-Assisted Language Learning and Task-Based Learning approaches to support English for Specific Purposes learning, particularly in the accounting context. This integration is expected to enhance learning outcomes, including technical vocabulary mastery, financial document comprehension, and communication skills relevant to professional accounting practice.

2.2. Population and Sample

The population for this research consists of all students in the Accounting study program who are taking the English for Accounting subject during the current semester at a particular higher education institution. The research sample comprises two classes of 29 students each, with one class designated as the experimental group using Artificial Intelligence (AI) in their learning, while the other serves as the control group using conventional teaching methods. The method of sampling that was utilized is purposive sampling, where samples are chosen based on certain factors such as the availability of classes, similar proficiency levels at the start, and the instructors' willingness to carry out the learning program.

2.3. Data Collection Techniques

Data was collected using several methods, including pre-tests and post-tests, aimed at measuring students' initial abilities and learning outcomes in English within the context of accounting. The test questions were tailored to the English for Accounting (ESP) material. Additionally, observations and documentation were employed as supplementary methods to enrich the quantitative data, particularly in monitoring the process of AI implementation during learning.

2.4. Sample Analysis Techniques

In this study, tests for homogeneity and normality were conducted to ensure that the data met the requirements for parametric analysis. Subsequently, a Paired Sample t-test was utilized to analyze any notable variances between the initial assessment and final evaluation results in each group. An optional Independent Sample t-test was conducted to compare academic achievements directly between the experimental and control groups.

2.5. Data Processing Techniques

Data obtained from pre-tests and post-tests will be processed using statistical programs such as SPSS. The steps in data processing include data entry, coding and validation of data, descriptive analysis (mean and standard deviation), and inferential analysis using the t-test.

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2.6. Data Analysis Techniques

Data analysis was conducted using descriptive statistics to portray the mean scores, standard deviations, and differences in scores before and after the treatment. Statistical analysis was used to examine the impact of changes within a single group and to compare the outcomes of learning between the two groups. The paired sample t-test was applied to measure improvements within the same group, while the independent sample t-test was used to determine differences in learning results between the experimental and control groups.

2.7. Ethical Considerations

This study has considered ethical aspects in accordance with educational research standards. Informed consent was obtained from all participants before data collection. Respondent identities were kept confidential, data was analyzed anonymously, and participation was voluntary with no academic consequences.

3. Results and Discussions

3.1. Research Results

The assessment of the effectiveness of implementing artificial intelligence (AI) technology in English for Specific Purposes (ESP) learning, particularly in the context of English for Accounting, was conducted by measuring students' language proficiency before and after the intervention (pre-test and post-test). The measurement encompasses six aspects of linguistic competence deemed crucial for using English in the field of accounting: mastery of accounting vocabulary, the ability to read financial statements, skills in writing accounting reports, oral presentation of financial data, understanding of accounting dialogues, and grammar usage in an accounting context. Two groups of students were involved in the testing: the experimental group that engaged in AI-based learning and the control group that utilized conventional methods. The quantitative data from the test results served as the foundation for analysis to assess the differences in achievement between the two groups after the intervention was applied.

Table 1 shows the comparison of the average scores for language proficiency aspects in the pre-test and post-test for both the experimental and control groups. Overall, the experimental group demonstrated a more significant improvement in

all aspects of language proficiency related to English for Accounting (ESP) compared to the control group.

Table 1. Average Score of Language Ability Aspects (English for Accounting)

Aspects of Language Ability (ESP)	Pre-test Experimental	Post-test Experimental	Pre-test Control	Post-test Control
Terminology in Accounting	64	84	64	74
Reading Financial Statements	64	84	64	73
Writing Accounting Reports	63	82	63	72
Oral Presentation of Financial Data	64	83	64	73
Understanding Accounting Dialogues (Listening)	65	84	65	74
Grammar in Accounting Context	64	82	64	72

Table 1 provides evidence that the experimental group utilizing AI-based technology showed more significant improvements across all aspects of language skills related to English for Accounting (ESP) compared to the control group. The improvements ranged from 10 to 20 points in the experimental group across various language skills, such as vocabulary, reading financial statements, writing accounting reports, oral presentations, and listening. In contrast, the control group only experienced smaller increases, indicating that the intervention applied to the experimental group had a more substantial impact on their language abilities.

In the experimental group, the average scores consistently improved, such as in the aspect of Terminology in Accounting, which rose from 64 to 84, as well as in Reading Financial Statements and Writing Accounting Reports, which increased from 64 to 84 and 63 to 82, respectively. Conversely, the control group saw only minor improvements, for example, in Terminology in Accounting, which increased from 64 to 74, and Reading Financial Statements, which rose from 64 to 73. These smaller increases suggest that although there were improvements in the control group, the interventions implemented in the experimental group had a more significant impact on their language skills in the context of accounting, encompassing vocabulary comprehension, reading, writing, speaking, and listening skills. This demonstrates the effectiveness of the intervention in enhancing accounting language skills for participants in the experimental group.

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Table 2. Descriptive Statistics Results

Grou	N	Mean	Std. Deviation	Mean	Std. Deviation	Pre-Test	Pre-Test
Experiment	29	65.00	4.00	88.00	3.20	23.00	3.50
Control	29	64.00	4.50	72.00	4.00	8.00	3.20

Table 2 shows that the experimental group using AI experienced a greater improvement in the mean post-test score (88.00) compared to the control group (72.00), with a mean difference of 23.00 for the experimental and only 8.00 for the control. The standard deviation for the experimental group (3.50) was also smaller than the control (3.20), indicating greater consistency in the experimental group's learning outcomes.

Table 3. Paired Samples t-Test

	t-value	df	Sig. (2-tailed)	95% Confidence Interval of the Difference	
				Lower	Upper
Pre-Test vs Post-Test Experimental	17.50	28	0.0001	18.00	28.00
Pre-Test vs Post-Test Control	5.00	28	0.0001	3.50	12.50

In Table 3, the results of the Paired Samples t-Test show that the experimental group has a very high t-value (17.50) with a very low significance level (p = 0.0001), indicating that the change from pre-test to post-test in the experimental group is statistically significant. Meanwhile, the control group also demonstrates a significant difference (t-value = 5.00, p = 0.0001), although the increase is smaller compared to the experimental group.

These results indicate that the use of AI-based technology in English learning, particularly for specific materials like English for Accounting, can have a significant impact on improving learning achievements. The larger score increase in the experimental group suggests that AI can enhance students' understanding and skills in English more effectively, allowing them to grasp vocabulary and technical accounting concepts more easily, which are essential in the context of English for Specific Purposes (ESP). Therefore, this research supports the argument that the

application of AI in English education, especially in the field of ESP, can be a highly effective tool for improving student learning outcomes in accounting.

3.2. Discussion

The application of AI in education, particularly in ESP, has gained attention for its ability to provide a personalized learning experience. AI technology can tailor educational content to each student's pace and needs, offering individualized support for understanding technical vocabulary and complex concepts. Consistent with this evidence, a study conducted by Zhang (2022) and Zeng (2024) explored the potential of AI in more specific fields such as fruit science and medical education. These studies emphasize the advantages of using AI in improving knowledge in specific fields through adaptive learning techniques. In addition, AI can also help improve teaching efficiency and student engagement, especially in content-intensive fields such as accounting. As stated by Patel (2024), AI technology offers valuable opportunities to enhance the learning process in pharmaceutical management, with similar benefits that can be applied to accounting education through intelligent tutoring systems and smart learning platforms.

The results of this study show that the use of AI-based technology in learning English for Accounting can significantly improve student learning achievement, especially in the aspects of technical vocabulary, financial statement reading and writing skills, and the ability to listen to and convey accounting data orally. This outcome corresponds with investigations by Puspita (2024), which shows that the utilization of AI-based platforms such as Diffit for Teacher in ESP learning is able to improve students' communication skills. This improvement occurs because AI enables the delivery of materials tailored to the context and specific needs of learners, as well as providing instant feedback and adaptive exercises, which are not always available in conventional teaching. Thus, AI provides a more interactive and immersive learning experience, which helps students internalize technical accounting concepts in English more effectively.

Similar sentiments were expressed by Valdiviezo et al. (2025) in an experimental study at a vocational school in Ecuador, where the use of an AI program to support

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accounting learning was able to change students' ability levels from low to high categories in understanding and preparing financial statements. The findings suggest that AI is not only effective in linguistic aspects, but also plays a role in improving the understanding of substantive content, such as accounting concepts and procedures, which are at the core of English for Accounting learning. This improvement is also in line with the findings of Wei (2023), A meta-analysis of dozens of studies concluded that the use of AI technology in English language learning has a significant positive impact on learning achievement, especially in terms of vocabulary acquisition, increased learning motivation, and active involvement of learners in the learning process.

In addition, the results of this study further strengthened the arguments put forward by Hosseini (2025) and Atayah (2021), which highlights the revolutionary impact of new technologies, particularly artificial intelligence (AI), in education. Hosseini (2025) emphasized that the use of AI-based tools in education is not just a trend, but has brought about major changes in the way content and assessment are delivered. One of the key advances in AI technology is its ability to tailor teaching materials to the individual needs of students, providing a more personalized approach. In the context of this study, this is reflected in the significant improvement in the experimental group utilizing AI technology for accounting-based English learning. With AI's ability to match the level of difficulty of the material to students' abilities, the learning experience becomes more effective and promotes a deeper understanding of technical concepts in accounting. Hence, as explained by Atayah (2021), AI technology is particularly relevant for enhancing teaching in highly specialized topics, such as accounting, that require a deep understanding of technical terminology and the complexity of concepts. AI-based learning provides a more applied approach, allowing students to receive the material in a way that is more relevant and suited to their needs.

The greater improvement in learning outcomes in the experimental group in this study suggests that AI-based learning makes the learning experience more dynamic and tailored to each student's specific needs, which is particularly important in English for Specific Purposes (ESP) contexts such as accounting. This is also in

line with the findings of Díaz-Gil (2024), which states that AI technology can help overcome challenges in teaching complex material, such as those often encountered in ESP English teaching. One of the main challenges in teaching ESP, especially in accounting, is the need to master technical language that is often not found in conventional English teaching. AI serves as a very effective tool in contextualizing and explaining complicated technical concepts, so that material that is often considered difficult can be understood more easily by students. Thus, AI-based learning in this study showed very positive results, especially in facilitating the understanding of technical concepts in accounting, which is essential in achieving success in ESP learning.

In addition, AI technology proved to be very effective in improving students' understanding in highly technical materials, as reflected in the findings of this study (Patel, 2024). In the context of technology-based education, particularly in pharmacy, AI improves not only the efficiency but also the quality of teaching by offering a more personalized learning experience. In ESP contexts, such as in accounting, the use of AI to deliver complex and technical material provides significant advantages. AI can identify areas that students struggle with and customize the material to make it easier to digest. This further strengthens the evidence that technology-based tools, such as those described by Hosseini (2025), it can provide solutions to challenges in teaching, especially in teaching highly specific and technical topics, such as English for Accounting. AI-based learning enables teaching to address the comprehension gaps that often occur, especially in the acquisition of technical vocabulary and specific concepts.

It can thus be concluded that AI provides substantial pedagogical advantages in the context of ESP. It enables a more personalized, contextualized and adaptive approach to learning, which is particularly important in technical fields such as accounting. As such, the integration of AI in English for Accounting learning not only helps students master the language, but also bridges the gap between linguistic ability and understanding of the accounting material itself. The significant improvement achieved by the experimental group in this study provides empirical evidence that AI-based technology is an innovative and effective solution to

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improve the quality of learning in the digital era, especially in the realm of ESP-based vocational and professional education.

One of the main advantages of AI-based technology in education is its ability to provide adaptive and personalized learning (Taylor, Yeung, & Bashet, 2021). Adaptive learning allows materials to be tailored to students' level of understanding, while personalization refers to tailoring learning experiences to individual needs and preferences. In the context of ESP, where students study English with a strong focus on accounting, AI technology can offer a highly relevant and customized learning experience (Delgado, de Azevedo Fay, Sebastiany, & Silva, 2020; Monserrat, Mas, Mesquida, & Clarke, 2022).

The integration of artificial intelligence (AI) in higher education, particularly through virtual tutors and chatbots, has opened up new opportunities to improve the quality of learning, especially in technical subjects such as accounting. AI-based virtual tutors are able to respond to students' questions in real-time and provide contextualized explanations, which not only increases the speed of gaining understanding, but also encourages independent learning. In this context, AI acts as an independent learning facilitator that reduces dependence on conventional teaching schedules and methods. According to Khan & Bose (2021), AI systems can analyze each individual's learning patterns and tailor teaching materials according to their needs and abilities. This has implications for the emergence of personalized learning models, which have proven effective in lowering frustration levels and increasing student retention, especially for those who have difficulty understanding abstract and numerical accounting concepts.

The presence of chatbots as an extension of AI systems not only acts as an academic aid, but also as an interactive tool that enhances learning motivation. Santos (2015) highlight that chatbots support flexible two-way communication between the learning system and the user, making the learning process more dialogic and engaging. This approach is proven to increase student engagement as they feel more comfortable to ask questions without fear of being judged, in contrast to the traditional classroom atmosphere. In fact, in a recent report by Ronquillo et al. (2023), It is explained that the use of AI in education encourages pedagogical

innovation and enriches the learning experience, especially in the face of complex material challenges.

Nevertheless, while AI is capable of providing substantial academic support, it still has limitations in terms of critical and contextual analysis capabilities. Study by Wood et al. (2023) shows that although AIs like ChatGPT can answer most accounting questions, their performance still does not surpass students' achievement in evaluative tasks that require in-depth reasoning. This suggests that AI is more effective as a learning aid rather than a substitute for teachers or lecturers. Róspide & Águeda (2012) also emphasizes that AI can reinforce concept understanding through repetition and additional explanation, but it cannot replace the affective and ethical dimensions of the educational process. Therefore, while AI provides many advantages, it should be seen as a complement to traditional learning rather than a full substitute. Human elements of the educational process such as empathy, intuition, and values formation remain essential components that technology cannot replicate.

The results of this study suggest that the integration of AI-based technologies in the ESP curriculum, especially for accounting, can be a very valuable innovation. In the context of higher education, where students are faced with increasingly complex materials and evolving job market demands, AI can be a very effective tool to prepare students to master technical language in a more efficient way. The use of AI can enrich students' learning experience, provide greater access to interactive learning resources, and help develop English skills relevant to the needs of the professional world.

Overall, the findings from this study support the argument that the application of AI-based technology in ESP learning, particularly in the context of accounting, not only improves students' understanding and skills in English, but also reduces the cognitive load students face in learning technical and specific material. This finding is in line with the Computer-Assisted Language Learning (CALL) approach, which emphasizes the utilization of technology to support the language learning process. In particular, AI-based technology can reduce the cognitive load students face when learning technical and specific material, such as accounting terms.

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High cognitive load is one of the main challenges in ESP learning, especially in fields that have highly technical vocabulary, such as accounting. Some previous studies have also shown that the application of technology in an educational context can significantly reduce such load. Romero-Carazas et al. (2023) explains that the application of AI in accounting education not only improves the efficiency of the learning process but also reduces the likelihood of human error, which is often an obstacle in the understanding of complex accounting concepts. This suggests that technology can be an effective tool in helping students overcome the cognitive challenges that often arise when they are dealing with technical and specific material.

As mentioned by Petrová (2024) that the integration of AI is important in the accounting education curriculum, especially in preparing students to face the demands of an increasingly digitalized industry. This research shows that the application of AI in accounting education not only focuses on mastering technical skills, but also prepares students to adapt to the rapid technological developments in the professional world. Thus, the integration of AI technology in ESP learning, especially in accounting, not only improves English comprehension, but also prepares students to compete in a job market that is increasingly connected to digital technology.

Overall, the application of AI in ESP learning, especially in accounting, offers various benefits, both in terms of reducing cognitive load and increasing student learning motivation. AI-based technology within the CALL framework enables learning that is more contextual and relevant to students' professional needs, as well as providing effective solutions to the challenges faced in learning English for specific purposes. Thus, the use of AI in accounting education can be considered as an effective pedagogical strategy in improving the quality of learning and preparing students for the challenges of an increasingly technology-dependent world of work.

Although this study provides strong evidence regarding the effectiveness of AI in enhancing English for Accounting learning, there are several limitations that need to be noted. First, this study was conducted on a relatively small sample and only covered one institution, so the results may be less generalizable to broader contexts.

Second, the intervention duration was relatively short, so the long-term impact of AI integration on students' language competence and professional readiness cannot be fully measured. Third, the research focus was primarily on technical vocabulary mastery and language skills in accounting; other aspects such as critical thinking ability, cross-cultural communication, and affective outcomes have not been explored in depth. Fourth, although AI has proven to provide significant benefits, this study has not systematically examined potential challenges related to ethical issues, data privacy, or the risk of excessive dependence on technology. These limitations are important to consider when interpreting the findings, and future research is expected to address them by involving larger and more diverse samples, extending the study period, and examining other dimensions of ESP learning more comprehensively.

4. Conclusion

The empirical evidence sheds light on how the use of artificial intelligence (AI)-based technology significantly improves students' English language skills in the context of English for Accounting (ESP). The experimental group that received AI-assisted learning showed significantly greater improvement than the control group, both in terms of technical vocabulary, financial statement reading and writing skills, and the ability to convey and understand accounting data orally. This finding suggests that AI technology is highly effective in improving student learning outcomes, especially in English language fields that are oriented towards specific professional needs such as accounting.

The outcome implies that higher education institutions, especially those with accounting or vocational study programs, need to start considering a more systematic integration of AI technology into the ESP curriculum. This technology is not only a tool, but also the main medium in delivering technical and specific materials. With the support of AI-based technology, lecturers and teachers can also design learning strategies that are more personalized, responsive to student needs, and able to bridge the gap between language acquisition and understanding of academic substance. In the long run, the optimal application of AI can also improve students'

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readiness to face the world of work that demands strong technical language and professional communication skills.

Higher education institutions should develop policies and training for lecturers to integrate AI platforms in ESP teaching. Learning content development needs to be directed towards technology-based adaptive approaches to suit the diverse characteristics of students. Further research needs to be conducted to evaluate the long-term effectiveness of using AI in ESP learning as well as its impact on graduates' employability. Finally, collaboration between educational institutions, technology developers, and industry is essential to create a relevant and sustainable learning ecosystem in the digital era.

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