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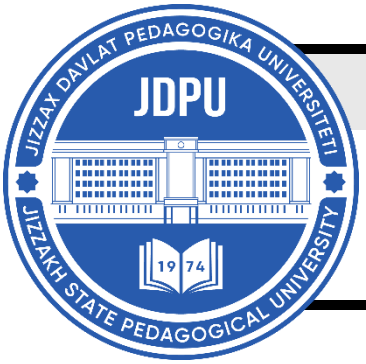

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IMPLEMENTING AI IN TEACHING ENGLISH TO B2 LEVEL ESP STUDENTS

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ABOUT ARTICLE

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Abstract: This article explores the integration of artificial intelligence (AI) into English language instruction for students at the B2 level of the Common European Framework of Reference for Languages (CEFR) within English for Specific Purposes (ESP) contexts. The growing demand for personalized and domain-specific language instruction in professional and academic settings necessitates innovative pedagogical strategies. AI technologies—ranging from intelligent tutoring systems and natural language processing tools to adaptive learning platforms—offer potential solutions to enhance language acquisition, engagement, and performance. The study provides an in-depth examination of current AI applications in ESP instruction, analyzes their effectiveness for B2-level learners, and discusses implementation strategies, challenges, and ethical concerns. The article concludes by proposing a research-based framework for integrating AI in ESP curriculum design and teacher training, aiming to optimize language outcomes in diverse educational environments.

Introduction

Artificial intelligence (AI) technology continues to rapidly develop, redefining and transforming many different sectors such as education. In English language teaching (ELT), AI technologies offer unprecedented access to the design of an instruction programme that suits the needs of students. For teachers working at the B2 level of the Common European Framework of Reference for Languages (CEFR), in particular English for Specific Purposes (ESP) courses, these technologies can bridge the gap between language skills and provide domain relevant exposure and practice.

ESP instruction is different from general English language instruction in that it is targeted at the needs of the learners' specific academic, professional, or technical interests. Such B2 level students generally already have intermediate to upper-intermediate general language skills, and need targeted support to begin mastering the specific vocabulary, genres, and communication norms related to their particular study area (as in engineering, medicine, law, or business). AI can provide support for these students by providing adaptive content delivery, real-time feedback, and environment-responsive learning models.

There is a growing acceptance for AI in language teaching, but little empirical research of its effectiveness in B2-level ESL contexts. This article aims to bridge the gap on this front by discussing the integration of AI technologies into ESL instruction at the B2 proficiency level. It includes a survey of available literature, a list of best practices for the integration of AI, challenges to and ethical issues in the use of AI technologies, and a set of frameworks for effective implementation.

Materials and methods

AI in language education is grounded in multiple pedagogical and computational theories. Constructivist learning theory, which argues that student learning is best achieved through active engagement with content and tasks (Vygotsky 1978), fits well with AI-based education systems that emphasize interactivity and autonomy. As a similar result, sociocultural theory, proposed by Vygotsky (1978), encourages scaffolding and focuses on the zone of proximal development (ZPD), both of which are brought about by AI-based education systems that can change the methods of instruction according to student performance.

From the technological perspective, AI in education generally entails natural language processing (NLP), machine learning (ML), and data-driven personalization. Intelligent Tutoring Systems (ITS) have become a well known example of AI applications developed to replicate human tutoring by a mechanism of providing immediate feedback and adaptive instruction (VanLehn, 2011). Intelligent Tutoring systems have shown promise in supporting second language acquisition by dynamically responding to learners' needs.

English for Specific Purposes (ESP) is defined by Hutchinson and Waters (1987) as teaching English that is specific to the learner's specific needs, focused on special domains of knowledge or professions. It is learner-centred and context-specific in that it is required to be responsive to the actual language demands of particular career fields such as aviation, tourism or healthcare (Dudley-Evans & St John, 1998).

At level B2 CEFR learners have a comprehensive understanding of general English grammar and vocabulary, but they need to develop their ability to acquire specialist lexical fields, pragmatic functions and genre-specific communication skills (Council of Europe, 2020). The B2 level is important in ESP contexts as it is where learners transition from functional competence to fluent professional performance.

AI-based systems can perform particularly well at this level as they can provide authentic content, context-aware learning spaces, and immediate feedback. Such artificial intelligence-powered writing assistants such as Grammarly or Quillbot provide feedback not only on grammar but also on style and tone, in line with professional writing conventions (Xu et al., 2020). In turn, domain-specific chatbots and virtual role-play systems can replicate workplace communication scenarios and allow B2 learners to practice in realistic situations.

Empirical evidence on the application of AI in English for Specific Purposes (ESP) contexts is sparse compared to existing ELT frameworks and observations from several recent studies may provide insights into its implementation. For example, Li and Hegelheimer (2013) examined use of AI-driven vocabulary tools in an ESP course designed for nursing students and found statistically significant improvements in learner lexical retention and comprehension of field-specific language.

Also, Wang and Vásquez (2012) examined the use of automated writing evaluation (AWE) tools in academically-based ESP courses, and showed that AWE tools increased the

learner autonomy and improved drafting abilities. These studies support the role that AI tools play in both linguistic and metacognitive development of ESP learners.

However, a lack of literature exists on the long-term effects of AI integration and its effects in different professional domains (with much research either exploratory or limited, with the suggestion that some broader, longitudinal studies and comparisons across disciplines are needed).

Bias in neural learning algorithms is another important consideration. As NLP engines (and especially algorithms like DeepMind) are trained primarily on general-purpose or western-centric corpora, they may misunderstand (or fail to respond adequately) to inferences from non-native or culturally diverse speakers (Blodgett et al., 2020).

Understanding B2 Level and ESP Learners The B2 Proficiency Level According to the CEFR, the B2-level student is able to grasp the main ideas of complex texts concerning both concrete and abstract concepts (including discussions of technical subjects which are relevant to his/her area of specialization), and to interact with proficiency levels high enough that regular interaction with native speakers cannot be stressful for either party (Council of Europe, 2020). At this level learners are transitioning from learning to communicate to communicating to learn and perform. They should be able to use language both flexibly and effectively for social, academic and professional purposes. There should be a reasonable range of grammar and vocabulary to express beliefs, narratives, and arguments persuasively, but learning difficulties may occur where nuances, idiomatic expressions and academic, cultural or occupational registers may not be available.

Characteristics and Needs of ESP Learners

ESP learners are distinguished not only by their level of English but also by the specificity of their language learning goals. These learners are often professionals, university students, or trainees who need English to function effectively in their domains—whether that's aviation, business, medicine, or law. Their primary concerns include mastering domain-specific vocabulary, genre conventions (e.g., writing reports or clinical case notes), and oral communication skills such as giving presentations or participating in meetings.

Motivation among ESP learners tends to be high, especially when course content directly relates to their personal or professional goals (Basturkmen, 2010). However, they also expect

relevance and practical applicability from the curriculum, which presents a challenge for instructors to tailor content appropriately. This is where AI's capacity for personalization becomes highly advantageous.

The Role of AI in Language Learning

AI in language education encompasses a broad set of technologies, including:

Natural Language Processing (NLP): Enables machines to understand and generate human language, foundational for tools like chatbots, speech recognition, and grammar checkers.

Machine Learning (ML): Empowers AI systems to improve their performance based on data input over time, essential for adaptive learning.

Intelligent Tutoring Systems (ITS): Simulate one-on-one tutoring by providing tailored feedback and scaffolding.

Speech Recognition and Generation: Facilitates pronunciation training and conversational practice.

These technologies contribute to the four essential pillars of effective language learning as identified by Mayer (2002): active engagement, meaningful learning, timely feedback, and personalized instruction. AI tools can automate vocabulary revision, simulate real-world conversation scenarios, and provide context-aware grammar corrections, supporting all four domains—listening, speaking, reading, and writing.

Moreover, AI systems can collect and analyze learner data to detect strengths and weaknesses, adjusting the difficulty and content of lessons in real time. For example, if a B2-level engineering student struggles with passive constructions in technical writing, an AI-enhanced platform could generate targeted practice exercises until mastery is demonstrated.

AI Tools for ESP Teaching at B2 Level

AI tools can be broadly classified into six categories in the ESP teaching context:

1. Intelligent Writing Assistants

Tools such as Grammarly, Quillbot, and Turnitin Revision Assistant use NLP to offer real-time feedback on grammar, vocabulary, coherence, and tone. These are especially useful in business and academic ESP writing, where register and precision are crucial.

Example: A business English student using Grammarly to fine-tune an executive summary or email.

2. Adaptive Vocabulary Trainers

Applications like WordUp, Lingvist, or Quizlet leverage AI to track learner performance and customize vocabulary drills. These are beneficial for memorizing technical terminology and collocations in fields like medicine or IT.

Example: An IT student using Lingvist to learn programming-related English terms.

3. AI-Powered Speaking Tools

Speech recognition and conversational AI tools such as ELSA Speak and Google AI voice apps offer pronunciation correction and dialogue simulation. These help ESP learners develop oral communication skills relevant to workplace settings.

Example: A hospitality ESP learner practicing check-in dialogues with a virtual assistant.

4. Chatbots and Virtual Tutors

AI chatbots (e.g., ChatGPT-based tutors) can mimic conversations in specific professional contexts, offering realistic practice in negotiation, diagnosis, or customer service scenarios.

Example: A legal English student simulating client-attorney interviews using a law-focused chatbot.

5. Content Recommendation Engines

Systems like Duolingo or Rosetta Stone adaptively recommend lessons based on learner performance, although their ESP offerings are still developing. Custom LXP (Learning Experience Platforms) are increasingly used in corporate training settings.

Example: A pharmaceutical sales representative receiving AI-curated modules on medical terminology.

6. Automated Assessment Tools

AI can also streamline formative and summative assessments through automated scoring of essays, quizzes, and even oral responses. Tools like Write & Improve by Cambridge use NLP to assess writing samples and offer feedback aligned with CEFR levels.

Example: A university student in an academic English program receiving CEFR-aligned scores on weekly essay drafts.

Methodologies for Implementing AI

1. Blended Learning Models

One of the most effective ways to incorporate AI into ESP instruction is through a blended learning approach, which combines face-to-face classroom interaction with AI-enhanced digital tools. In this model, AI serves as a supplement, not a replacement, for teacher-led instruction.

For example, an engineering English course may allocate class time for discussion and project work, while students use an AI-driven vocabulary trainer like Quizlet or Lingvist outside class to reinforce technical terms. Teachers act as facilitators who guide students in selecting appropriate tools, monitor progress through AI-generated analytics, and intervene when necessary.

2. Flipped Classrooms

The flipped classroom model, wherein students study foundational material at home using AI-powered content and use classroom time for higher-order tasks, has proven effective in ESP settings (González-González & Blanco-Iglesias, 2021). AI tools can provide interactive lectures, quizzes, and simulations tailored to each learner's progress.

Example: A medical English learner watches an AI-generated video lesson on anatomy terminology at home, then participates in diagnosis role-plays in class.

3. Task-Based Language Teaching (TBLT) with AI

Task-Based Language Teaching (TBLT), which emphasizes the completion of meaningful, real-world tasks, is enhanced by AI through contextualized simulations and feedback mechanisms. AI can monitor how learners handle tasks (e.g., writing reports, negotiating in English) and provide feedback aligned with CEFR descriptors.

Example: A business English learner completes an AI-monitored negotiation simulation where the system scores their use of persuasive language, cohesion, and grammar.

4. Project-Based Learning (PBL)

Project-based learning allows students to work on domain-specific problems or deliverables over time, such as preparing a research proposal or safety protocol. AI tools support this by helping with planning, drafting, and revising texts; checking vocabulary; and ensuring genre compliance.

Example: Legal English learners create a mock case brief, using Grammarly and ChatGPT to refine style and argument clarity.

Case Studies and Practical Applications

Case Study 1: AI in a B2-Level Medical English Course

At a university in Taiwan, a pilot project integrated AI-based writing tools and virtual conversation agents into a Medical ESP course for B2-level students. Tools like ELSA Speak helped with pronunciation drills for complex medical terminology, while Grammarly provided structural and lexical suggestions on writing clinical case notes.

Findings:

Improvement in pronunciation accuracy by 15% (pre/post test scores)

Increased learner autonomy and confidence in writing

Teachers reported greater engagement and individualized support via AI-generated analytics

Case Study 2: Chatbot-Based Training in Business ESP

In a Spanish business school, B2-level students used an AI-powered chatbot embedded in Microsoft Teams to simulate workplace scenarios, including meetings, negotiations, and emails. The chatbot adapted to user responses and provided real-time corrections.

Findings:

Improved fluency and accuracy in business-specific oral tasks

Learners reported higher motivation due to realism and interactivity

Teachers emphasized the ease of tracking student progress using AI logs

Case Study 3: AI Writing Feedback in an Engineering ESP Class

In Turkey, a group of engineering students at the B2 level integrated the Write & Improve platform by Cambridge into a technical writing course. The tool was used weekly to give CEFR-aligned feedback on reports and documentation.

Findings:

Significant gains in cohesion and grammar control over a 12-week period

High student satisfaction due to immediate feedback

Reduced teacher workload in initial drafting stages

Result and discussion

One of the main challenges in implementing AI is technological disparity. Not all institutions or learners have equal access to stable internet connections, modern devices, or advanced platforms. This can widen the digital divide and create inequities in language learning opportunities.

Example: In under-resourced regions, learners may not benefit from AI-rich instruction due to lack of devices or institutional licenses.

The effective use of AI in ESP education depends heavily on teacher readiness. Many educators lack training in AI literacy or instructional design for AI-enhanced environments. Moreover, some teachers fear being replaced or overwhelmed by technology.

Recommendation: Include AI-focused professional development in teacher education programs and provide ongoing support.

AI models trained on general-purpose or non-specialized corpora may fail to understand or produce domain-specific language accurately. This limits the effectiveness of tools like chatbots and grammar checkers in ESP settings unless they are specifically trained on professional corpora.

Example: An AI grammar checker might flag correct technical jargon in a legal brief as incorrect.

AI tools often collect extensive learner data to optimize instruction. This raises serious concerns about privacy, consent, and ethical data handling, particularly in regions with strict data protection laws such as GDPR in Europe.

Recommendation: Institutions must vet AI providers for compliance with privacy standards and establish transparent data-use policies.

AI systems still struggle with interpreting pragmatic and cultural nuances, which are vital in professional communication. A chatbot may simulate conversation but misinterpret sarcasm, politeness strategies, or hierarchical language use.

Solution: Combine AI tools with teacher-led debriefings to address cultural gaps and interpersonal subtleties.

Pedagogical Implications

The integration of AI into B2-level ESP teaching transforms not only the tools educators use but also the roles they play and the methodologies they apply. Below are some key pedagogical shifts and considerations:

1. From Instructor to Facilitator

With AI taking on repetitive or diagnostic tasks (e.g., grammar correction, vocabulary testing), teachers can focus more on facilitating learning, supporting higher-order skills like critical thinking, intercultural communication, and collaborative problem-solving. This shift requires a redefinition of teacher competencies to include digital literacy and data interpretation.

Example: An ESP teacher analyzing learner performance dashboards from an AI system to plan personalized interventions.

2. Personalized Learning Paths

AI enables learner-centered design by adapting content and pace to individual progress, interests, and needs. This aligns well with ESP, where students often have diverse language backgrounds but similar professional goals.

Pedagogical implication: Instructors should learn to design modular ESP content that interfaces effectively with AI systems for adaptive delivery.

3. Collaboration over Consumption

AI facilitates collaborative, constructivist learning by enabling group projects, virtual teamwork, and peer reviews within platforms. Tools like Google AI, Otter.ai, and GPT-based editors support students in synthesizing and presenting domain knowledge in English.

Classroom application: Students in a legal ESP course collaborate using AI tools to build a shared legal glossary and draft mock legal memos.

4. Integration of Multimodality

AI tools often leverage multimodal input—voice, text, image, or video—to enhance communication. For ESP learners, especially in technical or visual domains (e.g., aviation or architecture), this multimodal support enhances comprehension and retention.

Instructional strategy: Combine AI-driven visual dictionaries or AR-based simulations with tasks such as describing machinery or analyzing floor plans.

Assessment and Evaluation with AI

Assessment in AI-supported ESP learning environments must evolve to reflect the new dynamics of learner engagement, autonomy, and performance.

1. Formative Assessment

AI tools offer constant formative feedback without waiting for instructor input. Platforms such as Write & Improve and Grammarly help learners make iterative improvements to writing.

Benefit: Students can reflect, edit, and refine before submitting assignments, increasing metacognitive awareness.

2. Diagnostic and Adaptive Assessment

AI systems use learning analytics to identify gaps in learner knowledge and adapt subsequent content accordingly. Tools like Lingvist adapt vocabulary training based on forgotten or weakly retained items.

Application: At the start of a B2-level ESP course, students complete an AI-powered diagnostic quiz that determines personalized vocabulary and grammar paths.

3. CEFR-Aligned Scoring

Some tools, like Cambridge's automated feedback system and Duolingo English Test, align AI feedback with CEFR levels, ensuring consistency and transparency in scoring.

ESP relevance: Learners can track their development according to standard proficiency frameworks, important for credentialing and academic progression.

4. Portfolios and Self-Assessment

AI tools can also facilitate e-portfolios where learners document their progress, upload AI-scored samples, and reflect on improvement.

Instructor role: Facilitate guided reflection sessions using learner portfolio data, encouraging awareness of professional language use.

5. Risks and Limitations

Over-reliance on AI-generated scores: Teachers must balance automated assessments with human judgment to ensure reliability and contextual accuracy.

Inaccuracy in nuanced genres: AI might not properly assess creativity, tone, or rhetorical appropriateness in specialized writing.

Future Directions

As AI continues to evolve, several trends are expected to reshape ESP instruction at the B2 level and beyond:

1. Domain-Specific AI Training

Future AI systems will be increasingly domain-trained, allowing for more accurate simulations, corrections, and feedback. This will be particularly impactful for legal, technical, and medical English, where general NLP systems currently fall short.

Example: AI tutors trained on legal corpora to simulate courtroom dialogue or contract negotiation.

2. Integration with AR/VR

Combining AI with Augmented Reality (AR) and Virtual Reality (VR) can provide immersive ESP environments, such as virtual hospitals, job interviews, or industrial sites.

Example: Engineering students navigate a virtual factory and complete oral tasks guided by AI-driven prompts.

3. Emotion and Engagement Recognition

Advanced AI will integrate affective computing, detecting learner frustration, boredom, or confusion via facial recognition and biometric data to adjust instruction dynamically.

Ethical concern: This raises privacy issues, emphasizing the need for strong data governance frameworks.

4. Multilingual and Multimodal AI

Future tools will likely support code-switching, visual annotations, and multimodal input, making them accessible to learners from diverse linguistic and educational backgrounds.

5. AI-Augmented Teacher Roles

Educators will evolve into AI coordinators, curating tools, managing learning platforms, interpreting analytics, and providing the human connection that AI lacks.

Conclusion

The implementation of AI in teaching English to B2-level ESP students represents both a paradigm shift and a promising evolution in language education. By leveraging the capabilities of AI—adaptive learning, natural language processing, real-time feedback, and data analytics—educators can enhance the efficiency, personalization, and relevance of ESP instruction.

However, successful implementation depends on a careful balance: teachers must remain central as facilitators and ethical guides, ensuring that technology supports rather than replaces the human aspects of learning. Moreover, institutions must invest in infrastructure, teacher training, and ethical data practices to create inclusive and effective AI-enhanced learning environments.

Future developments in domain-specific AI, multimodal learning, and immersive technologies will only deepen the impact of AI on ESP teaching. As we move forward, a reflective, research-informed, and learner-centered approach will be crucial to realizing AI's full potential in helping B2-level learners thrive in their academic and professional endeavors.

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