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Reimagination of English Language Learning for Vocational Education: An Industry 5.0 Oriented English for Specific Purposes Learning Framework

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Abstract

Objective: To analyze the development of English for Specific Purposes (ESP) learning in vocational education and propose an Industry 5.0-oriented learning framework. **Theoretical framework:** The study integrates ESP, Industry 5.0, employability skills, digital learning, and constructivist learning theories. **Literature review:** Previous studies emphasize ESP and digital learning, but a comprehensive framework integrating AI, Industry 5.0, and employability skills in vocational education remains limited. **Methods:** A qualitative Systematic Literature Review (SLR) was conducted by synthesizing articles from reputable databases using content and thematic analysis. **Results:** The findings indicate that effective ESP learning requires the integration of industry needs analysis, adaptive curriculum design, AI-supported learning, digital learning ecosystems, project-based learning, and employability skills, including communication, collaboration, critical thinking, creativity, and adaptability. These components form the basis of an integrated conceptual learning framework. **Implications:** The proposed framework provides practical guidance for vocational institutions, educators, and curriculum developers in designing adaptive, technology-enhanced, and industry-aligned English learning to strengthen graduate competitiveness in the Industry 5.0 era. **Novelty:** This study proposes an integrated Industry 5.0-Oriented ESP Learning Framework that combines AI, digital learning, industry needs, and employability skills into a single conceptual model for vocational English education.

Keywords: english for specific purposes, industry 5.0, vocational education, employability skills, artificial intelligence.

INTRODUCTION

The development of the Industrial Revolution 5.0 has brought fundamental changes to the paradigm of vocational education in various countries. Unlike the Industrial Revolution 4.0, which focused on automation and digitalization, Industry 5.0 places humans at the center of innovation through collaboration between human intelligence and intelligent technologies, such as Artificial Intelligence (AI), the Internet of Things (IoT), big data, and cyber-physical systems. This concept requires vocational education institutions to produce graduates who possess not only technical skills but also competencies in communication, collaboration, creativity, and adaptability to changes in the world of work. Therefore, vocational education

needs to transform its curriculum and learning strategies to align with future industry needs [\[1\]](#).

Vocational education plays a strategic role in preparing competent human resources ready to enter the workforce through learning that emphasizes a balance between theory and practice. According to UNESCO, vocational education is an educational process designed to equip students with knowledge, skills, and competencies relevant to a specific field of work. Accordingly, the OECD emphasizes that future vocational education systems must be able to respond quickly to changing workforce skills needs, flexibly, and be oriented towards digital innovation. Therefore, the success of vocational education is measured not only by mastery of technical competencies, but also by the ability of graduates to adapt to the dynamics of the global industrial world [\[2\]](#) [\[1\]](#).

One of the increasingly important competencies in vocational education is English proficiency. English has developed into a lingua franca for international communication, global trade, technology transfer, research, and cross-border professional collaboration. Many multinational companies and national industries require English communication skills as a key indicator of graduates' job readiness. Therefore, English learning in vocational education is no longer solely focused on grammar mastery but must also be directed toward the ability to use the language appropriately for the work context and profession students will pursue [\[3\]](#) [\[4\]](#).

Various studies have shown that English language learning in vocational education still faces several challenges. The materials used are often general English, thus not reflecting the communication needs of the workplace. On the other hand, the industrial world requires graduates who are capable of conducting business presentations, negotiating, writing reports, technical communication, and providing customer service in English, relevant to their respective fields of expertise. This mismatch between learning materials and industry needs results in a skills gap, which impacts the low competitiveness of vocational graduates [\[5\]](#).

In response to these issues, the English for Specific Purposes (ESP) approach is increasingly being implemented in vocational education. ESP is an English language learning approach designed based on an analysis of student needs and the communication demands of specific professional fields. This approach enables the development of teaching materials that are more contextual, authentic, and relevant to the workplace, such as English for engineering, business, health, tourism, and information technology. Various studies have shown that implementing ESP can improve learning motivation, professional communication competency, and job readiness in vocational students because the material learned is directly related to their field of expertise [\[6\]](#).

In addition to changes in learning approaches, the development of digital technology has also transformed the way English language learning is conducted. The use of Learning Management Systems (LMS), online learning applications, virtual classrooms, digital simulations, and Artificial Intelligence technology allows the learning process to be more flexible, adaptive, and student-centered. The concept of Education 5.0 emphasizes that technology should not replace the role of educators, but rather become a tool to improve the quality of the learning experience through personalized learning, automated feedback, and the development of 21st-century skills. Thus, the integration of AI in ESP learning is a potential strategy to support the transformation of vocational education towards Industry 5.0 [\[7\]](#).

On the other hand, Industry 5.0 also emphasizes the importance of developing employability skills, a set of competencies that enable graduates to work effectively in a constantly changing work environment. These competencies include communication, critical thinking, collaboration, creativity, leadership, problem-solving, digital literacy, and lifelong learning. In the context of English language learning, these competencies can be developed

through project-based learning, workplace simulations, case studies, professional presentations, and cross-disciplinary collaboration. Therefore, ESP learning needs to be designed not only to improve language skills but also as a means of strengthening 21st-century work competencies [8].

Various previous studies have discussed ESP implementation, needs analysis, digital teaching materials development, and English language learning strategies in vocational education. However, most of these studies have focused on specific aspects, such as module development, student perceptions, or partial industry needs. Research integrating the ESP approach with Industry 5.0 principles, the use of Artificial Intelligence, digital learning ecosystems, project-based learning, and employability skills development within a unified conceptual framework remains relatively limited. This situation indicates a research gap that needs to be addressed by developing more comprehensive and adaptive learning models to address changing workplace needs [3].

LITERATURE REVIEW

Vocational Education

Vocational education is an education system designed to produce graduates with competencies that meet the needs of the business and industrial world (DUDI). Unlike academic education, which focuses more on developing knowledge, vocational education emphasizes mastery of practical skills, professional abilities, and job readiness. According to UNESCO, vocational education, or Technical and Vocational Education and Training (TVET), is a crucial component of a country's economic development because it produces a productive, innovative, and adaptable workforce [2]. Therefore, vocational education is a key factor in enhancing human resource competitiveness in the era of globalization .

The development of the Industrial Revolution 4.0, which subsequently transformed into Industry 5.0, has brought changes to the orientation of vocational education. Graduates are no longer only required to possess technical skills (hard skills), but also must master 21st-century skills such as communication, collaboration, critical thinking, creativity, leadership, digital literacy, and problem-solving. The OECD explains that future vocational education must be able to produce graduates who are adaptive to technological changes, able to work with artificial intelligence systems, and possess lifelong learning capabilities. Therefore, vocational education curricula need to be continuously updated to align with evolving industry needs [1].

In Indonesia, strengthening vocational education is also a government priority through the "link and match" concept between educational institutions and industry. This concept aims to ensure that the competencies taught in vocational colleges and vocational high schools truly align with the needs of the workforce. The implementation of "link and match" is realized through the development of a competency-based curriculum, project-based learning, industrial internships, professional certification, and collaboration with companies. This approach is expected to improve graduates' preparedness for the increasingly dynamic job market.

English for Specific Purposes

English for Specific Purposes (ESP) is an English language learning approach developed based on the specific needs of students, depending on their academic and professional fields. Hutchinson and Waters explain that ESP is not simply teaching technical vocabulary, but rather a learning approach that begins with a needs analysis so that materials, methods, and evaluations are truly tailored to the intended use of the language. This concept remains the

primary foundation for the development of English language learning in vocational education [9].

According to Basturkmen, the main characteristic of ESP is its orientation toward real-world communication needs in the workplace. Therefore, learning materials no longer focus on general grammar skills but rather on the ability to read technical documents, write professional reports, conduct presentations, negotiate, serve customers, and communicate in an international work environment. This approach makes learning more contextual, thereby increasing student motivation and competence [10].

In vocational education, ESP implementation is crucial because each study program has distinct professional communication characteristics. Mechanical Engineering students require different technical terminology than Accounting, Nursing, Tourism, or Information Technology students. Therefore, the development of ESP teaching materials must begin with an analysis of industry needs to ensure that the materials developed truly support graduates' job readiness.

Research by Fadlia, Rahmiani and Marwandi, and Hanapiah shows that implementing ESP can improve vocational students' professional communication skills, strengthen presentation skills, enrich technical vocabulary, and boost their confidence when entering the workforce [3][6][20]. Thus, ESP is the most appropriate learning approach to support the transformation of vocational education in the Industry 5.0 era.

Industry 5.0 in Education

Industry 5.0 is a new paradigm for industrial development that places humans at the center of innovation through collaboration between intelligent technology and human capabilities. Unlike Industry 4.0, which focused on automation, Industry 5.0 emphasizes three key principles: human-centeredness, sustainability, and resilience [11]. These three principles serve as the foundation for the development of various sectors, including education.

In the context of education, Industry 5.0 encourages the creation of a more personalized, adaptive, and collaborative learning process. Technologies such as Artificial Intelligence, the Internet of Things (IoT), Virtual Reality (VR), Augmented Reality (AR), Big Data, and Cloud Computing are utilized to enhance the quality of the learning experience without diminishing the role of educators as primary facilitators. Thus, learning is oriented not only toward knowledge transfer but also toward character development, creativity, empathy, and the ability to collaborate.

The application of the Industry 5.0 concept to vocational education requires learning that simulates real-world work conditions through the use of digital technology. Students need to be equipped with project-based learning experiences, cross-disciplinary collaboration, industrial problem-solving, and the ability to use digital technology to complete professional work. This approach is expected to produce graduates who are better prepared for the changing world of work.

Artificial Intelligence in English Learning

Artificial Intelligence (AI) has become a technology that has had a significant impact on the world of education, including English language learning. AI enables a more personalized learning process through analysis of student abilities, automated feedback, adaptive material development, and real-time learning evaluation. According to Zawacki-Richter, AI has significant potential to improve the quality of learning because it supports personalized learning processes tailored to each student's individual needs [11].

In English learning, AI can be utilized through various applications such as ChatGPT, Grammarly, Duolingo Max, Microsoft Copilot, Gemini, and Natural Language Processing (NLP)-based platforms. This technology can help students improve their speaking, writing,

reading, and listening skills through interactive exercises. Furthermore, AI can provide grammar correction, vocabulary enrichment, simulate professional conversations, and even automatically compile learning materials.

However, the use of AI in learning must remain under the supervision of lecturers to avoid diminishing students' critical thinking skills. AI should be positioned as a learning aid, not a substitute for the learning process. With this approach, AI integration will support the creation of more effective, efficient ESP learning, and in line with the characteristics of Industry 5.0.

Digital Learning Ecosystem

A digital learning ecosystem is the integration of various platforms, technologies, and digital learning resources that support the continuous learning process. In vocational education, the digital ecosystem encompasses not only a Learning Management System (LMS) but also learning videos, virtual simulations, e-portfolios, cloud collaboration, mobile learning, and academic social media. This ecosystem enables flexible learning without the constraints of space and time [\[12\]](#).

Digital-based English learning provides students with opportunities to practice communication through a variety of authentic media, such as podcasts, international webinars, video conferences, and collaborative projects with students from other countries [\[13\]](#). This approach can improve cross-cultural communication skills while strengthening students' digital literacy. Therefore, developing a digital ecosystem is a crucial component in transforming English learning in vocational education.

Employability Skills

Employability skills are a set of abilities needed to obtain, maintain, and develop a career in the workforce. The World Economic Forum (2025) identified that the skills most in demand in the future include communication, problem-solving, analytical thinking, creativity, collaboration, leadership, digital literacy, and lifelong learning [\[14\]](#).

In ESP learning, employability skills can be developed through various activities such as professional presentations, job interview simulations, business negotiations, group discussions, technical report writing, and collaborative projects with industry. These activities not only improve students' English skills but also build the professional competencies needed in the international workplace.

Thus, the integration of ESP, Artificial Intelligence, digital learning, and employability skills development is the main foundation for building an English language learning framework relevant to the needs of Industry 5.0 [\[15\]](#). A learning model that integrates these four components is expected to produce vocational education graduates with global communication competencies, digital literacy, and higher job readiness than conventional learning approaches.

METHODOLOGY

This study uses a qualitative approach with the Systematic Literature Review (SLR) method to comprehensively examine the development of English for Specific Purposes (ESP) learning in vocational education in the context of Industry 5.0 [\[16\]](#). The SLR method was chosen because it is able to provide a systematic synthesis of various previous research results so as to identify research trends, gaps (research gaps), and formulate a conceptual framework relevant to the needs of future vocational education. The research stages refer to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines which include identification, screening, eligibility determination, and inclusion of

articles. The focus of the study is directed at developing an ESP learning model that integrates industry needs, digital transformation, the use of Artificial Intelligence (AI), and strengthening employability skills as the main characteristics of learning in the Industry 5.0 era [17].

Data collection was conducted through a search of scientific articles in several reputable databases, namely Scopus, Web of Science, ERIC, ScienceDirect, SpringerLink, Taylor & Francis, and Google Scholar. The search used a combination of keywords such as English for Specific Purposes, ESP, Vocational Education, Technical and Vocational Education and Training (TVET), English Language Teaching, Industry 5.0, Artificial Intelligence, Digital Learning, and Employability Skills. Inclusion criteria included articles published between 2020 and 2026, written in English or Indonesian, peer-reviewed, discussing English language learning in vocational education, and relevant to ESP development, digital transformation, or workplace competency needs. Conversely, articles that were not directly related to the research theme, were non-scientific publications, or had incomplete information were excluded from the analysis process [18].

The data obtained were then analyzed using content analysis and thematic analysis to identify concepts, themes, patterns, and relationships between components that emerged in various previous studies. The analysis process was carried out through coding, categorizing, synthesizing findings, and interpreting the study results to obtain a comprehensive picture of the characteristics of ESP learning in vocational education. The results of this synthesis were then used as the basis for developing an Industry 5.0-Oriented English for Specific Purposes Learning Framework that integrates industry needs analysis, adaptive curriculum design, the use of Artificial Intelligence, a digital learning ecosystem, project-based learning, and employability skills development. The resulting framework is expected to serve as a conceptual reference for the development of English curriculum and learning practices in vocational education institutions to be more responsive to the dynamics of the global workplace [19].

RESULTS AND DISCUSSION

A synthesis of various studies on English for Specific Purposes (ESP) learning in vocational education shows that the orientation of English learning has undergone significant changes in recent years. Learning, which previously focused more on mastering language structures (General English), has begun to shift toward learning oriented towards the needs of the workplace and professional competencies. This change is driven by increasing industry demands for graduates who are able to use English in the context of technical communication, customer service, report writing, professional presentations, and cross-border collaboration. Research by Fadlia, Rahmiani and Marwandi, and Hanapiah shows that the implementation of ESP can increase the relevance of learning to industry needs because the learning materials are structured based on a needs analysis according to the students' areas of expertise. These findings demonstrate that English learning in vocational education is no longer only aimed at improving linguistic competence but also serves as a means of developing professional competencies that support graduates' work-readiness workforce [3] [6].

Although the implementation of ESP has shown positive progress, the study also identified several challenges still faced by vocational education institutions. One major issue is the uneven application of industry needs analysis in the development of curricula and teaching materials. Most institutions still use general learning materials, thus failing to accommodate the characteristics of professional communication in each field of expertise, such as engineering, accounting, tourism, health, and information technology. Furthermore, limited lecturer competency in developing ESP materials, minimal collaboration with the business and industrial world (DUDI), and limited digital learning facilities also contribute to

the effectiveness of learning [21]. These conditions indicate that the transformation of English language learning in vocational education requires not only curriculum changes but also increased human resource capacity, strengthened industry partnerships, and the provision of supportive learning infrastructure [22].

Analysis of various studies also shows that the development of Industry 5.0 has significant implications for the design of English language learning in vocational education. Unlike Industry 4.0, which emphasized automation and digitalization, Industry 5.0 emphasizes the principles of human-centeredness, sustainability, and resilience. In the context of learning, these principles require the educational process to produce graduates not only proficient in technology but also possess critical thinking, creativity, communication, collaboration, leadership, and emotional intelligence. Therefore, ESP learning needs to be designed as a learning experience that integrates language proficiency with solving real-world problems faced by the industrial world through project-based learning, problem-based learning, and work-integrated learning approaches. This approach allows students to develop language competency simultaneously with the professional skills needed in a global workplace.

The use of Artificial Intelligence (AI) has become one of the most prominent aspects in the transformation of English language learning in the Industry 5.0 era. Various AI-based platforms such as ChatGPT, Grammarly, Microsoft Copilot, Gemini, and adaptive learning applications can provide a more personalized, flexible, and interactive learning experience. The synthesis results show that AI can be used to compile learning materials, provide automatic feedback on writing and speaking skills, provide professional communication simulations, and assist lecturers in designing learning activities appropriate to students' ability levels. However, the use of AI must be balanced with lecturer supervision and guidance so that the technology functions as a support for the learning process, not as a substitute for students' critical thinking skills. Thus, the integration of AI in ESP learning is in line with the characteristics of Industry 5.0, which places humans as the primary actors in the utilization of technology.

Based on the analysis, this study proposes an Industry 5.0-oriented English for Specific Purposes Learning Framework as a conceptual model that can be applied to vocational education institutions. The framework consists of six main, interconnected components: industry needs analysis, development of an ESP-based adaptive curriculum, integration of Artificial Intelligence and a digital learning ecosystem, implementation of project-based learning, simulation of professional communication in the workplace, and competency-based evaluation and employability skills. These six components are designed sustainably to produce a learning process that is more contextual, authentic, and relevant to the needs of the workplace. Through this framework, students not only learn linguistic aspects but also gain experience using English in various professional situations that are close to real conditions in the industry.

Table 1. Industry 5.0-Oriented ESP Learning Framework

Component	Focus	Expected Outcome
Industry Needs Analysis	Identify workplace English competencies	Industry-relevant learning objectives
Adaptive ESP Curriculum	Contextual and competency-based materials	Professional English competence
AI & Digital Learning	AI-assisted and digital learning ecosystem	Digital literacy and personalized learning
Project-Based Learning	Authentic workplace tasks and collaboration	Critical thinking, creativity, and teamwork
Professional Communication	Workplace communication practice	Effective professional communication skills

Competency Assessment	Authentic and employability-based evaluation	Industry 5.0-ready graduates
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Implementation of the proposed framework is expected to have various positive implications for improving the quality of vocational education [22]. From the student perspective, learning becomes more meaningful because the material studied is directly related to their field of expertise and the needs of the profession they will pursue. From the lecturer's perspective, this framework provides guidance in developing learning outcomes, selecting learning strategies, and utilizing digital technology and AI effectively. Meanwhile, from the perspective of educational institutions, the implementation of the framework can strengthen the implementation of Outcome-Based Education (OBE)-based curriculum, increase collaboration with industry, and support the government's link and match policy. For the business and industrial world, graduates are expected to possess professional communication competencies, digital literacy, the ability to work in multicultural teams, and be prepared for increasingly rapid technological transformation [23].

Overall, the results of this study confirm that reimagining English language learning in vocational education is not sufficient through changes in teaching materials alone, but requires a comprehensive transformation of learning design, curriculum, methods, technology, and evaluation systems. The integration of the ESP approach with the principles of Industry 5.0 produces a learning model that is more adaptive to technological developments and responsive to the needs of the world of work. The novelty of this research lies in the development of a conceptual framework that connects industry needs analysis, ESP-based learning, the use of Artificial Intelligence, digital learning ecosystems, project-based learning, and the development of employability skills in a single learning model. This framework is expected to serve as a reference for vocational colleges, vocational high schools, curriculum developers, and other stakeholders in improving the quality of English language learning so that it can produce competent, adaptive, and competitive graduates in the Industry 5.0 era.

CONCLUSION

The study results indicate that English language learning in vocational education needs to undergo a transformation to meet the challenges of Industry 5.0 development and the needs of the global workplace. The English for Specific Purposes (ESP) approach has proven more relevant than general English learning because it focuses on professional communication needs according to students' areas of expertise. Furthermore, the integration of human-centered, sustainability, and resilience principles into learning encourages competency development that focuses not only on language skills but also on critical thinking, collaboration, creativity, digital literacy, and the ability to adapt to technological change. Thus, ESP learning is an important strategy in improving the quality of vocational education graduates so that they are competitive at the national and international levels.

Based on the synthesis of various studies, this article proposes an Industry 5.0-Oriented English for Specific Purposes Learning Framework as a conceptual model that integrates industry needs analysis, adaptive curriculum development, the use of Artificial Intelligence, digital learning ecosystems, project-based learning, professional communication simulations, and competency-based evaluation and employability skills. The framework is designed to create a learning experience that is more contextual, authentic, and aligned with the needs of the business world and the industrial world. The novelty of this research lies in the integration of various pedagogical components, technology, and industrial needs into one comprehensive learning framework, thus becoming an alternative model for developing English learning in vocational education institutions in the Industry 5.0 era.

Practically, the results of this study are expected to serve as a reference for vocational colleges, vocational high schools, English lecturers, curriculum developers, and other stakeholders in designing learning that is more adaptive to technological developments and job market demands. Although this research provides significant conceptual contributions, this study is still limited to a Systematic Literature Review (SLR) approach and therefore has not tested the effectiveness of the proposed framework in a real learning context. Therefore, further research is recommended to conduct empirical validation through experimental methods, research and development (R&D), or case studies in various vocational study programs so that the effectiveness of the framework can be measured more comprehensively and become the basis for formulating policies for developing English learning in the Industry 5.0 era.

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Author Contribution

All authors contribute equally to the publication of this paper, all authors read and agree to this paper, and all authors declare no conflict of interest.

Conflicts of Interest

All authors declare no conflict of interest.

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