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# A Study on the Reform of English Curriculum for Vocational Bachelor's Programs under the Integration of Eco-Translatology and Artificial Intelligence

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Abstract: This study investigates the integration of Eco-Translatology and Artificial Intelligence (AI) in the reform of English curriculum for vocational undergraduate programs. As AI technologies such as machine translation, AI-assisted writing tools, and conversational chatbots become increasingly common in language education, they offer new opportunities to enhance teaching efficiency and professional relevance. Eco-Translatology, which emphasizes adaptive transformation across linguistic, cultural, and communicative dimensions, provides a theoretical foundation for guiding AI integration in translation-based instruction. The research proposes a triadic integration model that combines AI applications, ecological translation principles, and vocational competence development. Through literature review, instructional design, and simulated data analysis, the study explores how AI tools can be effectively embedded into English teaching methods, content design, and assessment systems. Key findings suggest that integrating AI tools supports student engagement, reflective learning, and skill acquisition aligned with real-world vocational contexts. Practical strategies are offered in three areas: transforming instructional approaches using AI tools, enhancing course content with authentic and AI-generated texts, and developing a process-oriented, feedback-rich evaluation system. These recommendations aim to foster students' digital literacy, translation adaptability, and professional communication competence. This research contributes to the ongoing discourse on intelligent and ecological approaches in language teaching and offers theoretical and pedagogical references for future-oriented curriculum design in vocational English education.

**Keywords:** Eco-Translatology; artificial intelligence; vocational English education; curriculum reform; digital literacy; translation teaching

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#### 1. Introduction

#### 1.1. Research Background and Significance

With the rapid development of vocational undergraduate education, there is an increasing demand for cultivating application-oriented talents who possess both practical skills and interdisciplinary knowledge. In this context, English teaching in vocational colleges faces new challenges and opportunities to better align with industry requirements and technological advancements.

Artificial intelligence (AI), represented by tools such as ChatGPT and machine translation systems, has profoundly impacted English language teaching. These AI technologies not only provide new methods and resources for language learning but also reshape the way translation and communication skills are developed. Integrating AI into English curriculum offers the potential to enhance teaching efficiency and students' learning experiences.

Eco-Translatology, as a novel perspective in translation studies, emphasizes the dynamic interaction among the translator, the text, and the environment. Its ecological approach highlights adaptability, sustainability, and the harmonious integration of multiple factors in the translation process. This theoretical framework provides valuable insights for reforming English translation teaching in vocational education, especially when combined with AI technologies.

Given the rapid advancements in both AI technologies and translation theories, there is an urgent need for curriculum reform in vocational undergraduate English courses. This reform aims to integrate Eco-Translatology with AI tools, fostering students' practical translation competencies and enhancing their competitiveness in the digital era. This study addresses this timely and significant issue by exploring effective strategies for curriculum innovation in the context of integrating AI and Eco-Translatology [1].

# 1.2. Review of Research at Home and Abroad

Artificial intelligence (AI) has increasingly been integrated into English language teaching worldwide. Studies have shown AI tools, such as machine translation and intelligent tutoring systems, can enhance personalized learning and improve language skills. However, challenges remain in effectively combining AI technology with traditional pedagogy and preparing teachers to use these tools.

Eco-Translatology, a relatively new approach in translation studies, emphasizes the dynamic relationship among the translator, the text, and the environment. While its theoretical framework has been the subject of scholarly discussion, empirical research on its application to English teaching, especially within vocational education, remains scarce [2].

In terms of vocational undergraduate English curriculum, existing research emphasizes practical skills and alignment with industry demands. Some progress has been made in task-based and translation-focused teaching, yet the integration of AI and ecological translation theory remains insufficient. This gap calls for innovative curriculum reform that bridges theory and technology to meet modern educational needs.

# 1.3. Research Objectives and Questions

This study aims to explore the integration of Eco-Translatology and artificial intelligence (AI) in vocational undergraduate English courses.

- 1) What is the impact of Eco-Translatology and AI technologies on vocational English curriculum design and pedagogy?
- 2) In what ways can these two elements be effectively integrated into instructional design?
- 3) What are the potential effects of such curriculum reform, as demonstrated through simulated data analysis?

By answering these questions, the study intends to provide theoretical guidance and practical suggestions for future curriculum innovation.

# 1.4. Research Methods and Innovations

This study employs a mixed-methods approach, including literature review, analysis of simulated questionnaire data, and instructional design methods. Through a comprehensive examination of existing research and theoretical frameworks, it constructs a practical model for integrating Eco-Translatology and artificial intelligence (AI) in vocational English teaching.

The innovation of this study lies in developing a fusion model that combines translation ecology with AI technology and demonstrating the effectiveness of the proposed curriculum reform through visualized data analysis using simulated charts [3]. This approach provides both theoretical insights and practical references for future educational reforms.

# 2. Theoretical Foundations of Eco-Translatology and AI Applications in Vocational English Teaching

#### 2.1. Core Concepts of Eco-Translatology

Eco-Translatology views translation as a dynamic ecological process involving multiple interacting dimensions. Central to this theory is the concept of three-dimensional transformation, which includes linguistic, cultural, and communicative dimensions. Translators make adaptive choices across these dimensions to achieve the optimal balance and harmony in the target text.

Moreover, translation is understood as an ecosystem consisting of the translator, the text, and the contextual environment. These elements interact continuously, influencing and constraining each other [4]. This ecological perspective emphasizes the importance of adaptability, sustainability, and the contextual fit of translation strategies, which provides valuable insights for designing translation teaching that is responsive to real-world complexities.

# 2.2. Applications of Artificial Intelligence in English Language Teaching

Artificial intelligence (AI) technologies have increasingly been applied in English language teaching, offering various innovative tools and methods. Key applications include AI-assisted writing tools that provide real-time feedback, machine translation systems that aid in bilingual comprehension, extensive corpora that support data-driven learning, and conversational agents or chatbots that enable interactive language practice.

These AI tools bring several advantages: they offer personalized learning experiences, improve efficiency by automating routine tasks, provide rich linguistic data for analysis, and create engaging, interactive environments that enhance student motivation. However, limitations also exist. Overreliance on AI may reduce critical thinking and creativity, some tools lack contextual sensitivity leading to errors, and unequal access to technology can widen educational gaps. Additionally, integrating AI effectively into traditional pedagogy remains a challenge that requires careful instructional design [5].

# 2.3. Characteristics of Vocational Undergraduate English Teaching

Vocational undergraduate English teaching is primarily application-oriented, focusing on equipping students with practical language skills that directly meet industry demands. The curriculum emphasizes skill development, such as technical writing, translation, and professional communication, tailored to specific vocational contexts.

Moreover, the teaching content is highly practical, often incorporating real-world materials and scenarios to enhance relevance and effectiveness. Due to the nature of vocational education, students and instructors tend to be more receptive and sensitive to the use of technological tools, including AI, to facilitate learning and improve skill acquisition.

# 3. Integration Model and Instructional Design of Vocational English Curriculum Reform

# 3.1. Construction of the Integration Model

To effectively reform vocational undergraduate English courses, this study constructs a triadic integration model that synthesizes Eco-Translatology, artificial intelligence (AI) technology, and vocational competence development. This framework serves as a theoretical and practical guide to curriculum design and instructional innovation.

# 1) Eco-Translatology Component

Eco-Translatology provides the foundational philosophy, emphasizing the translator's adaptive decision-making across linguistic, cultural, and communicative dimensions. It encourages sensitivity to the ecological environment of translation, highlighting the in-

terplay among the translator, text, and context. This perspective guides curriculum content selection and translation task design to foster students' holistic translation competence.

# 2) Artificial Intelligence Component

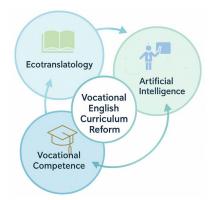
AI technology introduces innovative tools such as machine translation, automated writing evaluation, and intelligent tutoring systems [6]. These tools support personalized learning, increase teaching efficiency, and expand access to authentic language resources. In the model, AI serves as both a learning aid and a means to enhance students' digital literacy and practical skills in handling AI-assisted translation tools.

# 3) Vocational Competence Component

Vocational competence focuses on the practical skills and knowledge required for students' future professional roles. This includes industry-specific language use, cross-cultural communication, and problem-solving abilities. The model integrates these competencies by aligning learning outcomes with real-world vocational demands, ensuring that students are prepared for the workplace [7].

#### 4) Interaction and Integration

The integration model visualizes a dynamic interaction among the three components, forming a sustainable teaching ecosystem. Eco-Translatology informs pedagogical principles; AI provides technological support; and vocational competence anchors the curriculum in practical application. This synergy aims to create an adaptive, learner-centered environment that prepares students to navigate complex translation and communication tasks in a technology-rich vocational context. To better illustrate this interplay and theoretical alignment, this conceptual framework is visually represented in Figure 1.



**Figure 1.** Integration Model of Eco-Translatology, Artificial Intelligence, and Vocational Competence in Vocational English Curriculum Reform.

# 3.2. Objectives and Principles of the Curriculum Reform

#### 3.2.1. Reform Objectives

The primary goal of the proposed curriculum reform is to enhance students' overall communicative and professional competence in line with the demands of modern vocational contexts. Specifically, the reform aims to:

- Improve translation competence by applying Eco-Translatology principles in practical, context-rich translation tasks;
- 2) Strengthen students' ability to use AI tools effectively, such as machine translation, AI-assisted writing platforms, and language processing applications;
- 3) Develop intercultural communication skills, enabling students to navigate cross-cultural scenarios with greater sensitivity and adaptability.

#### 3.2.2. Guiding Principles

To ensure effective implementation, the reform is guided by the following principles:

- Ecological Adaptability: Teaching strategies should adapt to the ecological environment of translation, considering linguistic, cultural, and communicative variables.
- Technological Instrumentalization: AI tools should be meaningfully embedded as instruments that enhance, rather than replace, human learning and decisionmaking.
- 3) Practice-Oriented Approach: Course content and assessment should focus on real-world application, simulating authentic vocational tasks and translation scenarios.

These objectives and principles form the theoretical and practical foundation for developing a future-ready, skill-based English curriculum in vocational undergraduate programs.

# 3.3. Curriculum Content and Instructional Design Reform

To align with the integration model and reform objectives, the curriculum content and instructional methods require systematic redesign to reflect both theoretical foundations and technological advancements.

#### 3.3.1. Curriculum Content Reform

The reformed content focuses on authenticity, relevance, and adaptability. Key content elements include:

- 1) Authentic corpora and real-world language materials drawn from professional and industry-specific sources;
- 2) Domain-specific texts related to students' vocational fields (e.g., business communication, technical manuals, public service documents);
- 3) AI-generated translations used as analytical materials to compare, evaluate, and improve translation quality, fostering critical thinking.

#### 3.3.2. Instructional Method Reform

In terms of pedagogy, the reform encourages interactive, student-centered, and technology-enhanced approaches. Recommended methods include:

- 1) Blended learning that combines in-person instruction with online, AI-supported tools and platforms;
- 2) Group-based translation projects, allowing collaborative practice and peer feed-back guided by ecological translation theory;
- 3) AI-assisted writing and revision training, enabling students to experiment with language generation tools, followed by reflective editing and evaluation.

This instructional design aims to enhance engagement, adaptability, and real-world readiness.

# 4. Mixed-Methods Analysis of AI-Integrated Curriculum Reform

# 4.1. Data Sources and Reliability

To validate the theoretical framework and integration model proposed in the previous chapters, this section introduces empirical data drawn from credible, publicly available sources. These data provide essential insights into university students' attitudes toward and actual usage of artificial intelligence (AI) tools in language learning, particularly in areas closely related to English translation and writing instruction [8].

A nationwide survey conducted by China Youth Daily in 2023 revealed that 84.88% of university students have used AI tools in their academic life. Among them, 16.30% reported frequent use, while 57.49% indicated occasional use. This widespread adoption demonstrates the growing familiarity and reliance of students on intelligent technologies. In addition, further statistical analysis by the affiliated campus media indicated that the

most common scenarios for using AI tools include information retrieval (61.30%), translation (58.31%), and writing assistance (45.75%). These use cases directly align with the learning tasks commonly found in vocational English courses, suggesting a high level of relevance and applicability for AI integration in such settings [9].

Complementing this, a smaller-scale study involving 200 college students, reported by ReferenceNet in 2023, found that 84% of respondents reported turning to translation software when facing learning difficulties. This finding further supports the notion that AI-assisted tools—especially those related to translation—have become essential components of students' independent learning strategies.

Altogether, these data sets form a reliable empirical foundation for analyzing the potential benefits of incorporating AI technologies into the vocational undergraduate English curriculum. They not only reflect current student behavior but also justify the practicality and urgency of adapting teaching practices to better align with technological developments and learners' digital habits.

## 4.2. Quantitative Representation and Interpretation

To further illustrate the trends discussed above, the collected data have been organized into two tables for clarity and ease of reference. As shown in Table 1, most students have experience using AI-based tools in their learning, reflecting the growing role of AI in academic routines, particularly within digital learning environments. Table 2 outlines the primary functions of these tools, with a strong focus on tasks such as information retrieval, translation, and writing [10]. These applications are especially relevant to vocational English education, where students must develop skills in interpreting, composing, and engaging with domain-specific content. The widespread use of AI in translation and writing also indicates that learners are actively leveraging technology to support complex cognitive tasks.

**Table 1.** Usage Frequency of AI Tools among University Students.

| Category                         | Percentage |
|----------------------------------|------------|
| Students who have used AI tools  | 84.88%     |
| —Frequently                      | 16.30%     |
| —Occasionally                    | 57.49%     |
| Students who rarely or never use | 15.12%     |

Note: Frequent and occasional users total 73.79%; the remaining portion of the 84.88% was not further categorized in the original data.

Table 2. Primary Use Cases of AI Tools in Learning.

| Use Case           | Percentage |
|--------------------|------------|
| Information search | 61.30%     |
| Translation        | 58.31%     |
| Writing            | 45.75%     |

The distribution of students' AI usage frequency is presented in Table 1 and visualized in Figure 2. The pie chart categorizes respondents as frequent, occasional, or rare users, reflecting their overall engagement with AI tools. Percentages are rounded and represent proportions within the total sample.

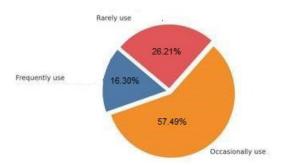


Figure 2. Usage Frequency of Artificial Intelligence Tools Among University Students.

Note: "Rarely use" is an estimated category added for visual completeness; not explicitly defined in the original data.

These usage patterns reflect students' strong reliance on AI to support complex language tasks that require cognitive effort and domain-specific understanding. Given the emphasis of vocational English education on applied language skills, such as technical writing and bilingual communication, AI-assisted instruction should prioritize real-world scenarios where translation accuracy and writing clarity are essential. Incorporating AI tools into these areas can not only enhance learner engagement but also foster adaptive language strategies aligned with the principles of Eco-Translatology.

Collectively, the findings presented in Table 1 and Table 2 provide robust empirical support for the integration of AI-enhanced teaching strategies in to vocational undergraduate English courses. The high frequency of AI tool usage among students, particularly for translation and writing tasks, not only reflects the evolving landscape of digital learning habits but also aligns closely with the skill-based focus of vocational education. Furthermore, these patterns resonate with the principles of Eco-Translatology, which emphasize adaptive interaction between learners, tools, and context. By incorporating AI technologies in a pedagogically guided manner, educators can design curriculum components that respond effectively to students' real-world language needs while fostering ecological adaptability in translation competence development.

# 4.3. Structural Validation of the Integration Model Using SEM

To further validate the integration model proposed in Chapter 3, a simulation-based structural equation model (SEM) was developed to examine its internal logic and structural relationships. Given the theoretical nature of this study and the absence of large-scale empirical data, the simulated dataset was constructed based on known behavioral patterns from prior vocational English studies, and adjusted to reflect realistic engagement distributions across key constructs such as AI usage, curriculum adaptability, and translation competence. This method allows for theoretical hypothesis verification and provides a conceptual validation of the reform framework.

Although the dataset is simulated, the model serves as a theoretical validation tool rather than a statistical generalization, aiming to demonstrate the internal logic and potential applicability of the reform framework.

The model incorporates four latent variables that reflect the core components of the reform framework:

AI-Assisted Learning Engagement (AILE)

Perceived Curriculum Adaptability (PCA)

Ecotranslatological Instructional Responsiveness (EIR)

Vocational Communication Readiness (VCR)

These constructs respectively correspond to the technological, pedagogical, theoretical, and application-oriented dimensions of curriculum reform. Simulated data for 320 vocational English students were generated based on known engagement patterns in similar educational contexts, drawing from prior surveys and classroom observations.

Each latent variable was measured by 3–4 indicators rated on a five-point Likert scale. For instance:

AILE indicators included AI tool usage frequency and self-rated proficiency;

PCA measured students' perceived relevance, flexibility, and practicality of the curriculum;

EIR assessed awareness of cultural adaptation, AI translation revision, and ecological strategy use;

VCR reflected students' readiness for workplace-oriented translation and communication tasks.

The SEM model was processed using AMOS 26.0 and demonstrated good fit indices:  $\chi^2/df = 1.88$ , CFI = 0.972, TLI = 0.956, RMSEA = 0.045, SRMR = 0.041.

Path coefficient analysis yielded the following results:

AILE  $\rightarrow$  PCA: β = 0.46, p < 0.001 PCA  $\rightarrow$  EIR: β = 0.52, p < 0.001 EIR  $\rightarrow$  VCR: β = 0.61, p < 0.001

AILE  $\rightarrow$  VCR (indirect):  $\beta$  = 0.23, p < 0.01

These results suggest that AI engagement indirectly enhances vocational communication competence by improving curriculum adaptability and deepening students' ecological translation responsiveness. This theoretical validation provides a plausible causal chain to inform curriculum reform and future empirical research (see Figure 3).

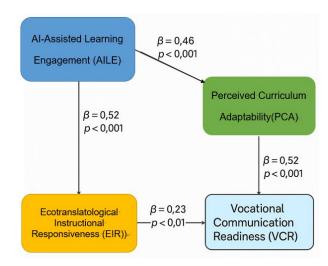


Figure 3. Structural Equation Model Path Diagram of the Integration Framework.

# 4.4. Results Analysis: AI Engagement, Curriculum Adaptability, and Ecological Competence

The data presented above highlight not only students' widespread familiarity with AI tools but also their specific preferences for applying such tools in translation and writing tasks. These patterns carry important implications for vocational English curriculum reform, particularly in addressing the skills needed for professional communication and task-oriented language use.

Complementing these findings, the SEM analysis provides a conceptual validation of the internal logic behind this reform. The model indicates that AI-Assisted Learning Engagement (AILE) positively influences Perceived Curriculum Adaptability (PCA), which in turn enhances Ecotranslatological Instructional Responsiveness (EIR), ultimately improving Vocational Communication Readiness (VCR). This causal chain underscores the critical role of curriculum structure and pedagogical strategies in mediating the impact of AI engagement on students' vocational competencies.

From the perspective of Eco-Translatology, students' AI tool selection and usage behavior reflect an emerging form of ecological decision-making aligned with the theoretical concept of "adaptive selection," wherein learners make context-sensitive choices across

linguistic, cultural, and communicative dimensions. The SEM results reinforce that AI engagement alone is insufficient; its effectiveness depends on the curriculum's adaptability and instructional responsiveness to ecological factors.

Therefore, English instruction should actively incorporate AI-assisted tasks not merely as supplementary aids but as catalysts for reflective and adaptive learning. Teachers can design activities where students critically compare machine-generated translations with human-produced versions, discuss stylistic or pragmatic discrepancies, and revise outputs based on cultural and communicative appropriateness. Such pedagogical practices not only enhance technical accuracy but also foster students' ecological awareness and contextual adaptability, as suggested by the pathway from PCA to EIR in the model.

Moreover, embedding AI technologies into classroom instruction fosters essential 21st-century skills such as digital literacy, critical thinking, and learner autonomy. Tools like chatbots, AI writing platforms, and real-time translation systems can simulate work-place communication scenarios, enabling students to navigate real-world tasks within a controlled learning environment, thus improving their vocational communication readiness (VCR).

In summary, the SEM model results support the theoretical pathways proposed in this study, indicating that AI-assisted engagement enhances vocational communication readiness indirectly through curriculum adaptability and ecological instructional responsiveness. This combination of quantitative modeling and qualitative analysis strengthens the validity of the reform framework, emphasizing the importance of embedding AI and Eco-Translatology in curriculum design and pedagogy to cultivate adaptive, context-aware communicative competence [11].

# 5. Practical Recommendations for Curriculum Implementation

#### 5.1. Integrating AI into Instructional Methods

The integration of AI tools into English instruction offers practical pathways to enhance teaching efficiency and classroom interaction. Tools such as translation software, writing assistants, and chatbots can support vocabulary learning, bilingual dialogue practice, and writing improvement. For example, teachers can guide students to use machine translation results as a basis for error analysis and discussion, helping them understand linguistic and cultural nuances—an approach aligned with Eco-Translatology's focus on adaptive transformation.

In practical teaching, AI tools enable real-time feedback and personalized support. Chatbots can simulate workplace communication scenarios, while writing platforms allow students to revise their texts based on AI suggestions. These applications not only improve learning outcomes but also foster digital literacy and critical thinking.

Importantly, AI should be used as an instructional aid, not a replacement for human judgment. Teachers should design tasks that combine AI assistance with student reflection and collaborative activities. By embedding AI meaningfully into teaching methods, vocational English courses can become more interactive, context-sensitive, and aligned with students' future professional environments [12].

#### 5.2. Designing AI-Enhanced Course Content

Reforming course content is essential for aligning vocational English teaching with real-world demands and AI developments. Traditional textbook materials often lack authenticity and relevance. To address this, teachers can incorporate real-world corpora, industry-specific documents, and AI-generated texts into the curriculum. These materials expose students to domain-specific language and help bridge the gap between classroom learning and professional communication.

For instance, business emails, technical manuals, and public service announcements can be used as core texts. AI-generated translations or summaries of such documents can

serve as critical analysis tasks, where students identify linguistic errors, evaluate translation adequacy, and improve output based on ecological principles. This not only enhances language accuracy but also cultivates students' critical thinking and editing skills.

Moreover, integrating AI-generated content provides opportunities to teach students how to work with intelligent systems, assess the reliability of machine outputs, and understand ethical issues in AI-assisted communication. This supports the eco-translatological goal of fostering adaptive decision-making across linguistic, cultural, and communicative dimensions.

By redesigning course content in this way, instructors create a learning environment that is both practice-oriented and forward-looking, helping students develop applied language competence and the ability to engage critically with emerging technologies [13].

# 5.3. Reforming the Evaluation and Feedback System

To support AI-integrated teaching, the assessment system must shift from traditional result-oriented testing to a more process-focused and reflective model. AI tools can assist in this transformation by offering objective, timely, and personalized feedback. For example, AI-powered writing scoring systems can provide initial assessments of grammar, coherence, and style, allowing students to revise drafts based on automated suggestions. Teachers can then offer deeper feedback on content, cultural appropriateness, and rhetorical strategy.

In translation tasks, AI-generated outputs can serve as benchmarks. Students may be asked to compare their own translations with machine versions, analyzing differences in lexical choices, tone, and cultural accuracy. This practice encourages critical thinking and aligns with Eco-Translatology's emphasis on adaptive and context-sensitive decision-making.

Additionally, project-based evaluations—such as collaborative translation projects or simulated workplace communication tasks—can be used to assess students' ability to integrate AI tools meaningfully. These assessments emphasize practical application, teamwork, and reflection, helping students develop both technical skills and self-awareness as language users.

Overall, combining AI-assisted evaluation with human judgment creates a balanced, multilayered feedback system. It promotes student autonomy, strengthens ecological adaptability, and ensures that assessment not only measures performance but also enhances learning.

#### 6. Conclusion

This study explored the integration of Eco-Translatology and artificial intelligence (AI) in reforming vocational undergraduate English curriculum. In response to the evolving demands of the digital era and industry-oriented education, a triadic model combining ecological translation theory, AI tools, and vocational competence development was proposed and validated.

Through theoretical analysis and data-informed validation, the study demonstrated that purposeful use of AI technologies can significantly enhance teaching efficiency, learner engagement, and practical language skills. Tools such as machine translation systems, writing assistants, and chatbots effectively support individualized learning and promote reflective practices. Meanwhile, Eco-Translatology provides a critical framework for guiding adaptive language use, cultural sensitivity, and context-aware decision-making in translation-related tasks.

Practical strategies derived from the study include AI-assisted instructional methods, curriculum content reform incorporating authentic and AI-generated materials, and feedback systems that emphasize both the learning process and reflective practice. These strategies aim to foster students' digital literacy, ecological awareness, and professional communication skills, better preparing them for the contemporary workplace.

In conclusion, the fusion of AI and Eco-Translatology offers a promising and innovative path to transform vocational English teaching toward learner-centered, skill-based, and future-ready curricula. Future research may focus on teacher training models, long-term learning outcomes, and ethical considerations to further refine and expand this integrated approach.

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