Article

New Developments in English Teaching and Translation Methods in the Converged Media Environment: An AI-Based Analysis

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Abstract: The rapid evolution of converged media has fundamentally transformed modes of information dissemination, presenting new opportunities and challenges for English teaching and translation methods. Concurrently, the rapid advancement of artificial intelligence (AI) technologies offers robust technical support for language education and translation practices. This study investigates the applications and innovations of AI in English teaching and translation within the context of converged media, with a focus on its role and potential in optimizing teaching methodologies, enhancing translation efficiency, and facilitating cross-cultural communication. By employing literature analysis and case studies, this paper summarizes practical models of AI technology in English education and translation and proposes strategies tailored to the characteristics of converged media. These findings aim to provide valuable insights for future research and practice in related fields.

Keywords: Converged media environment; English teaching; translation methods; artificial intelligence (AI); language education innovation

1. Introduction

1.1. Definition and Characteristics of the Converged Media Environment

Converged media refers to the deep integration of traditional and emerging media, enabled by technologies such as big data, cloud computing, and artificial intelligence, resulting in diversified and synergistic modes of information dissemination [1]. Its core features include diversified channels, digitalized content, and interactive modes of communication. In education, converged media extensively employs multimodal resources such as audio, video, text, and virtual reality, offering enriched media support for pedagogical activities [2].

In English teaching, its application has reshaped traditional classroom models by making educational resources more engaging and interactive. For example, live-streamed classes on educational platforms enable real-time learning across regions, while short-video platforms offer fragmented learning opportunities for language acquisition [3]. However, while enhancing the diversity of teaching resources, converged media also introduces challenges for educators, such as maintaining content quality and ensuring active student participation.

The multimodal characteristics of converged media align closely with the needs of language education. In English teaching, the integrated use of audio, visuals, and text can significantly enhance the efficiency of language input and output [4]. Additionally, converged media promotes learner-centered educational practices, empowering students to choose their learning content and pace. Exploring English teaching models within the converged media environment thus not only aligns with technological advancements but also better fulfills learners' needs.

1.2. Development of AI Technologies and Their Educational Applications

The application of AI technologies in education has evolved from experimental to mature stages, encompassing intelligent assessment, personalized learning pathways, and automated teaching support [5]. Core AI technologies include natural language processing (NLP), machine learning, and computer vision.

In English education, AI addresses several key challenges of traditional teaching. For instance, NLP-powered speech assessment systems analyze students' pronunciation accuracy and prosody in real-time, providing immediate feedback [6]. Personalized learning systems analyze students' learning data to recommend resources suited to their levels, enhancing efficiency. In translation, AI technologies such as neural machine translation (NMT) leverage deep learning algorithms to deliver higher-quality translations, revolutionizing translators' workflows while offering convenient tools for students to practice translation.

With the proliferation of converged media technologies, the integration of AI and education is becoming more seamless. This trend enables a shift from traditional "teacher-centered models" to "learner-centered approaches", while compelling education researchers to explore the profound impacts of AI on instructional content, formats, and assessments.

1.3. Research Objectives and Questions

This study aims to explore the innovative influence of AI technologies on English teaching and translation methods within the converged media environment, focusing on their roles in optimizing teaching resources, transforming learning approaches, and improving translation efficiency. Specific objectives include:

(1) Investigating the optimization of English teaching through AI and converged media.

(2) Analyzing the advantages and limitations of AI-driven translation technologies.

(3) Developing new paradigms for human-machine collaboration in teaching and translation.

The study addresses the following core research questions:

(1) How do converged media and AI optimize resources, pathways, and interactions in English teaching?

(2) What are the advantages and limitations of AI-driven translation technologies in practical applications?

(3) How can human-machine collaboration foster innovation and development in English teaching and translation?

1.4. Significance of the Study

Through theoretical analysis and case studies, this study explores the impacts of converged media and AI on English teaching and translation, uncovering the mechanisms of AI-enabled education and offering scientific recommendations for future educational practices.

1.4.1. Theoretical Significance

This research addresses gaps in the application of AI and converged media in English teaching and translation studies. It extends multimodal and personalized learning theories into the new media era, offering a theoretical framework for the integration of technology and language education. In translation, the study examines the mechanisms of NMT and human collaboration, proposing a theoretical model for human-machine co-translation. These insights enrich the scope of language education and translation studies while providing a theoretical foundation for future technology-driven language research.

1.4.2. Practical Significance

From a practical perspective, this study contributes in three key areas:

(1) Enhancing efficiency in teaching and translation: By summarizing applications of converged media and AI, it offers actionable guidance for educators designing efficient and personalized teaching models. AI-driven translation tools, particularly in high-volume scenarios, also promise significant efficiency gains.

(2) Innovating skills for teaching and translation: The study proposes strategies for skill development in using AI-assisted tools, helping educators and translators adapt to technological changes effectively.

(3) Optimizing human-machine collaboration: By introducing collaborative models, the study offers balanced approaches to leverage technology while retaining human agency in complex tasks.

1.4.3. Social Significance

This research aligns with globalization and informatization trends, yielding broad societal benefits:

(1) Promoting equitable language education: By leveraging AI technologies, the study provides solutions for resource-scarce regions, such as online education platforms and real-time translation tools, reducing educational disparities.

(2) Enhancing international communication and cultural dissemination: The proposed strategies improve language service quality, supporting cultural exchange and cooperation in a globalized context.

(3) Advancing the integration of technology and education: The findings offer a model for interdisciplinary applications of intelligent technologies, contributing to the broader progress of educational informatization and technological innovation.

2. Literature Review

2.1. Current Research on English Teaching and Translation in the Converged Media Era

In recent years, the application of converged media in education has been increasing, prompting scholars to explore its potential and challenges in English teaching and translation. Converged media technologies have injected new vitality into traditional teaching, with their multimodal characteristics helping to enrich teaching resources and enhance student engagement [7]. For instance, interactive teaching via converged media platforms has been shown to improve student performance in both language input and output.

In the field of translation, the converged media environment has provided multifaceted resources to support translation practice and teaching. The rise of multimodal translation tools allows translators to complete complex tasks more efficiently [8]. However, some studies also highlight challenges, such as the high demands on teachers' digital literacy and students' ability to filter information, as well as issues related to assessing learning outcomes and the high technical threshold required.

2.2. Current Applications of Artificial Intelligence in Language Education and Translation

The use of artificial intelligence (AI) in language education and translation has shifted from experimental research to widespread practical application. Recently, researchers have focused on how AI technologies can optimize the teaching and translation processes. A typical application of AI in English education is natural language processing (NLP), where intelligent writing assistance systems and language practice tools can analyze students' language errors in real-time, offering personalized suggestions for improvement [9]. Studies indicate that these tools significantly enhance students' learning efficiency and language accuracy.

In translation, deep learning-based Neural Machine Translation (NMT) has become a central focus in both academic and practical contexts. Research has shown that, compared to traditional statistical-based translation systems, NMT provides translation quality closer to human-level performance, particularly in terms of contextual relevance and semantic accuracy [10]. The rapid development of platforms such as Google Translate and DeepL has enabled language learners and practitioners to complete translation tasks more efficiently. However, some scholars argue that current AI translation tools still face limitations, particularly in understanding cultural contexts and handling creative translations [11], providing direction for research on

human-machine collaboration in translation teaching.

Additionally, the role of AI in supporting translation education has been widely discussed. For example, AI-based assessment systems enable teachers to quickly diagnose students' translation errors, providing a basis for personalized guidance. These studies demonstrate the immense potential of AI to innovate language education and translation methodologies.

2.3. Key Issues and Research Gaps

Despite the many advantages of integrating converged media and AI in English teaching and translation, current research still has notable shortcomings.

Firstly, from a technological perspective, existing AI-assisted tools are primarily focused on standardized language learning and translation tasks, with limited support for complex, open-ended tasks. For instance, AI tools' ability to dynamically understand pragmatic meaning in cross-cultural communication is still limited, restricting their application in higher-level translation tasks.

Secondly, from an educational perspective, the integration of AI and converged media technologies has not yet fully realized its potential in practical teaching. Some scholars note that educators face challenges such as high costs of technology, poor platform compatibility, and differences in how teachers and students accept technology, resulting in significant variability in the effectiveness of technology integration in actual teaching.

Finally, from a research perspective, most studies on the integration of AI and converged media in language education are case studies, lacking systematic theoretical frameworks. Additionally, research on ethical issues raised by AI technologies, such as student data privacy and algorithmic bias, is still in its early stages. This study seeks to address these gaps by providing concrete solutions based on systematic theoretical analysis.

3. The Impact of the Integration of Converged Media and Artificial Intelligence on English Teaching

3.1. Design and Development of Multimodal Teaching Resources

The converged media environment offers multimodal teaching resources for English education, such as integrated learning materials combining text, audio, video, and virtual reality (VR). These resources cater to students' diverse sensory learning needs, significantly enhancing their interest in and effectiveness in language learning.

The design of multimodal resources based on AI primarily relies on the following technologies: First, speech recognition technology enables real-time transcription of listening materials, providing students with immediate text-based support. Second, image recognition technology combines static images and dynamic videos, creating more intuitive, contextual learning environments for vocabulary acquisition. Third, personalized recommendation algorithms based on data mining suggest tailored learning resources based on students' learning history and interests. For example, some educational platforms use AI-driven dynamic teaching materials, where students not only learn the language by watching dialogue videos but also understand cultural expressions within specific contexts. This type of learning has been shown to effectively improve students' ability to apply language in real-world contexts.

However, the design and development of multimodal resources must strike a balance between academic rigor and technical operability. If the resource design is overly complex or the technical threshold too high, it may actually reduce students' learning efficiency. Therefore, it is crucial to ensure that multimodal resources are accessible and aligned with the learning objectives.

3.2. Building Personalized Learning Paths

In the context of the integration of converged media and AI, the development of personalized learning paths has become a focal point in English education. Personalized learning emphasizes creating customized learning plans and resource distribution based on students' abilities, interests, and learning goals. AI technology tracks students' learning behaviors and dynamically adjusts the learning process. Specifically, AI-based personalized learning paths typically involve the following steps: First, a diagnostic analysis of students' starting points,

using intelligent assessment systems to measure their current language proficiency; second, setting personalized goals based on students' short- and long-term learning needs; and third, dynamic feedback and path optimization, continuously adjusting learning paths based on real-time monitoring of students' progress.

Research indicates that personalized learning paths significantly enhance learning outcomes. For instance, some AI educational platforms recommend personalized grammar training materials and adjust the difficulty of exercises in real time. This adaptive learning mechanism significantly improves students' mastery of language knowledge. Moreover, converged media platforms, by integrating diverse learning resources, make personalized learning paths more flexible and engaging. However, building personalized learning paths also faces challenges, such as privacy concerns related to data collection and the need to balance the complexity of learning paths with students' ability to process them. These issues need to be addressed through a combination of technological optimization and instructional design.

3.3. AI Support in Teaching Interactions

In English teaching, teacher-student interaction is a crucial element in enhancing learning outcomes. The integration of converged media and AI offers new possibilities for teaching interactions. Through AI technology, teacher-student interaction extends beyond the classroom and can occur in real-time, intelligent exchanges via online platforms.

AI-supported teaching interactions manifest in three key areas: First, real-time language diagnosis, where speech analysis tools allow teachers to quickly identify students' pronunciation or grammar errors and provide feedback. Second, the use of virtual teaching assistants, where intelligent bots can provide instant answers to student questions or simulate interactive scenarios in the absence of a teacher. Third, data-driven teaching decision support, where AI analyzes students' learning records and engagement levels to help teachers optimize teaching content and formats. For example, AI interactive tools assist in English listening and speaking lessons, providing students with more frequent and personalized feedback compared to traditional classroom settings. This not only improves students' language skills but also enhances their motivation to learn.

However, the intelligentization of teaching interactions also presents potential risks. Over-reliance on AI may weaken students' independent learning abilities and even affect emotional connections between teachers and students. Therefore, AI support should be viewed as a supplement to teaching interactions, rather than a complete substitute.

Based on the above discussion, a model of the impact of converged media and AI integration on English teaching is shown in Figure 1.
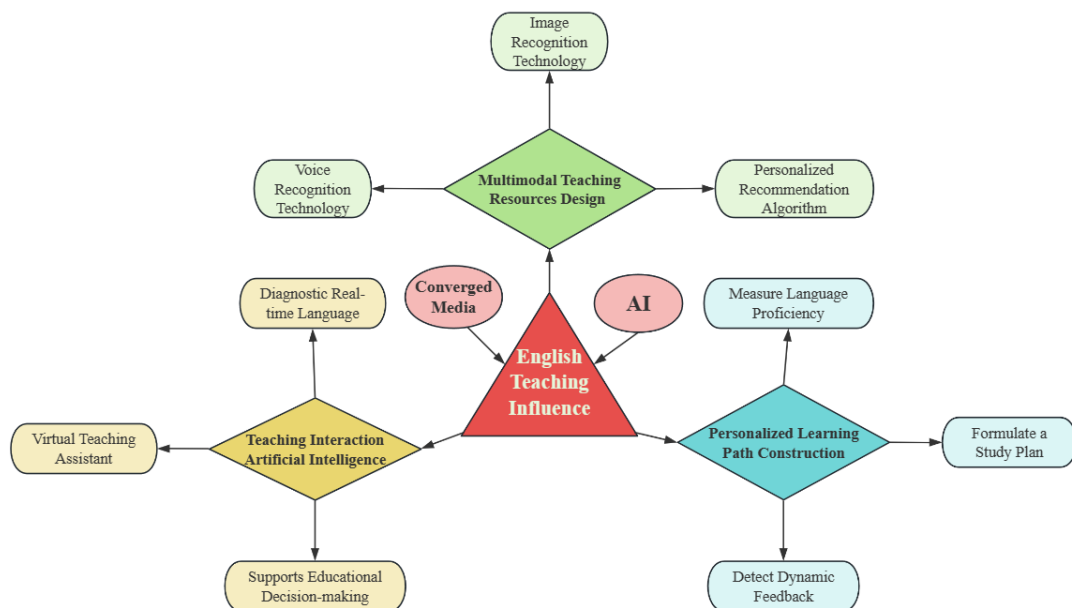
Figure 1. Impacts of Media Convergence and AI Integration on English Teaching Influence.

4. Revolutionizing Translation Approaches with AI

4.1. Principles and Applications of Intelligent Translation Technologies

AI-driven translation primarily relies on neural network models in deep learning, especially Neural Machine Translation (NMT). NMT employs an encoder-decoder structure to convert source language into target language, showcasing strong contextual understanding and semantic fluency. Compared to traditional rule-based and statistical translation systems, NMT approximates human translation levels, particularly excelling in long sentence translation and semantic consistency.

Currently, NMT is widely integrated into translation platforms such as Google Translate, DeepL, and Microsoft Translator. These tools utilize large-scale corpora to train models capable of handling multilingual translation demands. Furthermore, advancements like the Transformer architecture and pre-trained language models (e.g., BERT, GPT) enhance contextual understanding and translation quality. For instance, DeepL has earned recognition for producing more natural translations between complex language pairs.

However, intelligent translation technologies face limitations. While NMT performs well on general texts, it struggles with culturally sensitive literary works or jargon-heavy technical documents. Additionally, model training depends on high-quality, extensive corpora, limiting translation quality for less-common languages. Future research should focus on optimizing translation algorithms and exploring human-machine collaboration to address these shortcomings.

4.2. Case Studies on Enhancing Translation Quality and Efficiency with AI

Case studies provide empirical evidence for AI's ability to improve translation quality and efficiency. For instance, NMT shows distinct advantages in literary and commercial translation.

In literary translation, AI is used for initial text drafts, with translators refining and contextualizing the output. Some publishers adopt NMT for large-scale text pre-translation, significantly reducing translation cycles while preserving translators' control over stylistic nuances. Studies reveal that AI-assisted tools improve translator productivity by over 30%.

In commercial settings, AI excels in multilingual customer support. Large corporations deploy AI translation tools for real-time customer service, enabling users to communicate in their native languages. This approach not only boosts customer satisfaction but also reduces translation costs.

However, AI-generated mistranslations in certain contexts, such as medical documents, highlight the necessity of quality assurance processes. For example, misinterpreting terms in medical translations can lead to severe consequences. Expanding corpora and domain-specific model training can further enhance AI's accuracy.

4.3. Collaborative Models Between Machine and Human Translation

Collaborative translation models between machines and humans have become a significant trend, combining the strengths of both approaches to improve translation efficiency and quality.

These collaborative models typically take three forms:

(1) Human-Aided Machine Translation (HAMT): Translators edit machine-generated drafts to ensure semantic accuracy and grammatical fluency.

(2) Machine-Aided Human Translation (MAHT): Translators leverage terminology databases, memory tools, and real-time suggestions to enhance efficiency.

(3) Interactive Machine Translation (IMT): Translators and machines collaborate dynamically, adjusting translations in real time based on context.

For instance, HAMT is widely used in legal document translation. Machine-generated drafts save significant time, while translators focus on terminology and style revisions to ensure compliance. Studies indicate that such collaboration reduces translation time by over 50% compared to manual translation, without compromising quality.

Despite its advantages, successful implementation depends on translators' technical skills and familiarity with AI tools. Over-reliance on machine translation may also lead to skill degradation. Thus, promoting

collaborative models requires balancing technology optimization with skill development.

Based on the discussion, the impact of integrating AI and media convergence on translation methods are illustrated (Figure 2).
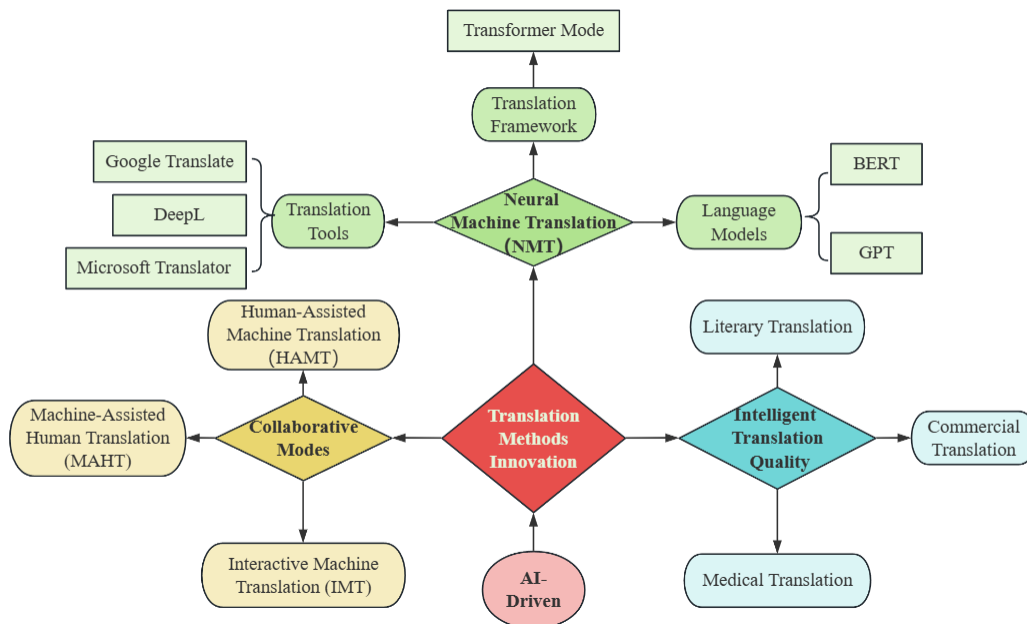
Figure 2. Impacts of Media Convergence and AI Integration on Translation Methods Innovation.

5. Recommendations for AI-Based English Teaching and Translation Strategies

5.1. Establishing Multidimensional Evaluation Mechanisms

In AI-assisted teaching and translation, traditional single-dimensional evaluation models are inadequate for complex tasks. Developing a multidimensional evaluation mechanism is crucial to comprehensively assess students' language proficiency and translation skills.

Such mechanisms include formative and summative evaluations. Formative evaluation uses AI to analyze learning behaviors, such as assignment completion and interaction frequency, providing teachers with dynamic insights for timely pedagogical adjustments. Summative evaluation combines human and AI assessments; for example, AI systems objectively analyze grammar, vocabulary usage, and textual structures, while teachers supplement subjective evaluations to ensure holistic assessment.

In translation teaching, dynamic evaluation leverages corpus comparison techniques. Translation memory (TM) systems compare student translations with standard references, automatically generating error analysis reports to guide improvement.

Studies show that multidimensional evaluation enhances feedback timeliness and specificity, avoiding biases inherent in single-dimensional assessments. However, its implementation demands teachers' data analysis proficiency and transparent, interpretable evaluation standards. Future efforts should prioritize developing user-friendly evaluation tools and teacher training programs.

5.2. Skills Development in Media-Converged Teaching and Translation

The dual drivers of media convergence and AI necessitate integrating digital elements into teaching and translation skills development. Teaching should focus on designing multimodal resources, such as audio, video, and images, to create immersive learning environments. Research indicates that such multisensory approaches significantly improve student engagement and memory retention.

Translation skill development should emphasize training in AI tool usage. Students need to master NMT platforms, understand terminology databases, and refine outputs collaboratively. Emerging skills, such as subtitle translation and interactive document translation, should also be incorporated.

Research highlights the importance of balancing tool reliance and independent problem-solving. Excessive dependence on AI tools may weaken critical thinking skills. Teachers should encourage students to think critically while using tools, ensuring competitiveness amidst technological changes.

### 5.3. Constructing Human-Machine Collaborative Paradigms

Human-machine collaboration is becoming a new paradigm in English teaching and translation, emphasizing complementary strengths among teachers, learners, and AI systems.

In teaching, collaboration focuses on rational task division between teachers and AI tools. AI systems handle repetitive tasks like grading and personalized resource recommendations, alleviating teachers' workload. Teachers concentrate on curriculum design, emotional support, and developing higher-order thinking. For example, intelligent classroom management systems enable teachers to adjust pacing based on real-time student feedback, maximizing personalized learning.

In translation, human-machine collaboration combines machine translation efficiency with human precision. In real-time conference subtitling, AI generates preliminary drafts while translators refine them for accuracy and cultural relevance. AI also supports terminology management and translation memory building, enhancing project efficiency.

Challenges to implementing this paradigm include technology accessibility and the technical proficiency of teachers and translators. Over-reliance on AI may lead to dehumanization in education and translation. Continuous training and technological advancements are needed to improve the scientific and practical aspects of collaboration, aligning with educational and translation goals.

Based on the above discussion, the impact of media convergence and AI integration and translation strategies are interpreted (Figure 3).
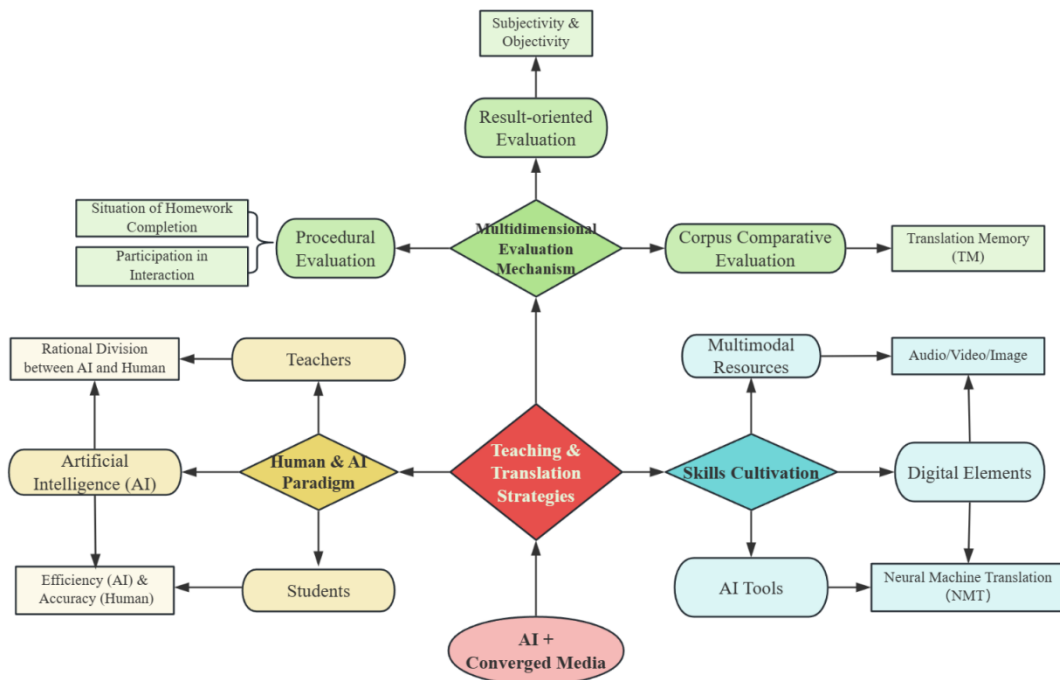
Figure 3. Impacts of Media Convergence and AI Integration on Teaching and Translation Strategies.

6. Conclusion and Future Directions

6.1. Key Findings

This study examines the influence of media convergence and AI technologies on English teaching and translation, yielding the following conclusions:

(1) The integration of media convergence and AI significantly enriches teaching resources and enhances translation efficiency.

(2) Intelligent translation technologies improve translation quality but still require human intervention in cultural and creative contexts.

(3) Human-machine collaboration provides a pathway for paradigm shifts in teaching and translation, optimizing outcomes through complementary strengths.

Despite these advancements, challenges such as technical costs, skill training, and ethical concerns remain. Striking a balance between innovation and practice is essential to ensure accessibility and sustainability.

6.2. Suggestions for Future Research

Future research should:

(1) Explore applications of media convergence and AI in complex linguistic contexts, such as pragmatic functions in cross-cultural communication.

(2) Develop systematic evaluation frameworks to assess long-term effects of multimodal teaching and intelligent translation.

(3) Address ethical issues related to AI, including privacy, algorithm fairness, and role shifts among teachers and students.

(4) Focus on supporting less-commonly spoken languages in education and translation to enhance inclusivity.

Technological development should prioritize usability and user experience, especially for non-technical users. By combining theoretical exploration and practical application, AI and media convergence can further revolutionize language education and translation, fostering global collaboration and cultural exchange.

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The authors declare no conflict of interest.

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