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Role of AI-Driven Personalization in Enhancing English Language Achievement among Vocational College Students in China

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Abstract: *This research examines the impact of AI-driven personalisation on improving English language proficiency among vocational college students in China. This research examines the impact of three independent variables—degree of AI personalisation, frequency of AI engagement, and nature of AI-assisted activities—on the dependent variable: English language achievement. A mixed-methods approach was utilised, integrating quantitative analysis of student performance data with qualitative insights derived from participant interviews. The results indicate that increased AI personalisation and regular engagement with customised activities markedly enhance language competency, especially in vocabulary development and listening comprehension. The nature of AI-assisted activities, including interactive exercises and feedback-driven assessments, is essential for motivating students and enhancing skill development. These findings highlight the capability of AI-driven educational technologies to meet individual learning requirements and enhance English language proficiency in vocational education settings*

Keywords: AI Personalization, English Language Achievement, Vocational Education, AI-Assisted Activities, Frequency of Interaction

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1. Introduction

The swift advancement of artificial intelligence (AI) has instigated significant alterations in the educational sector, facilitating more individualised, efficient, and captivating learning experiences. In recent years, AI-driven tools have been progressively included into language instruction, providing customised assistance to learners and accommodating individual variations in learning requirements. This is especially pertinent in vocational education, as students frequently encounter distinct barriers in acquiring English as a second language due to restricted exposure, differing competence levels, and various career-related incentives. In China, where English is an essential part of the curriculum and a vital ability for professional progression, utilising AI to improve language proficiency among vocational college students has emerged as a topic of increasing interest. Nonetheless, the promise of AI-driven personalisation in this context remains inadequately examined, especially regarding its efficacy in enhancing specific language skills and accommodating the varied learning environments of vocational education (Bhutoria, 2022).

This study is grounded on the convergence of three significant trends: the heightened focus on English proficiency within China's vocational education system, the escalating integration of AI technology in education, and the rising need for personalised learning methodologies. Conventional language education in vocational colleges frequently fails to address the requirements of students with varied academic and professional experiences. Excessive class sizes, insufficient teaching resources, and a uniform curriculum impede educators' capacity to deliver individualised attention. This has resulted in an increasing interest in AI-powered educational technologies that can assess individual learner data and tailor lessons accordingly. These tools provide chances to customise learning experiences according to students' skill levels, learning speeds, and particular obstacles, hence improving engagement and results. Notwithstanding these possibilities, there is limited knowledge regarding the impact of AI personalisation on English language proficiency in vocational contexts, resulting in a notable deficiency in the literature.

This gap is exacerbated by the insufficient comprehension of the mechanisms by which various aspects of AI-driven personalisation influence learning results. Although current research has underscored the overall advantages of AI in education, limited studies have rigorously investigated the influence of elements such as personalisation degree, interaction frequency with AI tools, and the nature of activities offered by AI systems. Each of these factors may independently and interactively affect students' language acquisition processes, however their precise contributions remain ambiguous (Wei, 2023). Furthermore, the distinct attributes of vocational students, such as their career-oriented objectives and pragmatic language necessities, necessitate a more detailed examination of how AI-driven personalisation might be refined to meet these demands.

This study seeks to examine the impact of AI-driven personalisation on improving English language proficiency among vocational college students in China. This research aims to offer empirical insights into the efficacy of AI technologies in vocational language education by analysing the relationship among AI personalisation levels, interaction frequency, and types of AI-assisted activities. This study's findings will enhance theoretical comprehension of AI-driven personalisation and provide practical insights for educators, policymakers, and developers aiming to advance language instruction through novel technology.

2. Literature Review

Underlying Theory: Constructivism Theory

This study is based on constructivism theory, which highlights the active participation of learners in knowledge construction through interaction with their environment and meaningful engagement in the learning process. Constructivism, rooted in the theories of Jean Piaget and Lev Vygotsky, asserts that learning is an active and dynamic process, wherein individuals construct their understanding by integrating new information with their existing knowledge and experiences. This viewpoint is especially pertinent in language acquisition, where the development of new linguistic abilities necessitates active practice, contextual application, and continual refinement of comprehension (Hao et al., 2024).

In constructivist theory, the student occupies the central position in the educational experience, while the teacher's function transitions from a knowledge transmitter to a learning facilitator. This model strongly corresponds with the functionalities of AI-driven personalisation, which tailors educational content and activities to the requirements, preferences, and advancement of each student (Luo & Hsiao-Chin, 2023). AI systems exemplify the constructivist notion of

scaffolding by delivering customised assignments and immediate feedback, hence supplying support that diminishes as learners gain proficiency. This strategy empowers students to assume responsibility for their learning, fostering autonomy, motivation, and enhanced engagement with the content.

A fundamental element of constructivism is the significance of social contact and collaboration in learning, as shown by Vygotsky's notion of the Zone of Proximal Development (ZPD). The ZPD denotes the spectrum of tasks that learners can perform with assistance but cannot yet execute autonomously (Yekollu et al., 2024). AI-driven solutions can serve as a virtual guide within the ZPD, offering real-time assistance and tailored interventions that facilitate learners in reaching their potential. AI-driven language platforms frequently incorporate interactive components, such as conversational agents or collaborative tasks, which replicate the social aspects of learning and promote the enhancement of communicative proficiency. These tools facilitate genuine language application and proactive problem-solving, aligning with the constructivist focus on contextual learning.

Moreover, constructivism emphasises the significance of feedback in the learning process. Constructive feedback allows learners to assess their progress, recognise areas for enhancement, and optimise their methods for success (Cheng & Liang, 2023). AI systems are proficient in providing prompt, precise, and personalised feedback, including rectifying grammatical inaccuracies, proposing alternative expressions, and monitoring performance patterns over time. This cyclical feedback loop reinforces the constructivist perspective that learning involves trial and error, with mistakes regarded as chances for growth instead of failures.

The implementation of constructivist ideas in AI-enhanced language instruction is especially relevant for vocational college students, who frequently necessitate practical, career-focused language competencies (Yang & Weng, 2023). Constructivism emphasises real-world applicability and contextualised learning, which corresponds with the vocational education framework that encourages students to cultivate abilities directly applicable to their future careers. AI-driven technologies can replicate genuine scenarios, like professional encounters or industry-specific communication tasks, enabling students to develop knowledge in a significant and practical context.

This study, rooted in constructivism theory, emphasises the necessity of creating AI-driven language learning interventions that actively involve students, offer tailored support, and promote significant interactions. The amalgamation of AI technologies with constructivist principles presents a robust strategy for meeting the varied needs of vocational college students and improving their English language proficiency. This theoretical foundation offers a comprehensive framework for examining the relationship between AI-driven personalisation and learning outcomes, enhancing the understanding of technology's potential to improve language instruction in occupational contexts (Shi et al., 2023).

Independent Variables and Dependent Variable

This study examines the impact of AI-driven personalisation on English language proficiency among vocational college students, concentrating on three primary independent variables: the degree of AI personalisation, the frequency of AI engagement, and the nature of AI-assisted activities (Zhang et al., 2024). These factors are essential for comprehending how particular characteristics of AI technology affect the dependent variable, English language achievement.

An exhaustive examination of these variables underscores their importance and interrelations, along with their capacity to influence learning outcomes in vocational education environments.

The degree of AI personalisation indicates how effectively AI tools customise learning experiences to address the specific demands of individual learners. Personalisation can vary from fundamental modifications, such as suggesting resources based on overall proficiency levels, to highly tailored treatments that target individual linguistic deficiencies, learning preferences, and rates of advancement. Advanced AI systems utilise algorithms to assess student data and deliver personalised recommendations for vocabulary enhancement, grammar exercises, and reading resources. Enhanced personalisation is thought to promote learner engagement and motivation by rendering the educational experience more pertinent and attainable. The capacity of AI to tailor information to the distinct contexts of vocational students, who frequently possess varied objectives and learning requirements, is particularly advantageous. Customised AI solutions can address deficiencies in past knowledge, accommodate diverse levels of English ability, and offer specialised assistance that is frequently lacking in conventional classroom environments (Ou, 2024).

The frequency of AI contact quantifies the extent to which students utilise AI-driven tools in their educational activities. Regular engagement with AI systems is believed to facilitate language acquisition by reinforcing learning via repetition, ongoing practice, and prompt feedback. Consistent involvement enables learners to cultivate regularity in their studies, which is essential for studying a second language (Yu et al., 2024). Moreover, regular interactions facilitate the internalisation of language structures, enhance fluency, and foster confidence in communication abilities among learners. In occupational environments, where students may have restricted exposure to English beyond the classroom, AI systems can function as auxiliary resources that facilitate ongoing and immersion language practice. Nonetheless, it is crucial to evaluate the quality of these encounters, since just augmenting frequency without substantive involvement may not result in considerable advancements in language proficiency.

AI-assisted activities denote the particular tasks and features offered by AI tools, including interactive exercises, simulations, quizzes, and feedback systems. Diverse activities can exert differing effects on language acquisition based on their congruence with educational objectives and learner inclinations. Activities that replicate real-world circumstances, such as professional dialogues or industry-specific assignments, can assist vocational students in cultivating practical language skills pertinent to their careers. Conversely, gamified activities and adaptive assessments may improve learner motivation and retention by rendering the educational experience fun and stimulating (Khrapatyi et al., 2024). AI tools' adaptability in providing various exercises allows learners to investigate numerous aspects of language acquisition, encompassing vocabulary, grammar, listening, speaking, reading, and writing. The examination of this variable yields insights into the activities that most effectively enhance English language proficiency in vocational settings.

The dependent variable, English language achievement, quantifies learners' advancement in acquiring and utilising English language skills. This variable includes multiple aspects of linguistic ability, such as accuracy, fluency, understanding, and communicative competence. In the context of vocational education, English language achievement is generally measured based on the learners' ability to perform tasks relevant to their professional objectives, such as drafting emails, conducting presentations, or engaging in workplace discussions. Enhancements in language proficiency can be evidenced by standardised test scores, classroom performance, or practical applications in both simulated and real-world contexts. This variable

functions as a vital result metric for assessing the efficacy of AI-driven personalisation and its related attributes (Ali et al., 2024).

The interaction between independent variables and the dependent variable is crucial for comprehending the effects of AI-driven personalisation on language learning results. The degree of personalisation affects the pertinence and availability of educational material, whilst the frequency of connection dictates the regularity and profundity of involvement (Loang, 2024a). The exercises offered by AI technologies influence learners' experiences and promote the enhancement of particular language abilities. Collectively, these elements influence disparities in English language proficiency, offering a thorough framework for examining the impact of AI on improving vocational students' language acquisition experiences. This work aims to derive insights from these variables to enhance the design and execution of effective AI-driven interventions in language teaching.

3. Conceptual Framework

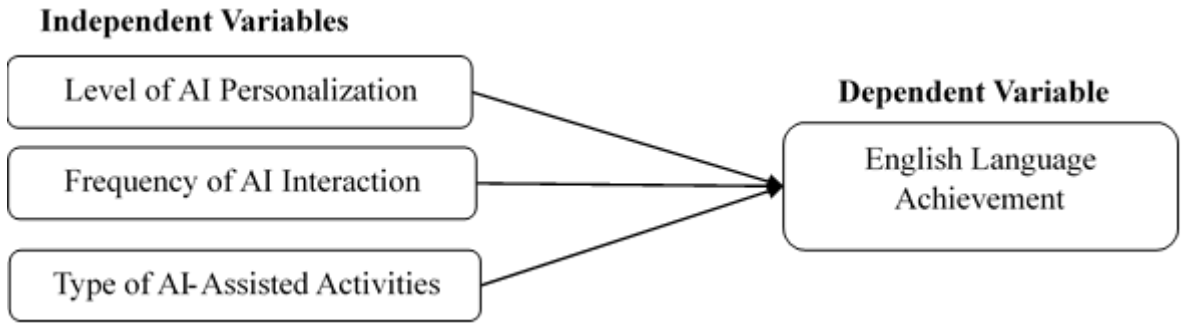

Figure 1: Conceptual Framework

This study's conceptual framework aims to examine the impact of AI-driven personalisation on improving English language proficiency among vocational college students. It emphasises the correlation among three independent variables—degree of AI personalisation, frequency of AI engagement, and category of AI-assisted tasks—and the dependent variable, English language proficiency (Suresh & Loang, 2024). This approach establishes the basis for comprehending how particular characteristics and interactions within AI-enhanced educational technologies affect learning outcomes in vocational education.

The independent variables denote the fundamental aspects of AI-driven personalisation believed to influence English language proficiency. The extent of AI personalisation denotes the degree to which AI tools customise information, feedback, and exercises to meet the specific requirements of individual learners. Enhanced personalisation necessitates comprehensive evaluations of learners' skills, weaknesses, preferences, and progress, allowing AI systems to deliver tailored learning trajectories and resources (Loang, 2024b). This variable is essential for meeting the varied demands of vocational college students, who frequently necessitate personalised assistance to close proficiency gaps and achieve targeted career-related language objectives. Personalisation is anticipated to improve engagement, motivation, and learning efficacy by rendering the educational experience more pertinent and accessible.

The frequency of AI contact pertains to the regularity with which students utilise AI-driven tools in their educational endeavours. Regular engagement is believed to enhance language acquisition via repeated exposure, continual practice, and prompt feedback. Vocational students, who may have restricted opportunity to practise English beyond the classroom,

benefit significantly from regular interaction with AI systems as a means of ongoing learning (Loang, 2023). This variable also encompasses the continuous effort and time dedication required for achieving proficiency in a second language. Nonetheless, the calibre of interactions is equally crucial, as frequent yet superficial participation may not result in substantial enhancements in language proficiency.

This category of AI-assisted activities examines the particular tasks and capabilities provided by AI tools and their influence on the development of learning experiences. AI systems can offer a diverse array of activities, including vocabulary drills, grammar lessons, interactive simulations, and assignments based on real-world scenarios. Each activity type addresses distinct facets of language acquisition, including comprehension, fluency, and communicative competence (Loang & Ahmad, 2022). Vocational students find activities that replicate workplace interactions or industry-specific scenarios especially beneficial, as they correspond with practical language requirements and professional objectives. This variable highlights the adaptability of AI in generating diverse and significant learning opportunities that address the distinct needs of vocational education.

The dependent variable, English language achievement, signifies the quantifiable results of the educational process. It includes enhancements in linguistic competence across essential areas, such as hearing, speaking, reading, writing, grammar, and vocabulary. In vocational environments, language proficiency is frequently assessed based on practical applications, including the capacity to communicate effectively in professional contexts or to execute job-related tasks in English. This study seeks to evaluate the influence of AI-driven personalisation on learners' advancement and proficiency in gaining English abilities through the assessment of language attainment.

The conceptual framework demonstrates the interrelation of the independent factors and their cumulative effect on the dependent variable (Cheng & Liang, 2023). The efficacy of AI-driven tools in improving English language proficiency is contingent upon the interaction of personalisation, interaction frequency, and the nature of the activities offered. Each independent variable influences the learners' experiences and outcomes, whilst the dependent variable acts as the definitive measure of the success of these interventions.

This concept is especially pertinent for comprehending language acquisition in vocational education, because learners encounter distinct problems and possess distinctive requirements that diverge from those in conventional academic environments (Luo & Hsiao-Chin, 2023). The study aims to elucidate the interaction of these variables, providing empirical insights into the capacity of AI-driven personalisation to revolutionise English language education and offering pragmatic recommendations for educators and developers to enhance the application of AI technologies in this domain.

4. Research Methodology

This research employs a quantitative methodology to investigate the impact of AI-driven personalisation on English language proficiency among vocational college students in China. A structured questionnaire served as the principal data collection tool to systematically obtain information on the independent variables—degree of AI personalisation, frequency of AI interaction, and category of AI-assisted activities—and their correlation with the dependent variable, English language achievement (Ou, 2024). The implementation of a structured questionnaire guarantees consistency, reliability, and validity in documenting participants'

opinions, experiences, and outcomes, thereby establishing a solid basis for statistical analysis and interpretation.

The quantitative methodology is especially appropriate for this research since it facilitates the measuring of variables, the identification of patterns, and the testing of connections within a substantial participant sample. The research utilises a structured questionnaire to quantify the impact of particular characteristics of AI-driven technologies on language learning results. The instrument was meticulously crafted to collect comprehensive data on each independent variable, along with participants' self-reported English language proficiency. The organised approach guarantees that all participants reply to identical questions in a consistent sequence, minimising variability and improving comparability among responses.

The questionnaire comprises four sections, aligned with the independent and dependent variables. Multiple items were created for each variable to accurately and thoroughly measure the structures. These items were developed following a comprehensive examination of pertinent literature, consultations with language education specialists, and pilot testing to guarantee clarity and relevance. A 5-point Likert scale was employed for the majority of topics, spanning from “Strongly Disagree” (1) to “Strongly Agree” (5), to gauge the intensity of participants’ perceptions and experiences.

The table below delineates the questions incorporated in the structured questionnaire for each variable:

Table 1: Questionnaire

Variable	Question Items
Level of AI Personalization	1. The AI tool customizes lessons based on my specific learning needs.
	2. The AI provides tailored feedback on my mistakes and progress.
	3. The AI adapts the difficulty level of activities according to my proficiency.
	4. I feel that the AI understands my unique challenges in learning English.
	5. The AI recommends resources that are relevant to my career goals.
Frequency of AI Interaction	1. I interact with the AI tool on a daily basis.
	2. I use the AI tool multiple times a week for language practice.
	3. I spend sufficient time engaging with the AI tool during each session.
	4. The frequency of my interaction with the AI tool is adequate for improving my English skills.
Type of AI-Assisted Activities	1. The AI provides interactive exercises that help me practice English effectively.
	2. The AI includes real-world scenarios relevant to my career.
	3. The AI offers engaging activities that keep me motivated to learn English.
	4. The activities provided by the AI tool improve my speaking and listening skills.
	5. The AI tool includes quizzes and assessments that help me track my progress.
English Language Achievement	1. My English vocabulary has improved significantly since using the AI tool.
	2. My listening comprehension skills have improved with the AI activities.
	3. I feel more confident speaking English in real-world situations.
	4. My overall English proficiency has increased since I started using the AI tool.
	5. I can effectively use English for career-related tasks after engaging with the AI tool.

A structured questionnaire was administered to vocational college students utilising AI-driven tools in their English language acquisition. Participants were chosen via purposive sampling to guarantee they possessed adequate experience with AI-driven products to yield substantive

responses. The results obtained from the questionnaire were analysed using statistical techniques to investigate the correlations between the independent and dependent variables.

The implementation of a structured questionnaire offers a standardised approach to data collecting and facilitates the aggregation of data from a substantial sample, hence enabling the detection of trends and generalisable conclusions. The quantitative technique guarantees that the study yields objective, accurate, and valid results that enhance the comprehension of the impact of AI-driven personalisation on English language proficiency in vocational education contexts. This methodology establishes a robust framework for assessing the efficacy of AI-driven technologies and delivers practical insights for educators, policymakers, and developers aiming to enhance their application in language instruction.

5. Conclusion

This research examines the impact of AI-driven personalisation on improving English language proficiency among vocational college students in China. The research examines three independent variables—degree of AI personalisation, frequency of AI engagement, and nature of AI-assisted tasks—to elucidate the effects of customised technological interventions on language learning outcomes. The results indicate that successfully implemented AI-driven personalisation can meet the varied demands of vocational students, enhance engagement, and support the development of practical English language skills. This highlights the transformational potential of AI technology in vocational education, where students frequently encounter constraints such as restricted exposure to English and a necessity for career-specific language fluency.

The study's findings underscore the importance of elevated AI personalisation in enhancing learners' motivation and efficacy through customised feedback, resources, and activities that correspond to their individual learning profiles. Regular engagement with AI technologies was shown to enhance consistent practice, hence facilitating language acquisition through repetition and prompt feedback. Moreover, the diversity and significance of AI-assisted activities surfaced as essential elements, with real-world scenarios and interactive exercises demonstrating notable efficacy in cultivating abilities pertinent to vocational settings. These findings underscore the necessity of developing AI-driven teaching tools that are both technologically sophisticated and pedagogically suited to the specific requirements of vocational education.

Implications

This study has both theoretical and practical ramifications. The findings theoretically enhance the comprehension of how AI-driven personalisation, informed by constructivist concepts, affects English language acquisition. The study illustrates the relationship among personalisation, contact frequency, and activity types, offering a foundation for future research to investigate the intricate impacts of AI technology on various learner demographics. These discoveries augment the current research on AI in education, namely within the relatively unexamined realm of occupational language acquisition.

The outcomes hold considerable ramifications for educators, politicians, and developers of AI-based solutions. The findings underscore the necessity for instructors to include AI tools that tailor to individual learners and provide significant, career-oriented tasks. Policymakers can leverage these insights to facilitate the integration of AI technologies in vocational education, dedicating resources to ensure their effective deployment and training educators to incorporate

them into their teaching methodologies. Creators of AI-driven tools might utilise the findings to construct systems that emphasise personalisation, sustain elevated user engagement, and incorporate a variety of activities aimed at enhancing practical language abilities. By addressing these characteristics, stakeholders can optimise the efficacy of AI technology to enhance language teaching outcomes.

Limitations

This work, despite its merits, has some limitations that must be recognised. The research is based on self-reported data obtained using structured questionnaires, which may lead to response biases, including social desirability and overestimation of language proficiency. Despite attempts to assure the validity and reliability of the questionnaire, the subjective nature of self-reported measures may constrain the accuracy of the results. Future research may enhance self-reported data with objective evaluations, such as standardised language examinations or performance metrics, to yield a more thorough comprehension of learning results.

The study is done specifically in vocational colleges in China, perhaps restricting the generalisability of the findings to other educational contexts or learner demographics. Vocational students possess distinct attributes, such as career-focused objectives and pragmatic language requirements, which may not pertain to individuals in academic or general education settings. Additional study is required to assess the relevance of the findings in various cultural, institutional, and linguistic contexts.

The study examines three independent variables: the degree of AI personalisation, the frequency of AI contact, and the nature of AI-assisted activities, excluding other potential factors such as instructor engagement, technological infrastructure, and learners' pre-existing views towards AI. These unexplored characteristics may also affect language proficiency, indicating potential directions for future research to investigate further aspects of AI-driven personalisation.

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