

AI Usage Patterns and Effects on English Language Comprehension Among Students at Politeknik Kota Bharu

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Abstract: This study examines the usage patterns of Artificial Intelligence (AI) technology and their effects on English language comprehension among students at Politeknik Kota Bharu. A cross-sectional quantitative survey design was employed, involving 344 students from four academic departments. Data were collected using a structured questionnaire and analysed using descriptive statistics via SPSS version 26. The findings indicate that students actively utilise AI tools for learning purposes, with ChatGPT, Google Translate, and Grammarly being the most frequently used applications. Overall, AI usage demonstrated a positive impact on English language comprehension across four key domains: writing, reading, speaking, and listening. Writing skills recorded the highest level of improvement (mean = 4.07), followed by reading comprehension (mean = 4.00). Speaking (mean = 3.89) and listening skills (mean = 3.88), meanwhile, showed comparatively moderate gains. The stronger improvement in text-based skills reflects the predominance of AI tools that provide immediate feedback, language correction, and content clarification. Despite these positive outcomes, the study also identifies challenges such as limited exposure to AI-focused instruction, variations in access to technology, and the need for greater lecturer readiness in integrating AI into teaching practices. Ethical considerations, including data privacy and responsible AI use, are also highlighted. The findings underscore the potential of AI technology to enhance English language learning in the TVET context and

suggest that strategic integration of AI training within the curriculum could improve learning outcomes. From a broader perspective, this study provides empirical evidence to inform educational policy and institutional planning aimed at promoting effective, ethical, and inclusive AI adoption in technical and vocational education.

Keywords: *artificial intelligence, English language learning, TVET education, language comprehension, student engagement*

1. INTRODUCTION

In the era of globalization and rapid technological advancement, the integration of technology in education has become an urgent necessity. One of the emerging technologies that has gained significant attention is Artificial Intelligence (AI). AI technology is increasingly recognized for its potential to transform educational practices, particularly within Technical and Vocational Education and Training (TVET). While TVET primarily focuses on equipping students with industry-relevant technical skills, language proficiency—especially in English—remains a crucial complementary skill for graduates entering a globalized workforce. Mastery of English facilitates international communication, enhances employability, and enables access to technical documentation and global knowledge resources. In this regard, AI has been identified as a promising tool to support English language learning through interactive, adaptive, and personalized approaches. A study conducted by Zawacki-Richter et al. (2019) highlighted that AI applications in language education can provide additional instructional support through more customized and learner-centred experiences.

Technologies such as AI-based language learning applications allow TVET students, who often face constraints related to time, learning pace, and academic preparedness, to engage in self-directed English learning at their own convenience (Viberg & Grönlund, 2020). This is particularly relevant in the context of the students studying in Politeknik Kota Bharu, a Malaysian TVET institution, who come from diverse academic backgrounds and may have limited exposure to English outside the classroom. Many students rely heavily on lecturer-led instruction, and opportunities for extended English

practice are often constrained by packed technical curricula. Within this local context, AI tools such as ChatGPT, Google Translate, and Grammarly present an opportunity to bridge language gaps by providing immediate feedback, explanations, and language support beyond formal class hours. Recent studies have also indicated that AI-supported language learning can enhance students' motivation and confidence in using English, which is especially valuable in TVET settings where communication skills are considered an added professional advantage (Chen et al., 2020).

Furthermore, AI technology supports adaptive learning by adjusting content difficulty based on learners' proficiency levels, allowing students to progress at their own pace (Xie et al., 2021). This feature is particularly beneficial for students at Politeknik Kota Bharu, where variations in English proficiency levels pose challenges for uniform instruction. AI-driven learning tools offer flexible support that complements conventional teaching methods and aligns with TVET's objective of producing competent, industry-ready graduates. With the continuous advancement of AI, TVET education is now positioned at the intersection of technology and language learning, with AI potentially strengthening English comprehension and better preparing students to compete in an increasingly global and technologically driven job market (Hwang et al., 2022).

Despite the growing body of international research on AI in education, empirical studies examining AI usage patterns and their direct effects on English language comprehension within Malaysian TVET institutions remain limited, particularly at polytechnic level. Therefore, this study addresses this gap by focusing specifically on students at Politeknik Kota Bharu, providing localized empirical evidence on how AI technologies are utilized and how they influence English language comprehension. The novelty of this study lies in its context-specific examination of AI usage patterns and their impact on multiple dimensions of English comprehension within a Malaysian TVET setting, offering practical insights for curriculum enhancement and AI integration in polytechnic education.

2. PROBLEM STATEMENT

Although polytechnics and TVET institutions in Malaysia prioritize the development of technical skills, English language proficiency among TVET students remains a significant challenge. Limited English language comprehension restricts students' ability to compete in the global job market, particularly in industries that require cross-cultural communication and engagement with technical documentation that is predominantly written in English. At Politeknik Kota Bharu, this issue is influenced by students' diverse educational backgrounds and varying levels of prior exposure to the English language.

In addition, English language instruction within the polytechnic curriculum is often constrained by limited instructional time and stronger emphasis on technical subjects. As a result, students have fewer opportunities for structured and continuous language practice, leading to persistent weaknesses in grammar, pronunciation, and text comprehension. While digital learning tools are increasingly available, challenges related to access to appropriate technology, internet connectivity, and students' familiarity with advanced learning platforms further limit the effectiveness of language learning support outside the classroom.

Artificial Intelligence (AI) technology has the potential to address these limitations by offering personalized, interactive, and flexible approaches to English language learning. However, research examining how AI influences English language comprehension within Malaysian TVET institutions, particularly at Politeknik Kota Bharu, remains limited. This is consistent with the findings of Yao et al. (2020), who noted that although AI has demonstrated positive effects in language learning contexts, its application within technical and vocational education settings is still underexplored.

Previous studies have shown that AI can enhance language learning through personalized approaches tailored to learners' levels of understanding (Dong et al., 2020). Similarly, Pham et al. (2021) found that improvements in English comprehension through AI can increase students' confidence in engaging with the global workforce. Therefore, this study seeks to examine how AI technology is utilized among students at Politeknik Kota Bharu and how it affects their level of English language comprehension within the existing TVET learning environment.

3. RESEARCH QUESTIONS

1. What is the extent of Artificial Intelligence (AI) technology usage in learning among students at Politeknik Kota Bharu?
2. What is the impact of Artificial Intelligence (AI) technology on students' English language comprehension at Politeknik Kota Bharu?

4. RESEARCH OBJECTIVES

1. Determine the usage level of Artificial Intelligence (AI) technology in learning at Politeknik Kota Bharu.
2. Analyze how the use of Artificial Intelligence (AI) technology affects the level of understanding of English among Politeknik Kota Bharu students.

5. LITERATURE REVIEW

This literature review examines recent studies and theoretical perspectives on the application of Artificial Intelligence (AI) in education, with particular emphasis on its role in English language learning. Within the context of Technical and Vocational Education and Training (TVET), the review highlights how AI technologies support language development while addressing learners' diverse needs. The section is organized into two main areas: the level of AI usage in teaching and learning, and the impact of AI technology on students' English language comprehension.

5.1 THE USAGE LEVEL OF ARTIFICIAL INTELLIGENCE TECHNOLOGY IN TEACHING & LEARNING

The use of AI technology in teaching and learning has increased significantly due to its capacity to personalize learning experiences and improve educational outcomes. Early applications of AI in education focused primarily on administrative support and basic instructional software. Over time, AI integration has expanded to include web-based intelligent systems, adaptive learning platforms, and conversational agents such as chatbots, which can

function independently or in collaboration with instructors (Chen et al., 2020). While these developments demonstrate the rapid evolution of AI in education, recent literature emphasizes functionality and pedagogical value rather than technological novelty.

Several studies highlight that AI-powered systems enhance instructional efficiency by automating routine tasks such as grading and feedback, allowing educators to focus more on instructional quality (Mello et al., 2023). At the same time, AI's adaptive capabilities enable the customization of learning materials based on individual learners' progress and preferences, contributing to improved engagement and knowledge retention (Chen et al., 2020; Mello et al., 2023). However, Viberg and Grönlund (2020) caution that effective AI adoption depends not only on availability but also on students' digital literacy and institutional readiness.

From a TVET perspective, the utilization of AI is particularly relevant, as students often balance intensive technical coursework with limited time for language development. Studies conducted in vocational and higher education contexts suggest that AI-supported learning environments can compensate for restricted instructional time by offering flexible, self-paced learning opportunities (Hou, 2021). Despite these benefits, Ojha et al. (2023) and Chen et al. (2020) note that AI usage levels vary widely across institutions, often influenced by access to technology, institutional support, and educators' familiarity with AI tools. These findings indicate a gap between AI's potential and its actual implementation, especially in applied education settings such as TVET.

5.2 THE IMPACT OF ARTIFICIAL INTELLIGENCE TECHNOLOGY ON STUDENTS' ENGLISH COMPREHENSION

Existing literature consistently reports positive effects of AI technology on students' English language comprehension, particularly through personalized feedback and adaptive learning mechanisms. AI-powered tools analyze learners' performance to provide targeted feedback, enabling students to identify weaknesses and adjust their learning strategies accordingly (Mukhallafi, 2020; Hou, 2021; Zhang, 2021). Compared to traditional instruction, these tools promote learner autonomy and continuous engagement with the language.

Studies also highlight the role of AI-based conversational agents in enhancing language practice. Tools such as chatbots and virtual assistants create interactive environments where learners can practice reading, writing, speaking, and listening with immediate feedback (Mello et al., 2023; Zastudil et al., 2023). While Nazari et al. (2021) demonstrated that AI-powered writing assistants significantly improve writing accuracy and organization, other studies emphasize vocabulary development and comprehension as key benefits of AI-supported reading activities (Song & Song, 2023).

Comparatively, vocational-focused studies suggest that AI has a particularly strong impact on learners who require practical and contextualized language support. Hou (2021) found that AI-enhanced English learning in vocational colleges improved comprehension by aligning content with students' academic and professional needs. Similarly, Pham et al. (2021) reported that AI-based language learning increased students' confidence in preparing for workforce communication, an outcome highly relevant to TVET students. However, Yao et al. (2020) argue that despite these promising findings, AI research in vocational and technical education remains limited in scope and context-specific evidence is still insufficient.

More recent research on generative AI tools, such as ChatGPT, indicates their potential to accelerate learning through instant explanations, examples, and interactive feedback (Mello et al., 2023; Waseem et al., 2024). While these studies demonstrate positive outcomes in higher education and technical disciplines, most focus on general or international contexts rather than localized TVET institutions. As noted by Song and Song (2023), further empirical research is required to examine how AI tools influence multiple dimensions of English comprehension within specific educational settings.

Overall, the reviewed studies suggest that AI technology positively influences English language comprehension by supporting personalized learning, increasing motivation, and fostering learner autonomy. Nevertheless, gaps remain in understanding how AI is used in Malaysian TVET institutions and how usage patterns relate to actual language comprehension outcomes. This study addresses these gaps by examining AI usage patterns and their effects on English language comprehension among students at Politeknik Kota Bharu, thereby contributing localized empirical evidence to the existing body of literature.

6. RESEARCH METHODOLOGY

This study employed a descriptive survey design using a quantitative research methodology. A quantitative approach was selected as it allows for the efficient collection of data from a large number of respondents and facilitates statistical analysis of patterns and relationships. The survey method was considered appropriate for examining students' usage of Artificial Intelligence (AI) technology and its effects on English language comprehension. The data collected were analysed using the Statistical Package for Social Science (SPSS) version 26.

The primary research instrument was a structured questionnaire developed to align with the research objectives and research questions of the study. The questionnaire items were generated based on a review of relevant literature on AI usage in education and English language learning, ensuring content relevance and conceptual alignment. The items focused on students' frequency of AI usage in learning activities and their perceived effects on different aspects of English language comprehension, including writing, reading, speaking, and listening. Prior to full distribution, the questionnaire items were reviewed for clarity, language suitability, and relevance to the TVET context to ensure that they were easily understood by polytechnic students.

The questionnaire employed a five-point Likert scale ranging from Strongly Disagree to Strongly Agree. The Likert scale was chosen as it is widely used in educational research to measure attitudes, perceptions, and self-reported behaviours, allowing respondents to express varying degrees of agreement in a structured and quantifiable manner. This scale also enabled the calculation of mean scores and standard deviations, which were essential for addressing the research questions.

The survey questionnaire was distributed online using Google Forms. This platform was selected due to its accessibility, ease of use, and suitability for reaching a large student population efficiently. Google Forms also allowed respondents to complete the questionnaire at their convenience, which was particularly appropriate for polytechnic students who may have varying schedules due to academic and practical training commitments. Additionally, the use of an online platform facilitated accurate data collection and reduced manual data entry errors.

The questionnaire consisted of three parts. Part A collected respondents' demographic information. Part B examined students' usage of AI technology in learning, while Part C comprised 21 items measuring the influence of AI technology on English language comprehension. Descriptive analysis was conducted for Part A, while Parts B and C were analysed using mean scores and standard deviations to determine usage levels and perceived effects.

Reliability analysis was conducted using the "Reliability Analysis – Scale Alpha" function in SPSS version 26. The results indicated a Cronbach's Alpha value of 0.983 for the questionnaire, demonstrating a high level of internal consistency and confirming that the instrument was reliable for measuring the intended constructs.

Cronbach's Alpha	N of Items
.983	13

Table 1. Questionnaire reliability index

6.1 RESEARCH SAMPLE

The study sample was selected using purposive sampling, focusing specifically on students from Politeknik Kota Bharu, as the institution represents a typical Malaysian TVET context. Students from four major departments were included to ensure a diverse academic representation. A simple random sampling method was subsequently applied to select participants from each department. A total of 344 students participated in the study, comprising 151 students (43.9%) from the Department of Commerce, 123 students (35.7%) from the Department of Civil Engineering, 27 students (7.8%) from the Department of Electrical Engineering, and 43 students (12.5%) from the Department of Mechanical Engineering.

In terms of gender, 171 respondents (49.7%) were female and 173 respondents (50.3%) were male. With regard to academic level, 202 students (58.7%) were from Semester 1, 55 students (16%) from Semester 3, and 86 students (25%) from Semester 5.

While the sample size was adequate for quantitative analysis, potential limitations should be acknowledged. As participation was voluntary, self-selection bias may have occurred, with students who were more familiar or comfortable with AI tools having been more inclined to respond. In addition, variations in departmental representation may have also influenced the generalisability of the findings, as students from different academic disciplines may experience different levels of exposure to English and AI technology. These factors were considered when interpreting the results of the study.

7. RESEARCH FINDINGS

7.1 THE UTILIZATION LEVEL OF ARTIFICIAL INTELLIGENCE TECHNOLOGY IN LEARNING

The findings reveal that the top three Artificial Intelligence (AI) tools utilized by students at Politeknik Kota Bharu for learning purposes are ChatGPT (34.35%), Google Translate (31.85%), and Grammarly (13.57%). These tools play a crucial role in supporting English language comprehension, particularly in text-based learning activities. ChatGPT is frequently used for generating explanations and examples, Google Translate assists in understanding unfamiliar vocabulary and sentence structures, and Grammarly supports accuracy and clarity in writing. This pattern reflects students' preference for AI tools that provide immediate and direct assistance in completing academic tasks.

To gain insight into student experiences and perceived learning outcomes, a structured questionnaire was administered after the completion of peer-teaching sessions. The survey was distributed to all 125 participating students across the four classes. It was designed to capture both quantitative and qualitative data. The quantitative portion consisted of 10 closed-ended items rated on a 4-point Likert scale (1 = Strongly Disagree to 4 = Strongly Agree). These items evaluated various aspects of Canva usage, including perceived engagement, content comprehension, note-sharing efficiency, and overall satisfaction with Canva as a digital learning tool. Some sample survey statements included the following:

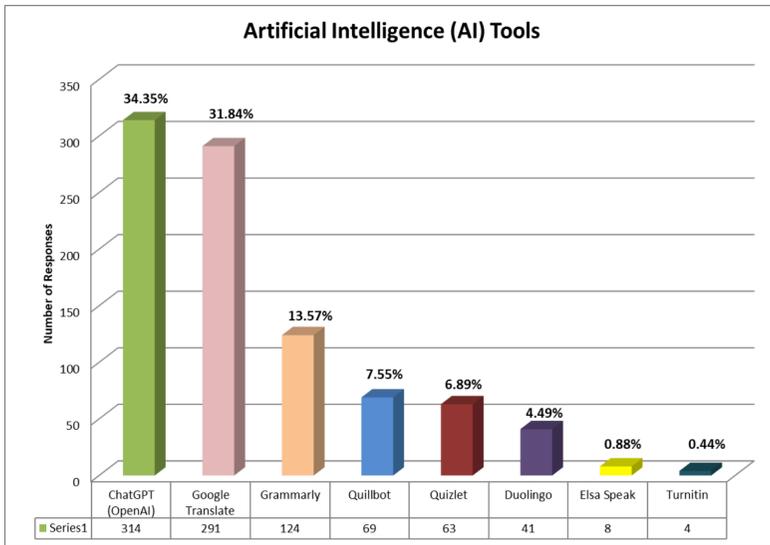


Figure 1. Artificial Intelligence (AI) tools utilized by students

The overall mean score for AI technology usage among students is 3.8038, indicating an active level of engagement with AI tools. Students reported frequent use of AI for learning activities (mean = 4.08), completing tasks (mean = 3.81), doing exercises (mean = 3.72), and completing assigned homework (mean = 3.60). These findings suggest that AI technology is primarily integrated into students' daily academic routines, particularly for individual and task-oriented learning activities.

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
S1 Use AI in learning	344	1	5	4.08	.828
S2 Use AI in completing tasks	344	1	5	3.81	.905
S3 Use AI in doing exercises	344	1	5	3.72	.952
S4 Use AI in completing assigned homework	344	1	5	3.60	.987
AI_LEVEL	344	1.00	5.00	3.8038	.78989
Valid N (listwise)	344				

Table 2. The AI Technology Usage

7.2 THE INFLUENCE OF ARTIFICIAL INTELLIGENCE TECHNOLOGY ON ENGLISH LANGUAGE COMPREHENSION LEVELS

The findings indicate that Artificial Intelligence (AI) technology has a positive influence on students' English language comprehension at Politeknik Kota Bharu across four key language domains: writing, reading, speaking, and listening. All domains recorded mean scores above 3.8, reflecting a generally positive perception of AI-supported language learning. However, the degree of improvement varied across skills, with writing and reading showing higher mean scores compared to speaking and listening.

One possible explanation for this variation is the nature of AI tools most frequently used by students. As the findings show, commonly used tools such as ChatGPT, Google Translate, and Grammarly are predominantly text-based and are designed to support reading comprehension, vocabulary development, and writing accuracy. These tools allow students to revisit content, revise outputs, and receive immediate corrective feedback, which may contribute to greater improvements in writing and reading skills compared to oral skills that require real-time interaction and pronunciation practice.

7.2.1 WRITING SKILLS

Students reported notable improvements in writing skills through the use of AI tools. Higher clarity and organization in writing recorded a mean score of 4.02, while improved word choice achieved a mean score of 4.12. Additionally, students indicated a reduction in grammatical errors (mean = 4.13) and an enhanced ability to write more professionally (mean = 3.99), resulting in an overall writing mean score of 4.07.

The strong improvement in writing skills may be attributed to the frequent use of AI tools that provide instant feedback on grammar, sentence structure, and vocabulary. The availability of automated suggestions and corrections enables students to refine their written work independently, reinforcing learning through repeated practice.

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
S5 Produce clearer and more organized writing	344	1	5	4.02	.884
S6 Choose more appropriate words	344	1	5	4.12	.810
S7 Reduce mistakes in writing	344	1	5	4.13	.814
S8 Improves ability to write more professionally	344	1	5	3.99	.879
WRITING	344	1.00	5.00	4.0654	.76390
Valid N (listwise)	344				

Table 3. The Effects on Writing Skills

7.2.2 READING COMPREHENSION

AI tools were also effective in improving reading comprehension, with an overall mean score of 4.00. Students found it easier to understand articles or texts (mean = 3.89), comprehend new vocabulary (mean = 4.11), and interpret complex sentence structures (mean = 4.01). AI-assisted explanations and translations further supported students in analysing and interpreting content (mean = 4.03) and understanding overall text meaning (mean = 3.97).

The improvement in reading comprehension may be linked to students' reliance on AI tools to clarify meanings, paraphrase content, and provide contextual explanations, which are particularly beneficial for learners with limited language exposure. The ability to control reading pace and revisit explanations allows students to process information more effectively.

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
S9 Makes it easier to understand articles or texts	344	1	5	3.89	.895
S10 Helps in understanding the meaning of new words	344	1	5	4.11	.845
S11 Helps in understanding more complex sentence structures	344	1	5	4.01	.849
S12 Helps in understanding the overall meaning of text better	344	1	5	3.97	.836
S13 Helps analyse and interpret content	344	1	5	4.03	.802
READING	344	1.00	5.00	4.0012	.74895
Valid N (listwise)	344				

Table 4. The Effects on Reading Comprehension

7.2.3 SPEAKING SKILLS

The findings show a positive but comparatively moderate impact of AI on speaking skills, with an overall mean score of 3.89. Students reported increased confidence in speaking English (mean = 3.85), improved pronunciation (mean = 3.96), reduced anxiety when speaking (mean = 3.78), and more frequent English practice (mean = 3.85).

The relatively lower improvement in speaking skills may be due to the limited use of AI tools that support interactive, real-time oral communication. Speaking proficiency often requires immediate feedback, spontaneous interaction, and sustained practice, which may not be fully supported by text-based AI tools commonly used by students.

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
S14 Increases confidence to speak	344	1	5	3.85	.924
S15 Improves pronunciation	344	1	5	3.96	.890
S16 Reduces anxiety when speaking	344	1	5	3.78	.905
S17 Helps practice English more often	344	1	5	3.85	.855
S18 Helps in knowing the correct pronunciation of words	344	1	5	4.00	.866
SPEAKING	344	1.00	5.00	3.8884	.79538
Valid N (listwise)	344				

Table 5. The Effects on Speaking Skills

7.2.4 LISTENING PROFICIENCY

Listening proficiency also showed positive outcomes, with an overall mean score of 3.88. Students indicated improved understanding of conversations (mean = 3.93), better comprehension of different accents (mean = 3.79), and enhanced overall listening comprehension (mean = 3.92).

Similar to speaking skills, listening improvement may be influenced by the extent to which students engage with audio-based AI resources. While AI tools can support listening through generated audio or multimedia content, students may have fewer opportunities to practice listening skills independently compared to reading and writing, which are more commonly integrated into academic tasks.

	Descriptive Statistics				
	N	Minimum	Maximum	Mean	Std. Deviation
S19 Improves understanding of conversation	344	1	5	3.93	.829
S20 Helps in understanding English of various accents	344	1	5	3.79	.889
S21 Improves listening comprehension	344	1	5	3.92	.808
LISTENING	344	1.00	5.00	3.8828	.75773
Valid N (listwise)	344				

Table 6. The Effects on Listening Proficiency

Overall, the findings demonstrate that AI technology contributes positively to English language learning among students at Politeknik Kota Bharu. The higher gains observed in writing and reading suggest that AI tools are particularly effective in supporting text-based language skills, while improvements in speaking and listening may require more interactive and audio-focused AI applications. These findings provide important insights into how AI tools are currently used and where further instructional support may be needed to achieve balanced language development.

8. CONCLUSION

The findings of this study underscore the significant impact of Artificial Intelligence (AI) technology on teaching and learning processes, particularly in supporting English language comprehension among students at Politeknik Kota Bharu. AI has demonstrated strong potential in facilitating personalized and effective learning experiences by providing real-time feedback, supporting independent learning, and enhancing students' motivation and engagement.

As noted by Brown and Smith (2021), AI enables students to access learning resources tailored to their proficiency levels, thereby accelerating the learning process and improving comprehension outcomes.

Although the findings indicate that polytechnic students are actively engaging with AI tools, several barriers to broader and more effective adoption remain. One key challenge relates to lecturer readiness and digital competence. Lecturers play a critical role in guiding students' use of AI tools, and without sufficient training and pedagogical support, the integration of AI into teaching practices may remain limited or inconsistent. Furthermore, differences in students' access to technology and familiarity with AI applications may affect equitable participation in AI-supported learning.

In addition to implementation challenges, ethical considerations must also be addressed to ensure responsible use of AI in education. Issues related to data privacy, transparency, and potential bias in AI-generated content raise important concerns, particularly when students rely heavily on AI tools for learning and assessment. Educational institutions must therefore establish clear guidelines and ethical frameworks to safeguard students' data and promote critical and informed use of AI technologies. As emphasized by Kim and Park (2022), institutional support, infrastructure development, and continuous professional training are essential to maximize the benefits of AI while minimizing potential risks.

In conclusion, while AI has considerable potential to enhance inclusive, student-centred learning in TVET education, its effective integration requires coordinated efforts from educators, institutions, and policymakers. Introducing AI-focused or skill-based training modules, strengthening lecturers' digital competencies, and addressing ethical and infrastructural concerns are crucial steps toward sustainable implementation. Future research could explore longitudinal impacts of AI-assisted language learning, examine lecturers' readiness and perceptions of AI integration, or investigate policy frameworks that support ethical and effective AI adoption in Malaysian TVET institutions. Such efforts would contribute to the development of a more innovative, responsible, and globally competitive education system.

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11. AUTHORS' CONTRIBUTION

Melissa Khor Suan Chin led the conceptualisation, research design, data collection, and manuscript writing. She also coordinated the overall research process and interpretation of findings. Che' Fadhilah contributed to the development and validation of the research instrument, data analysis, and critical review of the manuscript. Rodey Hamza assisted in literature review, data entry, and formatting of research materials. All authors read and approved the final version of the paper.

12. CONFLICT OF INTEREST STATEMENT

We certify that the article is the Authors' and Co-Authors' original work. The article has not received prior publication and is not under consideration for publication elsewhere. This research/manuscript has not been submitted for publication, nor has it been published in whole or in part elsewhere. We testify to the fact that all Authors have contributed significantly to the work, validity and legitimacy of the data and its interpretation for submission to IJELHE.

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