AI Readiness for Learning English among TVET Students: A Cross-Sectional Quantitative Study

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ABSTRACT

The rapid spread of artificial intelligence (AI) tools such as chatbots, grammar checkers and machine translation is changing how technical and vocational education and training (TVET) students learn English, yet little is known about how ready these learners are to use AI for language learning. This cross-sectional study examined readiness to use AI for learning English among engineering technology students at Universiti Teknikal Malaysia Melaka (UTeM). A 20-item questionnaire measured five dimensions: digital readiness, AI awareness, perceived usefulness, perceived ease of use and behavioural intention. Of 55 responses, 51 were retained after the removal of one duplicate and three multivariate outliers. Internal consistency was acceptable to excellent (α = .71–.88; overall α = .94). Readiness was high across all dimensions (overall M = 4.40, SD = 0.53, on a 5-point scale), with digital readiness (M = 4.54) and perceived usefulness (M = 4.51) rated highest and behavioural intention lowest (M = 4.19). At item level, trust in the information provided by AI tools received the weakest endorsement (M = 3.90; 68.6% agreement). Non-parametric tests showed no significant differences in any dimension by year of study, programme level, faculty or self-rated English proficiency (all p > .20). All dimensions were positively correlated (ρ = .52–.86). In a multiple regression, the four antecedent dimensions explained 62.7% of the variance in behavioural intention, with perceived ease of use the only significant unique predictor (β = .30, p = .029). The findings suggest that TVET students are attitudinally ready for AI-assisted English learning, but that their intention to use AI depends chiefly on confidence in using the tools, while trust in AI output remains guarded. English for Specific Purposes (ESP) courses in TVET should therefore build hands-on AI competence together with the critical evaluation of AI-generated language.

Keywords: AI readiness, TVET, English language learning, technology acceptance, behavioural intention

INTRODUCTION

Artificial intelligence (AI) has become one of the most influential technologies of the present era (Russell & Norvig, 2020). Tools that were once confined to specialised settings, such as conversational chatbots, automated grammar checkers and machine translation, are now part of everyday study routines, and higher education institutions are under pressure to decide how these tools should be integrated into teaching and learning (Kurtz et al., 2024; Zawacki-Richter et al., 2019). University students' attitudes toward AI are multidimensional, involving cognitive, emotional and behavioural components (Katsantonis & Katsantonis, 2024), and their digital literacy cannot be taken for granted (Mustapha et al., 2023).

The question is especially pressing in technical and vocational education and training (TVET). TVET programmes aim to produce workforce-ready graduates who combine specialised technical competence with the communicative proficiency that modern industry expects, and English remains central to documentation, reporting and communication in international technical workplaces. Generative AI is increasingly used to train professional communication skills (D. W. Dai et al., 2025), and applied linguistics research on AI has grown rapidly (Alaqlobi et al., 2024). For TVET learners, the ability to use AI tools purposefully for English learning is therefore becoming a practical vocational asset rather than an optional extra.

Empirical work on students' AI readiness has, however, concentrated on STEM and health science programmes (Xu & Ouyang, 2022; Xuan et al., 2023) and, more recently, on applied linguistics undergraduates (Teoh et al., 2025). Studies focusing specifically on TVET students' readiness to use AI for learning English remain scarce. TVET learners differ from these populations: their programmes emphasise practical, applied skills, and English is typically studied as a service subject alongside a demanding technical curriculum. Understanding whether these students feel equipped, convinced and willing to use AI for English learning can inform how ESP courses in TVET institutions are designed.

This study addresses that gap by examining readiness to use AI for learning English among engineering technology students at Universiti Teknikal Malaysia Melaka (UTeM). Readiness is conceptualised in five dimensions: digital readiness, AI awareness, perceived usefulness, perceived ease of use and behavioural intention. The study is guided by three research questions:

- **RQ1:** What is the level of readiness to use AI for learning English among TVET students across the five dimensions?
- **RQ2:** Does readiness differ by year of study, programme level, faculty and self-rated English proficiency?
- **RQ3:** To what extent do digital readiness, AI awareness, perceived usefulness and perceived ease of use predict behavioural intention to use AI for learning English?

THEORETICAL BACKGROUND

AI readiness and technology acceptance

Readiness to use a new technology has been theorised from several angles. Parasuraman's (2000) technology readiness construct describes a person's general propensity to embrace new technologies. In education, AI readiness has been operationalised as a multidimensional competence; the Medical Artificial Intelligence Readiness Scale, for example, distinguishes cognition, ability, vision and ethics (Karaca et al., 2021), and the same framework has been applied to Malaysian medical students (Xuan et al., 2023) and applied linguistics undergraduates (Teoh et al., 2025). Closely related is AI literacy, which encompasses knowing and understanding AI, using and applying it, evaluating it and considering its ethical implications (Ng et al., 2021).

The Technology Acceptance Model (Davis, 1989) provides a complementary lens by explaining why people choose to use a technology. It proposes that perceived usefulness and perceived ease of use shape attitudes and behavioural intention, which in turn predict actual use. The Unified Theory of Acceptance and Use of Technology later added facilitating conditions, such as access to devices and support, as a further determinant (Venkatesh et al., 2003). Drawing these strands together, the present study treats readiness to use AI for learning English as comprising the enabling conditions a learner brings (digital readiness), what the learner knows about AI for language learning (AI awareness), the learner's beliefs about AI (perceived usefulness and perceived ease of use) and the learner's disposition to act (behavioural intention). Consistent with this view, Wang et al. (2023) found that students who perceived more supportive environments and held stronger expectancy and value beliefs showed stronger intentions to learn AI.

AI for English language learning in TVET contexts

For language learners, AI tools offer immediate feedback on writing, models of spoken English, vocabulary support and translation. These affordances are particularly relevant to TVET learners, who must produce technical reports, standard operating procedures and workplace communication in English. At the same time, the growing use of AI raises questions about responsible use, including the verification of AI output, academic integrity and data privacy (Borenstein & Howard, 2021; Usher & Barak, 2024). Readiness therefore involves not only willingness and confidence but also an appropriately critical stance toward AI-generated content.

Differences in readiness across academic cohorts have been reported in some studies, with more senior students typically showing greater familiarity with AI (Teoh et al., 2025; Wang et al., 2023), while other work

suggests that demographic factors play a relatively small role once students have similar access to technology (Wang et al., 2023). Whether such differences appear among TVET students learning English is an open question that this study examines.

MATERIALS AND METHODS

Research design and instrument

A cross-sectional quantitative survey design was employed. Data were collected with an online questionnaire titled *Readiness to Use AI for Learning English among TVET Students*. The items were adapted from previous studies on technology acceptance and AI readiness in education and contextualised for English language learning among TVET students, reflecting constructs from the Technology Acceptance Model (Davis, 1989) and related acceptance frameworks (Venkatesh et al., 2003). Section A gathered demographic information (faculty, programme level, year of study and self-rated English proficiency). Section B contained 20 statements rated on a 5-point Likert scale (1 = *Strongly Disagree* to 5 = *Strongly Agree*). The items were grouped into five dimensions: digital readiness (B1–B4), covering access to devices, comfort with digital tools, prior use of AI tools and ease of learning new technology; AI awareness (B5–B8), covering awareness of AI tools for English learning and understanding of how AI supports language learning; perceived usefulness (B9–B12), covering the perceived benefits of AI for writing, speaking, feedback and learning efficiency; perceived ease of use (B13–B15), covering ease of use, need for training and confidence; and behavioural intention (B16–B20), covering enjoyment, willingness, trust, motivation and readiness to integrate AI tools into English learning. The full item wording is shown in Table 3.

Participants and data collection

Participants were diploma and degree students from two engineering technology faculties at UTeM: the Faculty of Mechanical Technology and Engineering (FTKM) and the Faculty of Electrical Technology and Engineering (FTKE). Convenience sampling was used. The questionnaire link was shared with students during their English classes in July 2026 and completed online, and 55 responses were received.

Data screening

One response was an exact duplicate of another submission and was removed. Multivariate outliers were then screened using Mahalanobis distance on the five dimension scores, with a critical value of $\chi^2(5) = 20.52$ at $p < .001$ (Tabachnick & Fidell, 2019). Three cases exceeded this threshold; each showed an internally inconsistent pattern, such as strongly disagreeing with all digital readiness items while strongly agreeing with every AI item, and these cases were excluded. The final sample therefore comprised 51 respondents. Nine respondents gave the same answer (4 or 5) to every item; because all items were positively worded and such uniformly positive responses are plausible, these cases were retained. There were no missing values. Faculty names entered in free text were recoded into the two faculties.

Data analysis

Internal consistency was assessed with Cronbach's alpha and corrected item–total correlations, with values of .70 or above regarded as acceptable (Hinton et al., 2004). Dimension scores were computed as the mean of their items. Shapiro–Wilk tests indicated that all dimension scores departed from normality (all $p < .01$) and were negatively skewed, and several comparison groups were small. Non-parametric tests were therefore used: Kruskal–Wallis H tests for year of study and Mann–Whitney U tests for programme level, faculty and self-rated English proficiency. Because only ten students were in Years 1 and 2, these years were combined into one group; for proficiency, students rating themselves as elementary or intermediate were compared with those rating themselves as upper-intermediate or advanced. Associations between dimensions were examined using Spearman's rank-order correlation. Finally, multiple linear regression was conducted with behavioural intention as the criterion and the other four dimensions as predictors. Because the residuals were not normally distributed (Shapiro–Wilk $p = .001$), 95% confidence intervals for the regression coefficients were estimated from 5,000 bootstrap resamples. Analyses were conducted in Python using the SciPy library.

RESULTS

Respondent profile

Table 1 summarises the profile of the 51 respondents. Most were degree students (82.4%) in their third year of study (58.8%), and most rated their English proficiency as intermediate (76.5%). Year 1 and Year 2 respondents were almost all diploma students, so year of study and programme level overlap substantially in this sample.

Table 1: Profile of respondents (N = 51)

Variable	Category	*n*	%
Faculty	FTKM (Mechanical Technology and Engineering)	28	54.9
	FTKE (Electrical Technology and Engineering)	23	45.1
Programme level	Degree	42	82.4
	Diploma	9	17.6
Year of study	Year 1	6	11.8
	Year 2	4	7.8
	Year 3	30	58.8
	Year 4	11	21.6
Self-rated English proficiency	Elementary	4	7.8
	Intermediate	39	76.5
	Upper intermediate	5	9.8
	Advanced	3	5.9

Reliability

As shown in Table 2, internal consistency was acceptable for all five dimensions, ranging from α = .71 for perceived ease of use to α = .88 for behavioural intention, and was excellent for the full 20-item scale (α = .94). All corrected item–total correlations exceeded .40.

Table 2: Internal consistency of the readiness dimensions

Dimension	Items	No. of items	Cronbach's α	Corrected item–total *r*
Digital readiness	B1–B4	4	0.74	.45–.65
AI awareness	B5–B8	4	0.74	.51–.57
Perceived usefulness	B9–B12	4	0.84	.64–.71
Perceived ease of use	B13–B15	3	0.71	.43–.63
Behavioural intention	B16–B20	5	0.88	.53–.84
Overall readiness	B1–B20	20	0.94	—

Level of readiness to use AI for learning English (RQ1)

Item-level results are presented in Table 3. Agreement was high for almost all statements. The most strongly endorsed items were regular access to a device for learning (B1, *M* = 4.71), the belief that AI tools can help improve English writing (B9, *M* = 4.61) and the view that AI provides useful feedback on language mistakes (B11, *M* = 4.59). The least endorsed item was trust in the information provided by AI tools (B18, *M* = 3.90), with which only 68.6% of respondents agreed and 7.8% disagreed. Feeling motivated to learn English when using AI tools (B19, *M* = 4.06) and knowing different types of AI tools for learning English (B6, *M* = 4.22) were also comparatively low.

Table 3: Item-level descriptive statistics (N = 51)

Code	Item	*M*	*SD*	% Agree
Digital readiness				
B1	I have regular access to a smartphone, tablet, or computer for learning.	4.71	0.54	96.1
B2	I am comfortable using digital tools and applications.	4.57	0.61	94.1
B3	I have used AI tools (e.g., chatbots, grammar checkers, translation tools) before.	4.53	0.64	92.2
B4	I can easily learn how to use new technology without much help.	4.35	0.74	84.3
AI awareness				
B5	I am aware that AI tools can help improve my English skills.	4.55	0.64	92.2
B6	I know different types of AI tools used for learning English.	4.22	0.9	72.5
B7	I understand how AI can support language learning (e.g., writing, speaking, vocabulary).	4.55	0.58	96.1
B8	I believe AI is becoming important in education.	4.45	0.83	88.2
Perceived usefulness				
B9	AI tools can help me improve my English writing skills.	4.61	0.57	96.1
B10	AI tools can help me improve my English speaking skills.	4.43	0.85	90.2
B11	AI can provide useful feedback on my language mistakes.	4.59	0.75	94.1
B12	Using AI can make learning English faster and more efficient.	4.39	0.8	84.3
Perceived ease of use				
B13	AI tools are easy to use for learning English.	4.49	0.76	94.1
B14	I can use AI tools without needing much training.	4.27	0.87	82.4
B15	I feel confident using AI tools for my English learning tasks.	4.33	0.77	82.4
Behavioural intention				
B16	I enjoy using AI tools for learning.	4.37	0.82	86.3
B17	I am willing to use AI regularly to improve my English.	4.29	0.81	82.4
B18	I trust the information provided by AI tools.	3.9	0.98	68.6
B19	I feel motivated to learn English when using AI tools.	4.06	0.9	74.5
B20	I am ready to integrate AI tools into my English learning process.	4.31	0.88	82.4

Note. 1 = Strongly Disagree to 5 = Strongly Agree. % Agree = percentage of respondents choosing 4 (Agree) or 5 (Strongly Agree).

At dimension level (Table 4), overall readiness was high (*M* = 4.40, *SD* = 0.53). Digital readiness (*M* = 4.54) and perceived usefulness (*M* = 4.51) were rated highest, followed by AI awareness (*M* = 4.44) and perceived ease of use (*M* = 4.37). Behavioural intention was the lowest-rated dimension (*M* = 4.19, *SD* = 0.73) and showed the greatest spread; 68.6% of respondents had a mean intention score of 4.00 or above, compared with 92.2% for digital readiness.

Table 4: Descriptive statistics for the readiness dimensions (N = 51)

Dimension	*M*	*SD*	*Mdn*	Min	Max	% ≥ 4.00
Digital readiness	4.54	0.48	4.75	3	5	92.2
AI awareness	4.44	0.56	4.5	2.75	5	84.3
Perceived usefulness	4.51	0.62	4.75	2.75	5	82.4
Perceived ease of use	4.37	0.64	4.67	2.67	5	80.4
Behavioural intention	4.19	0.73	4	2.4	5	68.6
Overall readiness	4.4	0.53	4.55	2.95	5	80.4

Note. % ≥ 4.00 = percentage of respondents whose mean dimension score was 4.00 or above.

Differences by respondent characteristics (RQ2)

Table 5 reports the group comparisons. No dimension differed significantly by year of study, programme level, faculty or self-rated English proficiency (all $p > .20$). Mean overall readiness was almost identical across Years 1–2 ($M = 4.34$), Year 3 ($M = 4.41$) and Year 4 ($M = 4.43$), across degree ($M = 4.40$) and diploma ($M = 4.38$) students, and across the two proficiency groups (both $M = 4.40$). The largest, though non-significant, difference was in behavioural intention between faculties, with FTKM students ($M = 4.32$) scoring slightly higher than FTKE students ($M = 4.03$), $U = 259.5$, $p = .233$.

Table 5: Differences in readiness by respondent characteristics

Dimension	Year of study $H(2)$ (p)	Programme level U (p)	Faculty U (p)	Proficiency U (p)
Digital readiness	0.20 (.903)	177.5 (.780)	310.5 (.830)	147.0 (.514)
AI awareness	0.60 (.740)	200.5 (.780)	292.0 (.566)	185.0 (.739)
Perceived usefulness	1.01 (.603)	187.0 (.969)	284.0 (.458)	175.5 (.935)
Perceived ease of use	1.32 (.516)	220.5 (.430)	286.5 (.495)	184.5 (.749)
Behavioural intention	0.23 (.892)	182.0 (.870)	259.5 (.233)	189.0 (.664)
Overall readiness	0.15 (.929)	191.0 (.970)	273.0 (.358)	175.5 (.938)

Note. Year of study: Kruskal–Wallis test comparing Years 1–2 ($n = 10$), Year 3 ($n = 30$) and Year 4 ($n = 11$). Programme level: degree ($n = 42$) vs diploma ($n = 9$). Faculty: FTKM ($n = 28$) vs FTKE ($n = 23$). Proficiency: elementary or intermediate ($n = 43$) vs upper intermediate or advanced ($n = 8$). Mann–Whitney U tests, two-tailed.

Relationships between dimensions and prediction of behavioural intention (RQ3)

All five dimensions were positively and significantly correlated (Table 6), with coefficients ranging from $\rho = .52$ (digital readiness and perceived ease of use) to $\rho = .86$ (AI awareness and perceived usefulness). Behavioural intention was most strongly associated with perceived ease of use ($\rho = .74$).

Table 6: Spearman correlations between readiness dimensions (N = 51)

Dimension	1	2	3	4	5
1. Digital readiness	—				
2. AI awareness	0.73	—			
3. Perceived usefulness	0.67	0.86	—		
4. Perceived ease of use	0.52	0.65	0.67	—	
5. Behavioural intention	0.56	0.69	0.68	0.74	—

Note. All correlations are significant at $p < .001$.

The regression model (Table 7) was significant, $F(4, 46) = 19.30$, $p < .001$, and the four predictors together explained 62.7% of the variance in behavioural intention (adjusted $R^2 = .594$). Perceived ease of use was the only significant unique predictor ($\beta = .30$, $p = .029$; bootstrap 95% CI [0.02, 0.78]). Perceived usefulness showed the largest standardised coefficient ($\beta = .37$) but did not reach significance ($p = .084$), and neither AI awareness ($\beta = .25$, $p = .206$) nor digital readiness ($\beta = -.08$, $p = .531$) contributed uniquely. Variance inflation factors for AI awareness (4.83) and perceived usefulness (5.29) indicate substantial overlap between these two predictors, consistent with their high correlation, so their individual coefficients should be interpreted with caution. The Durbin–Watson statistic (2.35) indicated no autocorrelation of residuals.

Table 7: Multiple linear regression predicting behavioural intention (N = 51)

Predictor	*B*	*SE*	β	*t*	*p*	Bootstrap 95% CI
(Constant)	−0.15	0.65	—	−0.23	0.822	[−1.36, 0.82]
Digital readiness	−0.12	0.19	−.08	−0.63	0.531	[−0.42, 0.25]
AI awareness	0.33	0.26	0.25	1.28	0.206	[−0.38, 0.89]
Perceived usefulness	0.43	0.24	0.37	1.77	0.084	[−0.30, 1.13]
Perceived ease of use	0.34	0.15	0.3	2.26	0.029	[0.02, 0.78]

Note. $R = .79$, $R^2 = .627$, adjusted $R^2 = .594$, $F(4, 46) = 19.30$, $p < .001$. CI = confidence interval for *B*, based on 5,000 bootstrap resamples. VIF: digital readiness = 1.99, AI awareness = 4.83, perceived usefulness = 5.29, perceived ease of use = 2.16.

DISCUSSION

High readiness with a gap between belief and intention

The TVET students in this study reported high readiness to use AI for learning English. Nearly all had regular access to devices and were comfortable with digital tools, and a large majority believed that AI can improve their English writing, speaking and accuracy. This pattern suggests that access and awareness are no longer the main barriers for these learners. It also reflects the broader normalisation of AI in university study reported in recent research (Katsantonis & Katsantonis, 2024; Kurtz et al., 2024).

Behavioural intention, however, was the lowest-rated dimension and the most variable. Students largely agreed that AI is useful, yet fewer were committed to using it regularly, felt motivated by it or trusted its output. In other words, positive beliefs about AI do not automatically translate into a settled intention to integrate it into English learning. This gap matters for ESP instructors because it indicates that promoting the benefits of AI is unlikely to be sufficient on its own.

Ease of use as the key lever

The regression results help explain this gap. Once the overlap among predictors was accounted for, perceived ease of use, which captures how easy AI tools are to use, how little training students feel they need and how confident they feel, was the only dimension that uniquely predicted intention. This finding is consistent with the Technology Acceptance Model (Davis, 1989) and with evidence that students' expectancy of success is central to their intentions to learn AI (Wang et al., 2023). Perceived usefulness and AI awareness were strongly related to intention but largely overlapped with each other, suggesting that students who know more about AI for language learning also see more value in it. Digital readiness contributed little once the other dimensions were considered, which is unsurprising given that almost all students reported adequate access; when a condition is nearly universal, it cannot explain differences between students.

Guarded trust in AI output

The comparatively low level of trust in information provided by AI tools deserves careful interpretation. It may partly reflect an appropriate awareness that AI output can be inaccurate, which would be a healthy sign for responsible use (Usher & Barak, 2024). It may also, however, act as a brake on intention, as students who are unsure whether to trust AI feedback may be reluctant to rely on it. The present instrument cannot distinguish between informed scepticism and general uncertainty. Developing students' ability to evaluate AI-generated language, rather than simply trusting or distrusting it, is therefore an important goal for ESP teaching (Borenstein & Howard, 2021; Ng et al., 2021).

Uniform readiness across groups

No differences in readiness were found by year of study, programme level, faculty or self-rated proficiency.

This contrasts with studies reporting that senior students show greater AI readiness (Teoh et al., 2025) but is consistent with evidence that demographic factors have relatively weak effects on students' intentions to learn AI (Wang et al., 2023). One plausible explanation is that AI tools have become so widely available that exposure no longer depends on how far students have progressed in their programmes. These null results should nevertheless be read cautiously: the Year 1–2, diploma and upper-intermediate or advanced groups were small, so the study had limited power to detect modest differences.

IMPLICATIONS AND RECOMMENDATIONS

Building hands-on AI competence in ESP courses

Because perceived ease of use was the strongest unique predictor of intention, ESP courses in TVET institutions should include structured, hands-on practice with AI tools for authentic language tasks, such as drafting and revising technical reports, preparing workplace presentations and checking the accuracy of technical vocabulary. Guided practice of this kind is likely to build the confidence that turns positive beliefs into regular use.

Developing critical evaluation of AI output

Instruction should also teach students how to verify AI feedback and translations, how to recognise inaccurate or inappropriate output, and how to acknowledge AI assistance in line with institutional policies on academic integrity. Such training addresses the guarded trust observed in this study by giving students clear criteria for when and how to rely on AI.

LIMITATIONS AND FUTURE RESEARCH

Several limitations should be noted. First, the sample was small ($N = 51$) and drawn by convenience from two faculties at a single university, which limits generalisability; future studies should involve larger samples across multiple TVET institutions. Second, several comparison groups were small, and year of study overlapped with programme level, so the group comparisons should be regarded as exploratory. Third, the dimension structure was defined on the basis of item content, and the sample was too small for confirmatory factor analysis; the instrument's factor structure should be validated with a larger sample. Fourth, all measures were self-reported and cross-sectional, so they capture perceived rather than demonstrated readiness and do not establish causal relationships. Future research could combine surveys with performance-based tasks and follow students over time.

CONCLUSION

This study found that TVET engineering technology students at UTeM are highly ready to use AI for learning English in terms of access, awareness and perceived usefulness, and that this readiness is consistent across years of study, programme levels, faculties and proficiency levels. Their intention to use AI, however, was weaker than their beliefs about it, and it was most closely tied to how easy and confident they felt in using AI tools. Trust in AI-generated information was the least endorsed aspect of readiness. ESP curricula in TVET institutions should therefore move beyond raising awareness of AI and focus on building practical competence and the critical evaluation of AI output, so that students can use these tools confidently and responsibly in their English learning and future workplaces.

ETHICAL APPROVAL

This study followed established ethical principles for research involving human participants. Participation was voluntary and anonymous, and no personally identifying information was collected. All responses were stored securely and are reported only in aggregate form.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

DATA AVAILABILITY STATEMENT

The data supporting the findings of this study are available from the corresponding author upon reasonable request. The data are not publicly available in order to protect the privacy and anonymity of the participants.

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