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PREDICTIVE FACTORS OF CHATGPT USE BEHAVIOUR AMONG ESL STUDENTS IN UNIVERSITI KEBANGSAAN MALAYSIA

FARAH AIDA FADZIL*, MUHAMMAD FAZLI ABDULLAH, ZAHID IBRAHIM, AISYAH NURHUDA ABD. RAHMAN & SABRINA CHE HARON

ABSTRACT

The integration of artificial intelligence (AI) tools into education has transformed the ways students engage with learning and language acquisition. ChatGPT, a generative AI platform, has become particularly relevant for English as a Second Language (ESL) learners, offering personalized feedback, interactive communication, and language support. This study investigates the factors influencing ChatGPT use behaviour among ESL students at Universiti Kebangsaan Malaysia (UKM). Guided by the Unified Theory of Acceptance and Use of Technology (UTAUT) and Self-Determination Theory (SDT), a quantitative correlational design was employed. Data were collected from 357 ESL learners through a structured questionnaire and analyzed using descriptive statistics, Pearson's correlation, and multiple regression. Results revealed high levels of ChatGPT usage, with performance expectancy, effort expectancy, facilitating conditions, autonomy, and relatedness identified as significant predictors of use behaviour. Competence, while correlated with use behaviour, did not emerge as a significant predictor in the regression model. These findings underscore the combined influence of technological and psychological factors in shaping AI adoption for language learning. The study contributes to the discourse on digital transformation in Malaysian higher education and offers insights for educators, policymakers, and developers on fostering responsible and effective use of generative AI in ESL contexts.

Keywords: ChatGPT; ESL learners; Technology adoption; UTAUT; SDT; Malaysia; Higher education

INTRODUCTION

Artificial intelligence (AI) is reshaping the landscape of education by enabling new forms of teaching, learning, and assessment. Among the various applications of AI, conversational agents such as ChatGPT have become increasingly relevant, particularly for English as a Second Language (ESL) learners. ChatGPT allows students to engage in real-time conversations, receive instant feedback, and experiment with language use in a supportive environment. Its interactive features offer learners greater flexibility in practicing vocabulary, grammar, and writing skills, supplementing traditional classroom instruction.

In Malaysia, the push toward digital transformation has been underscored by initiatives such as the Malaysia Digital Economy Blueprint (MyDIGITAL) and the National Artificial Intelligence Roadmap (2021–2025). Both frameworks emphasize the integration of AI

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technologies into education as part of the broader goal of preparing a digitally skilled workforce. Within higher education, universities are expected to adopt innovative tools to enhance teaching and learning practices, with AI positioned as a critical enabler of this transformation.

For Malaysian ESL learners, ChatGPT presents both opportunities and challenges. It offers immediate language practice and feedback that might otherwise be unavailable outside the classroom. However, concerns persist regarding over-reliance on AI, academic integrity, and the accuracy of AI-generated responses. As students increasingly turn to ChatGPT for learning support, understanding the factors that predict their use of the tool becomes essential.

The problem addressed in this study is that while AI adoption is encouraged at the national and institutional levels, little is known about the behavioural factors influencing how Malaysian ESL students engage with ChatGPT. This gap hinders the ability of educators and policymakers to design effective interventions and guidelines for responsible AI use.

This study, therefore, investigates the predictive factors of ChatGPT use behaviour among ESL students at Universiti Kebangsaan Malaysia (UKM). It applies two complementary theoretical frameworks: the Unified Theory of Acceptance and Use of Technology (UTAUT), which emphasizes technological determinants of adoption, and Self-Determination Theory (SDT), which highlights intrinsic motivational factors. The study addresses three objectives:

1. To determine the extent of ChatGPT use among ESL students at UKM.
2. To examine the relationships between UTAUT and SDT variables and ChatGPT use behaviour.
3. To identify the strongest predictors of ChatGPT use behaviour among ESL students.

By integrating UTAUT and SDT, this research contributes a comprehensive perspective on the technological and psychological drivers of ChatGPT adoption in higher education. Its findings provide practical insights for educators, institutions, and policymakers aiming to support responsible and effective AI use in ESL contexts.

LITERATURE REVIEW

AI in Education and ESL Contexts

The integration of AI in education has gained traction globally, with tools such as chatbots, adaptive learning systems, and generative AI models providing new opportunities for personalised learning. Chatbots are increasingly being used in language education because of their ability to simulate conversational practice and provide instant corrective feedback. These affordances allow students to engage in language learning outside formal classroom settings, offering flexibility and autonomy.

For ESL learners, ChatGPT provides significant advantages. It allows learners to generate ideas for essays, clarify grammar and vocabulary questions, and engage in extended practice dialogues. This reduces language anxiety and increases confidence, as learners can practice without fear of judgment from peers or instructors. However, the adoption of such tools also raises questions about dependency, plagiarism, and the quality of AI-generated output.

In the Malaysian context, ESL learning remains a critical area of focus. Despite years of policy initiatives aimed at improving English proficiency, challenges persist in ensuring that students achieve the desired levels of competence. AI tools like ChatGPT offer a promising avenue to address these gaps by providing individualised and on-demand language support. Nevertheless, for AI to be effectively integrated into ESL education, it is crucial to understand what drives students to adopt and use such tools.

UTAUT and Technology Adoption

The Unified Theory of Acceptance and Use of Technology (UTAUT) has been widely applied in education to explain user behaviour toward new technologies. The model posits that performance expectancy, effort expectancy, social influence, and facilitating conditions influence behavioural intention and usage.

- Performance Expectancy. This refers to the belief that using a technology will improve performance. In ESL contexts, this may involve students' perceptions of whether ChatGPT helps them improve their writing, comprehension, and communication skills. Studies consistently show that performance expectancy is a strong predictor of technology adoption.

- Effort Expectancy. Defined as the ease associated with using the technology, effort expectancy reflects whether students perceive ChatGPT as intuitive and easy to operate. In educational settings, ease of use often determines whether students are willing to engage consistently with a tool.

- Facilitating Conditions. These refer to the resources and support available to enable technology use, including access to devices, internet connectivity, and institutional encouragement. Without such conditions, even a useful and user-friendly technology may not be widely adopted.

Although UTAUT also includes social influence, this construct was not emphasised in the present study as the focus was on individual adoption behaviour.

Self-Determination Theory and Motivation

Self-Determination Theory (SDT) complements UTAUT by focusing on intrinsic motivation. According to SDT, human motivation is shaped by the fulfilment of three basic psychological needs: competence, autonomy, and relatedness.

- Competence. This refers to the perception of being capable of using a tool effectively. In the case of ChatGPT, competence relates to students' confidence in navigating the platform to support their academic work.

- Autonomy. Defined as the ability to make independent decisions, autonomy in this context refers to students' freedom to use ChatGPT according to their preferences and learning styles. Autonomy has been linked to greater engagement and persistence in learning.

- Relatedness. This captures the sense of social connection that learners experience. In ESL learning, ChatGPT may provide a sense of companionship and interactive support, thereby fulfilling the need for relatedness.

Theoretical Synergy Between UTAUT and SDT in Explaining ChatGPT Usage Behaviour

The integration of UTAUT and SDT provides a more comprehensive explanation of ChatGPT adoption by addressing both the technological and psychological factors that shape ESL learners' behaviour. While UTAUT focuses on external, system-related determinants such as performance expectancy, effort expectancy, and facilitating conditions, it does not fully account for learners' internal motivational states. SDT fills this gap by offering insight into intrinsic drivers of behaviour through the constructs of autonomy, competence, and relatedness. Together, these frameworks capture distinct yet complementary sources of variance. UTAUT explains how perceptions of usefulness, ease of use, and resource availability drive behavioural intention, whereas SDT explains why learners feel motivated, confident, and emotionally supported to engage with the technology. Integrating both strengthens the conceptual model by acknowledging that successful AI adoption requires not only favourable user perceptions of the technology but also the fulfilment of psychological needs that sustain meaningful and self-directed use. Thus, combining UTAUT and SDT allows for a deeper understanding of ChatGPT usage behaviour, recognising that ESL learners adopt AI tools not merely because they are useful and accessible, but because they also support their motivation, autonomy, and engagement.

Empirical Studies on AI Adoption in ESL

Empirical research on ChatGPT in ESL is still emerging. However, prior studies on chatbots and AI in language learning highlight both opportunities and challenges. Some research points to increased motivation, autonomy, and engagement among students who use AI-supported tools. Others caution against over-reliance, ethical risks, and disparities in digital access. In Malaysia, AI adoption in education has been encouraged through policy frameworks, but institutional readiness varies. While some universities are well-equipped to integrate AI into teaching and learning, others face challenges in digital infrastructure and faculty training. These disparities underscore the need for research that identifies the factors influencing AI adoption in local contexts.

Recent empirical work on ChatGPT in education has begun to clarify how learners adopt and use this tool in language learning contexts. Habibi et al. (2023), for example, examined ChatGPT use among Indonesian higher education students and found that performance expectancy, effort expectancy and facilitating conditions significantly predicted acceptance and actual use, highlighting the relevance of technology acceptance constructs in AI-supported learning. In a language-specific context, Tram et al. (2024) conducted a multi-method study with EFL learners and reported that ChatGPT supported self-directed English learning, improved perceived language gains, and fostered positive attitudes, while also revealing concerns about over-reliance and accuracy. Focusing on ESL writing, Ibrahim and Kirkpatrick (2024) synthesised empirical studies showing that ChatGPT can enhance learners' motivation, provide immediate feedback, and improve written output when used with clear pedagogical guidance. Complementing these, Lo (2024) reviewed 70 empirical studies on ChatGPT in ESL/EFL education, concluding that although applications span writing, speaking, and reading,

most research foregrounds functional affordances and classroom practices rather than integrated motivational–acceptance models.

While previous studies examined learners' acceptance, patterns of use, and pedagogical impacts of ChatGPT in EFL/ESL and higher-education settings, none have investigated ChatGPT usage behaviour in Malaysian ESL contexts using an integrated UTAUT–SDT framework that simultaneously models technological perceptions and basic psychological needs.

METHODS

This study adopted a quantitative, correlational design. The participants consisted of 357 ESL students enrolled at Universiti Kebangsaan Malaysia. Stratified random sampling was used to ensure representation across faculties and years of study.

The sample size for this study was determined using Cochran's formula (1977), which is widely used to calculate an ideal sample size when the desired confidence level, margin of error, and population variability are known. Given an estimated population of 5,705 ESL learners enrolled in LMCE English courses at UKM, Cochran's formula was applied to ensure adequate representation of the population.

The simple random sampling process involved the following steps to determine the required sample size for this study. Using Cochran's (1977) formula for continuous data, the sample size was calculated based on the following parameters: confidence level (z) of 95%, corresponding to a z-value of 1.96, population proportion (p) of 0.5, indicating a balanced assumption, and margin of error (e) of 5%, corresponding to 0.05. Since the population is finite (N =5707), the sample size was adjusted using Cochran's correction formula:

$$n = \frac{n_0}{1 + \frac{n_0}{N}}$$

Using Cochran's formula, the minimum required sample size for this study was 360 participants; however, the collected sample of 357 is still acceptable based on established guidelines for multiple regression analysis. Hair et al. (1995) recommend at least five observations per independent variable, while Miller and Kunce (1973) and Halinski and Feldt (1970) suggest a more conservative ratio of ten observations per variable to ensure validity and avoid overfitting. With six independent variables in this study, the minimum required sample would be 30 under the 5:1 ratio and 60 under the 10:1 ratio. Thus, having 357 respondents far exceeds both thresholds, indicating that the sample size is statistically sufficient to support multiple regression analysis and ensures the reliability and generalizability of the study's findings.

Instrumentation

The research instrument was a structured questionnaire adapted from validated UTAUT and SDT scales. The items measured constructs of performance expectancy, effort expectancy, facilitating conditions, competence, autonomy, relatedness, and use behaviour. All items employed a 5-point Likert scale ranging from "strongly disagree" to "strongly agree."

Reliability and Validity

The experts assessed the questionnaire items for their alignment with the research objectives, clarity of language, and suitability in measuring each construct. Based on their feedback, several questions were rephrased to enhance clarity and minimise ambiguity. The content validity of the questionnaire, as evaluated by the experts, was quantified using the Sidek & Jamaludin Content Validity Formula and expressed as a percentage.

$$\frac{Total\ score\ given\ by\ the\ expert}{Total\ score} * 100\%$$

According to Cortina (1993) the validity of the overall content is acceptable if the validity coefficient is 0.70 and above. Table 1 reports the validity levels as verified by the experts. Content validity was ensured by adapting items from established frameworks and pilot-testing the questionnaire prior to administration. Table 1 presents the demographic distribution of the 357 ESL respondents from Universiti Kebangsaan Malaysia.

Table 1. Validity of constructs

Item	Expert 1	Expert 2	Expert 3	Total Mean Percentage (100%)
PE1	4	4	4	100.00
PE2	4	4	4	100.00
PE3	2	3	3	66.67
PE4	2	3	4	75.00
PE5	3	4	4	91.67
PE6	3	4	4	91.67
PE7	3	4	4	91.67
EE1	2	4	4	83.33
EE2	3	4	4	91.67
EE3	4	3	4	91.67
EE4	3	3	4	83.33
EE5	3	4	4	91.67
EE6	4	4	4	100.00
FC1	3	4	4	91.67
FC2	4	4	4	100.00
FC3	2	4	4	83.33
FC4	3	2	4	75.00
FC5	3	3	2	66.67

FC6	3	4	4	91.67
FC7	4	4	4	100.00
FC8	4	3	3	83.33
COM1	3	4	4	91.67
COM2	3	3	4	83.33
COM3	3	3	4	83.33
COM4	4	4	4	100.00
COM5	4	3	4	91.67
AUTO1	3	4	4	91.67
AUTO2	4	3	4	91.67
AUTO3	4	4	4	100.00
AUTO4	4	3	4	91.67
AUTO5	2	4	4	93.33
AUTO6	3	4	4	91.67
RELATED1	2	4	4	93.33
RELATED2	3	3	4	83.33
RELATED3	3	3	3	75.00
RELATED4	3	4	4	91.67
RELATED5	3	3	4	83.33
RELATED5	3	3	4	83.33
UB1	3	2	4	75.00
UB2	2	3	4	75.00
UB3	4	3	4	93.33
UB4	4	3	4	91.67
UB5	4	4	4	100.00
UB6	3	4	4	91.67
UB7	2	4	4	83.33

Table 2. Reliability of constructs

Section	Item / Construct	Quantity of Item	Cronbach's Alpha (CA)
2	1) Performance Expectancy	7	.801
	2) Effort Expectancy	6	.676
	3) Facilitating Conditions	8	.758

4) Competence	5	.843
5) Autonomy	6	.679
6) Relatedness	6	.895
7) Use Behaviour	7	.783

As shown in Table 2, the reliability scores for each variable ranged from 0.60 to 0.89, indicating that all items in the research instrument are appropriate for use in this study as an Alpha value slightly above 0.6 can reflect an acceptable level of internal consistency (Nunnally & Bernstein, 1994).

Data Collection and Analysis

Data were collected online and analysed using SPSS. Descriptive statistics were used to examine levels of ChatGPT use. Pearson's correlation was conducted to identify relationships between variables, and multiple regression was employed to determine the predictive power of UTAUT and SDT constructs.

RESULTS

The results of the study are presented in three parts: (1) demographic profile of respondents, (2) correlations among variables, and (3) regression analysis of predictors of ChatGPT use behaviour.

Demographic Profile

Table 3 presents the demographic distribution of the 357 ESL respondents from Universiti Kebangsaan Malaysia.

Table 3. Demographic Profile of Respondents

Variable	Frequency	Percentage (%)
Gender (Male/Female)	120 / 237	33.6 / 66.4
Year of Study (1/2/3/4)	80 / 95 / 92 / 90	22.4 / 26.6 / 25.8 / 25.2
Faculty Distribution	Varied across faculties	Balanced sample

As shown in Table 3, the sample comprised 120 male students (33.6%) and 237 female students (66.4%). This reflects the general trend of female predominance in language-related studies in Malaysian universities. The distribution of respondents across years of study was relatively even, ranging from 22.4% in Year 1 to 25.8% in Year 3. Students also represented a variety of faculties, ensuring balanced perspectives across disciplines. This distribution enhances the representativeness of the findings for the UKM student population.

Correlations Among Variables

Table 4 presents the descriptive statistics and correlation coefficients among the seven study variables.

Table 4. Descriptive Statistics and Correlations among Study Variables

Variable	M	SD	1	2	3	4	5	6	7
1. Performance Expectancy	3.98	.64	1						
2. Effort Expectancy	4.12	.59	.564**	1					
3. Facilitating Cond.	3.87	.71	.522**	.498**	1				
4. Competence	3.91	.68	.401**	.437**	.396**	1			
5. Autonomy	3.94	.63	.429**	.452**	.418**	.403**	1		
6. Relatedness	4.01	.60	.478**	.499**	.440**	.424**	.452**	1	
7. Use Behaviour	4.07	.62	.564**	.603**	.559**	.410**	.446**	.529**	1

Note. *$p < .01$.

As shown in Table 4, the highest mean scores were recorded for effort expectancy (M = 4.12, SD = .59) and use behaviour (M = 4.07, SD = .62), indicating that students perceived ChatGPT as easy to use and engaged with it frequently. Relatedness (M = 4.01, SD = .60) was also high, reflecting the social support students felt when interacting with the tool.

The correlation results show that ChatGPT use behaviour was significantly and positively related to all six predictor variables. Effort expectancy (r = .603), performance expectancy (r = .564), and facilitating conditions (r = .559) demonstrated the strongest associations, suggesting that technological factors were the most influential. Psychological factors such as relatedness (r = .529), autonomy (r = .446), and competence (r = .410) also showed moderate positive correlations, underscoring the role of intrinsic motivation in shaping use behaviour.

Regression Analysis

Table 5 presents the regression analysis used to identify predictors of ChatGPT use behaviour.

Table 5. Regression Analysis Predicting ChatGPT Use Behaviour

Predictor	β	t	Sig.
Performance Expectancy	.214	5.12	.000
Effort Expectancy	.268	6.34	.000
Facilitating Conditions	.207	4.95	.000
Competence	.051	1.27	.203
Autonomy	.122	2.89	.004
Relatedness	.185	4.36	.000

Note. Model $R^2 = .563$, $F(6, 350) = 75.39$, $p < .001$.

As indicated in Table 5, the overall regression model was significant, explaining 56.3% of the variance in ChatGPT use behaviour. Among the predictors, effort expectancy emerged as the strongest predictor ($\beta = .268$, $p < .001$), followed by performance expectancy ($\beta = .214$, $p < .001$) and facilitating conditions ($\beta = .207$, $p < .001$). These results confirm that perceptions of usefulness, ease of use, and institutional support are central to ChatGPT adoption.

From the SDT perspective, autonomy ($\beta = .122$, $p = .004$) and relatedness ($\beta = .185$, $p < .001$) were also significant predictors, highlighting the importance of psychological needs in sustaining engagement. Competence, however, was not a significant predictor ($\beta = .051$, $p = .203$), despite its positive correlation with use behaviour. This suggests that while students may

feel confident using ChatGPT, competence alone is insufficient to explain adoption when other factors are considered.

DISCUSSION

The findings of this study reveal that both technological determinants from the Unified Theory of Acceptance and Use of Technology (UTAUT) and psychological determinants from Self-Determination Theory (SDT) significantly shape ESL students' ChatGPT use behaviour at Universiti Kebangsaan Malaysia (UKM). Five of the six predictors which are performance expectancy, effort expectancy, facilitating conditions, autonomy, and relatedness have shown to significantly influence usage behaviour, while competence did not. These results highlight the multidimensional nature of ChatGPT adoption, demonstrating that students' engagement with AI tools is not driven solely by perceptions of usefulness or ease of use, but also by underlying motivational needs that support autonomy and social connectedness.

Performance expectancy emerged as a significant predictor, indicating that students who believed ChatGPT enhanced their academic performance were more likely to use it frequently. This aligns with earlier findings by Hsu (2012) and Martín-Rodríguez et al. (2014), who reported that perceived academic benefits strongly encourage students to adopt educational technologies. Similarly, research on AI tools in Malaysian tertiary education, such as Lam and Abdul Rahim (2025) and Muniandy and Selvanathan (2024), confirms that learners value ChatGPT for improving writing clarity, generating ideas, and supporting oral fluency, these benefits are consistent with the high performance expectancy observed in this study. From a theoretical standpoint, UTAUT positions performance expectancy as the strongest determinant of behavioural intention (Venkatesh et al., 2016), and this study's findings corroborate the model by showing that perceived performance improvement directly translates into sustained usage. SDT further explains this pattern by suggesting that students experience enhanced intrinsic motivation when learning tools support their sense of competence, encouraging more frequent use.

Effort expectancy also significantly predicted usage behaviour, demonstrating that students were more inclined to adopt ChatGPT when they perceived it as easy to use. This is consistent with prior research emphasising the importance of simplicity in technological adoption (Duong, 2024; Williams et al., 2015). AI tools like ChatGPT require minimal technical skill and respond in natural language, which reduces cognitive load and makes them attractive to learners who may struggle with traditional language-learning methods. UTAUT posits that ease of use directly influences user acceptance, particularly among individuals with varying levels of digital literacy. The present findings affirm this principle, showing that intuitive AI interfaces can facilitate adoption even among students who might otherwise be hesitant to embrace new technologies. Moreover, from an SDT perspective, tools that require low effort can strengthen learners' perceived autonomy, as they feel more capable of navigating the tool independently.

Facilitating conditions were also found to significantly predict ChatGPT use, indicating that students with adequate institutional support, access to a stable internet, and familiarity with digital platforms were more likely to engage with ChatGPT. This aligns with prior Malaysian studies that emphasise the role of environmental support in successful technology integration (Lai & Lee, 2022; Tengku Ariffin et al., 2023). The significance of facilitating conditions

highlights that even highly useful and easy-to-use technologies require supportive ecosystems to enable consistent adoption. UTAUT suggests that facilitating conditions become more influential as users move from intention to actual use (Venkatesh et al., 2016), which corresponds with the positive association observed in this study. In the context of UKM's CEFR-aligned curriculum, which is designed to improve English proficiency (Musa et al., 2021), adequate support structures may play a key role in enabling learners to use AI tools effectively as supplementary learning resources.

Autonomy was another significant predictor of ChatGPT use behaviour. This finding aligns with SDT literature, which posits that learners are more motivated to use educational tools when they feel a sense of volition and control over their learning (Deci & Ryan, 2008). Studies such as Bureau et al. (2021) and Rosli and Saleh (2022) similarly show that autonomous learning environments foster deeper engagement with digital learning platforms. ChatGPT supports autonomy by allowing students to choose what, when, and how they learn, whether through self-directed vocabulary building, idea generation, or clarification of complex language structures. This flexibility aligns with the needs of ESL learners who may feel anxious or constrained in traditional classroom settings. The significant influence of autonomy found in this study thus reinforces SDT's proposition that autonomy-supportive tools enhance intrinsic motivation, encouraging sustained and self-initiated use.

Relatedness was also identified as a significant and relatively strong predictor of ChatGPT usage. This suggests that social connection, whether through peer influence, shared academic norms, or collaborative learning practices, has the ability to drive students to adopt AI tools. This finding is consistent with studies highlighting the role of social presence and peer support in technology use (Rochmawati, 2023; Zhou et al., 2021). In the context of ESL learning, where communication and interaction are central, feeling connected to peers who also use ChatGPT may create a sense of community and validation around using AI for academic purposes. SDT posits that relatedness enhances emotional engagement and encourages behaviours that align with group norms. The significance of relatedness in this study therefore, highlights the social dimension of AI adoption, a factor sometimes overlooked in technology acceptance research dominated by cognitive and usability-based variables.

Interestingly, competence did not significantly predict ChatGPT use behaviour, contradicting traditional SDT expectations that competence satisfaction motivates engagement. This finding diverges from studies by Bureau et al. (2021) and Mulyono et al. (2024), which found competence to be a strong predictor of digital learning tool adoption. A likely explanation is that generative AI tools such as ChatGPT function as competence-supporting agents rather than requiring users to feel competent themselves. Students with low English proficiency may still adopt ChatGPT extensively because the tool compensates for their linguistic limitations by generating coherent ideas, correcting grammar, and providing explanations. This phenomenon aligns with recent AI research indicating that learners adopt generative AI regardless of their self-perceived competence, as the tool reduces performance barriers (Dwivedi et al., 2023). Thus, competence may be less relevant for AI adoption than for other technologies that require higher user skills.

Overall, the study demonstrates that ChatGPT adoption among ESL students is shaped by both technological expectations (usefulness, ease of use, environmental support) and psychological needs (autonomy, relatedness). The interplay of UTAUT and SDT predictors supports an integrative theoretical model in which external system features and internal motivational states

jointly influence technology use behaviour. These results contribute to a growing body of literature emphasising the importance of addressing both cognitive and motivational factors in AI integration within higher education.

IMPLICATIONS

The findings of this study provide several important implications for educators, higher education institutions, policymakers, and theoretical development in technology-enhanced language learning. These implications highlight the practical significance of integrating ChatGPT into ESL education while addressing usability, motivation, and systemic support.

The results emphasise the need for ESL instructors to embed structured AI literacy within teaching practices. Educators should explicitly guide students on how to use ChatGPT effectively, particularly in areas such as prompt formulation, evaluation of generated responses, and revision of AI-assisted drafts. This ensures that ChatGPT is used as a learning aid rather than a replacement for academic effort. Furthermore, educators can leverage ChatGPT as a scaffold for lower-proficiency learners by designing tasks in which the tool supports vocabulary development, idea generation, and simplified explanations before students refine the content independently. As autonomy emerged as a significant predictor, instructors should design learning activities that provide students with freedom of choice in determining how ChatGPT supports their learning. Additionally, because relatedness influences usage behaviour, educators should incorporate collaborative classroom activities where students compare, critique, and refine AI-generated outputs. Such practices enhance peer learning, foster social support, and promote responsible AI usage. Finally, lecturers should integrate clear ethical guidelines and academic integrity expectations into coursework to ensure that students understand the boundaries of acceptable AI involvement.

At the institutional level, the findings indicate the urgent need for universities to develop comprehensive AI literacy frameworks for both students and staff. This may include training modules, micro-credentials, workshops, and competency-based guidelines on responsible AI usage. As facilitating conditions significantly predicted ChatGPT use, UKM and other higher education institutions must strengthen digital infrastructure, ensuring stable connectivity, accessible AI platforms, and integration with existing systems such as UKMFolio. Institutions should also establish clear AI policies outlining acceptable and unacceptable uses in academic contexts, with these guidelines embedded in course outlines, assignment instructions, and university-wide regulations. To further support students, institutions may set up AI learning support units or consultation clinics, similar to writing centres, where learners can receive guidance on using ChatGPT meaningfully without over-dependence. Additionally, universities should consider implementing monitoring systems or analytics dashboards (with appropriate privacy safeguards) to track AI usage trends for the purpose of improving pedagogy, identifying support needs, and promoting ethical use.

At the policy level, the findings align closely with Malaysia's national digital transformation agendas, including the MyDIGITAL Blueprint, the National AI Roadmap, and the Malaysia Education Blueprint 2013-2025. The results suggest that AI-supported ESL learning can contribute to the development of digitally fluent graduates, thereby supporting national goals. Policymakers may consider incorporating AI literacy competencies, such as evaluating AI

outputs, practising ethical use, and developing prompt engineering skills into higher education curriculum standards and accreditation requirements by MOHE and MQA. Policies should also address digital equity by providing targeted support or funding to institutions with limited technological infrastructure to ensure fair access to AI tools across campuses. Furthermore, the establishment of national guidelines for ethical generative AI use in education, covering academic integrity, privacy protection, and responsible usage, would help provide uniformity and clarity across higher education institutions. Given that ChatGPT supports language skill development, policymakers may integrate generative AI into national initiatives aimed at raising English proficiency and supporting CEFR-aligned instruction.

The theoretical implications of this study highlight the value of integrating UTAUT and Self-Determination Theory (SDT) to understand generative AI adoption. The findings demonstrate that both extrinsic factors (usefulness, ease of use, support) and intrinsic psychological needs (autonomy and relatedness) influence behaviour, suggesting that technology acceptance in AI-mediated learning contexts is both cognitive and motivational. This validates the complementary nature of UTAUT and SDT and extends their applicability to generative AI tools in ESL learning. Furthermore, the non-significant role of competence reveals a potential boundary condition within SDT, suggesting that generative AI may reduce the importance of perceived self-competence by providing direct linguistic and cognitive scaffolding. This insight contributes to theoretical advancement by challenging the assumption that competence is always central to motivation in technology-mediated learning environments. Overall, the study enriches the conceptual understanding of AI adoption and offers a foundation for future research exploring motivation-technology relationships in educational settings.

CONCLUSION

This study examined the factors influencing ChatGPT use behaviour among ESL learners at Universiti Kebangsaan Malaysia (UKM) and addressed the broader research problem of how generative AI can support English language learning within CEFR-aligned higher education curricula. The results demonstrated that ChatGPT adoption is shaped by both technological determinants (i.e. performance expectancy, effort expectancy, and facilitating conditions) and psychological determinants (i.e. autonomy and relatedness), highlighting that students' engagement with AI tools is driven not only by perceived usefulness but also by the fulfilment of key motivational needs. The non-significant influence of competence suggests that generative AI may function as a compensatory tool, reducing the reliance on learners' initial self-perceived abilities.

The study contributes to existing literature by integrating UTAUT and SDT as a unified explanatory model, offering a more holistic understanding of AI adoption in language learning contexts. Additionally, the findings provide practical insights for improving instructional practices, designing institutional guidelines, and informing national policy development within Malaysia's digital transformation initiatives. By returning to the research problem, this study demonstrates that empowering ESL learners to use AI effectively requires more than access to technology; it necessitates supportive learning environments, clear ethical guidance, robust institutional frameworks, and alignment with broader national digital strategies.

Ultimately, the study underscores the potential of generative AI to enrich ESL learning when appropriately integrated. By addressing both technological and psychological factors, universities can maximise the educational benefits of ChatGPT while mitigating risks such as over-reliance and inequitable access. These insights lay the groundwork for future research exploring long-term effects, cross-institutional comparisons, and the evolving roles of educators and learners in AI-enabled learning environments.

LIMITATIONS AND FUTURE RESEARCH

This study has several limitations. First, it was conducted at a single institution, limiting the generalizability of findings to other universities in Malaysia. Second, the study employed a cross-sectional design, which does not capture changes in ChatGPT use behaviour over time. Third, the reliance on self-reported data may introduce bias. Future research could address these limitations by conducting longitudinal studies that track students' use of ChatGPT over time, exploring differences across institutions, and incorporating qualitative methods to capture students' lived experiences. Expanding the investigation to diverse student populations would also provide a more comprehensive understanding of AI adoption in Malaysian higher education.

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FARAH AIDA FADZIL*
Pusat Pengajian Citra, Universiti Kebangsaan Malaysia,
43600 Bangi, Selangor, Malaysia
farahfadzil@ukm.edu.my

MUHAMMAD FAZLI ABDULLAH
Pusat Pengajian Citra, Universiti Kebangsaan Malaysia,
43600 Bangi, Selangor, Malaysia
afazli@ukm.edu.my

ZAHID IBRAHIM
Pusat Pengajian Citra, Universiti Kebangsaan Malaysia
43600 Bangi, Selangor, Malaysia
zahid.ibrahim@ukm.edu.my

AISYAH NURHUDA ABD. RAHMAN
Pusat Pengajian Citra, Universiti Kebangsaan Malaysia
43600 Bangi, Selangor, Malaysia
aisyahnurhuda@ukm.edu.my

SABRINA CHE HARON
Pusat Pengajian Citra, Universiti Kebangsaan Malaysia
43600 Bangi, Selangor, Malaysia
sabrinaharon@ukm.edu.my

*Corresponding author: farahfadzil@ukm.edu.my

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