

Artificial Intelligence Integration in Malaysian TESL Classrooms: Effects on Student Engagement and Teaching Effectiveness

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DOI: <https://doi.org/10.47772/IJRISS.2026.100601255>

Received: 25 June 2026; Accepted: 30 June 2026; Published: 16 July 2026

ABSTRACT

It is projected that the use of artificial intelligence (AI) in education, especially Teaching English as a Second Language (TESL), will alter TESL by improving teaching effectiveness and learner engagement. The use of AI in TESL classrooms may affect these results, according to this conceptual paper, which provides a framework for analysis. The study is based on research on constructivist learning theory, student engagement theory, and the Technological Pedagogical Content Knowledge (TPACK) framework, published between 2021 and 2025. To suggest an integrated model, the concept-building research paper assesses current research on a certain topic. It is anticipated that AI tools such as ChatGPT would promote personalized education by offering instantaneous feedback in an interactive manner, hence improving student behavior, emotion, and cognition. With less administrative work and more data-driven instructional decisions, the use of AI may also boost teaching productivity. However, problems like digital illiteracy, moral dilemmas, and over-reliance on technology could affect how it is used. By offering a paradigm to guide practice and upcoming empirical research in Malaysian higher education, this work contributes to the body of TESL literature already in existence.

Keywords: TPACK, conceptual framework, Malaysia, TESL, AI, and student involvement.

INTRODUCTION

With a focus on Teaching English to Speakers of Other Languages (TESL), this study examines the impact of digital technology usage in contemporary education. Artificial intelligence (AI) stands out as a possible agent for improving instruction and students' learning experience with the increasing usage of innovations in higher education. Teachers in Malaysia are expected to experiment with AI-based technologies in language classes because of the country's need to go digital and progress with Education 4.0.

AI tools can create an interactive environment that may help learn new languages, enabling personalized learning, and provide quick feedback. All of these are relevant to TESL since practice and teacher-student interaction are essential. However, integrating AI into education presents several challenges and calls for effort to combine pedagogical efficacy with contemporary technology tools.

In the context of TESL in Malaysia, a model outlining the relationship between AI adoption, student engagement, and teaching quality will be proposed in this study. Additional research may be laid out in the context of theoretical analysis and literature review.

LITERATURE REVIEW

In the modern era, many scholars have been interested in implementing AI technology in the educational domain. Particularly, in language learning environments where the importance of interaction, practice, and feedback is high

in learning outcomes, AI technology is increasingly applied within the context of education in order to enhance adaptive learning, provide automated feedback, and promote students' interest in subject matter (Zawacki-Richter et al., 2022). These affordances are very useful in the realm of Teaching English to Speakers of Other Languages (TESL), as the learning of language requires active involvement and communicative process. The two dependent variables in this research are students' engagement and teachers' effectiveness, whereas the independent variable is the implementation of AI.

Artificial Intelligence Integration and Student Engagement

As many scholars highlight, student engagement is a complex process that involves behavioral, emotional, and cognitive elements of engagement and is crucial for learning processes (Fredricks et al., 2022). When it comes to the teaching of English as a second language, it is vital to create favorable conditions and motivate students to pay attention and engage in communicating, thus practicing linguistic abilities. Personalization and interaction created by integrating artificial intelligence are some of the ways to make learning more engaging.

For instance, recent research claims that AI-based solutions that offer personalization and feedback to the users may contribute to an increased level of student engagement. In particular, in their meta-analysis of chatbots in language learning, Huang et al. (2023) found that artificial intelligence may foster learner confidence and lower fears regarding the communication experience, thus increasing learner participation. Hence, the use of AI might help improve emotional engagement by providing favorable learning conditions.

On the same note, their meta-analysis showed that AI applications positively affected learners' English language achievements. This indicates that an AI-driven learning context might encourage learners to take an active part in their studies and internalize information effectively. Indeed, this can be explained by a constructivist point of view according to which knowledge acquisition happens due to social interaction. In the case of AI applications, learners are encouraged to interact with the subject matter from various perspectives and receive feedback immediately, thus fostering cognitive engagement.

Recently, new evidence has been gathered regarding the potential of AI systems to engage behaviors in gamified learning contexts. Specifically, in the opinion of Zawacki-Richter et al. (2022), these systems allow for the tracking of learners' performance and the adjustment of the material to make it more appealing and engaging for students. Nonetheless, such technologies come along with the risk of superficial participation. For instance, Yusof et al. (2025), citing a common phenomenon observed among learners in educational contexts, state that sometimes they "parrot" AI feedback without engaging in classwork.

Studies done in Malaysia have indicated that students' perceptions of usefulness and satisfaction with AI can predict the use of AI among students. It has been discovered that students' satisfaction can predict AI usage in higher education institutions by Mat Yusoff et al. (2025), showing the importance of creating value and meaning in the learning process through AI-mediated interactions. Studies show that, if the mediating variables, such as digital literacy or good design of instructions, are considered, AI should positively impact students' engagement.

Artificial Intelligence Integration and Teaching Effectiveness

The capacity of TESL teachers to enable effective learning of a language using appropriate techniques of teaching, giving constructive criticisms, and providing support to learners is referred to as TESL teaching effectiveness. Through enhancing efficiency, instructional decisions, and customized learning, the application of AI is currently viewed as an effective method of improving teaching effectiveness.

One important technique through which the application of AI increases the efficiency of teachers is that of automated feedback. Using AI, instantaneous and specific feedback regarding the language capabilities of the learners, especially in written assignments, is possible. According to Youn et al. (2025), the automated feedback process enables learners to revise their written assignments easily due to timely and accessible feedback. Teachers are no

longer occupied by other tasks since their workload has been removed, thus enabling them to facilitate discussions with the learners.

Additionally, by producing learning trajectory and student performance information, AI integration makes data-driven instruction possible. Teachers can modify their pedagogical approaches in response to larger and more varied student groups thanks to these analyses, which enhances the quality of instruction (Tan et al., 2024). In TESL classrooms, where students usually have diverse language competency levels and require individualized instruction, this is quite helpful.

AI's role in teacher professional development and innovative instruction has also been demonstrated by recent systematic reviews. Differentiated instruction is necessary in TESL courses because students are rarely at the same skill level. However, Tan et al. (2024) stressed that there is potential in terms of how conversational AI, adaptive learning, and immersive technology can benefit instruction. However, the study mentioned that instructors "require prior knowledge or training and must possess digital literacy, without which they may not be able to harness the full potential of implementing AI."

Meanwhile, the literature concerning the use of AI in teaching and learning stresses the need for proper planning before integrating AI into schools. According to Giannakos et al. (2025), generative AI presents issues including overuse, ethical ramifications, and the erosion of teacher agency, but it also opens up new possibilities for improving teaching practice. Over-reliance on AI may prevent real language engagement in the TESL setting, where human connection is essential to the development of communicative competence.

Additionally, research shows that the compatibility of technology and pedagogy has a role in the success of integrating AI. The quality of teaching outcomes may be enhanced if the applications of AI technologies are in line with and support the methodology and/or instructional goals, for as by enhancing communicative language education. The impact of AI tools on learning is far less obvious when they are utilized as stand-alone instructional components without explicit methodological aims.

Synthesis and Research Gap

According to the literature, integrating AI into TESL may have a significant impact on instructional efficacy and student engagement. Additionally, research regularly shows positive outcomes in terms of learning attainment, motivation, interaction, and feedback. However, these benefits are not assured and are impacted by things like ethical concerns, teacher readiness, and instructional design.

There are several gaps in the growing body of research on AI in education. First off, most of the research that is now available is done in general educational settings rather than specifically in TESL settings, particularly in Malaysia. Second, instead of combining both perspectives into a single model, they typically look at student outcomes and instructional methods independently. Third, not many models have been developed based on theories about the way in which integrating AI affects both student engagement and teaching effectiveness.

As such, the gap is filled in this current study through the provision of a theoretical paradigm whereby the integration of AI serves as the independent variable while student engagement and teaching effectiveness serve as two dependent variables.

Problem Statement

Concerns do arise in recent literature on the interactions of students with AI technology. As noted by Yusof et al. (2025), some students engage in "parroting," whereby they take the output generated by the AI and invest little cognitive effort into it. From these findings, it can be concluded that performance pressure and extraneous cognitive loads are the reasons behind such an activity, meaning that AI may encourage surface-level engagements unintentionally if not used properly. This problem becomes even more relevant when discussing TESL courses since

the learners have to actively use the language to build their competencies.

Teacher readiness remains an important concern in relation to teaching. Even though the possibilities of using AI technology in enhancing the effectiveness of teaching through offering automated feedback and analytics have been demonstrated, there are claims that most teachers do not have the necessary technological and pedagogic abilities to fully use AI technologies in their teaching (Zawacki-Richter et al., 2022). The problem becomes even more pronounced in the case of teaching English as a second language because good teaching in this area involves more than just passing knowledge; rather, it involves engaging students, giving constructive feedback, and adapting teaching in response to diverse student needs.

Moreover, the rapid development of generative artificial intelligence technologies like ChatGPT has brought about many ethical and pedagogical problems, such as those related to academic integrity, privacy, and technology dependency (Giannakos et al, 2025). Therefore, the process of using artificial intelligence in teaching ESL requires a more systemic theoretical approach that considers not only the benefits of the technology but also its appropriateness for specific pedagogical goals and learners' engagement.

Considering all these points, the current literature still lacks research dedicated to finding a systematic way of integrating AI into TESL that would contribute to achieving both high levels of students' engagement and teachers' effectiveness. Though some of the existing literature has examined the implementation of AI technology, students' attitudes, and effects of AI usage on learning outcomes, the relations between these variables have not been explored sufficiently. As a result, the purpose of the present study is to fill in the identified gap by providing a conceptual framework of AI integration in Malaysian TESL that sees AI as an independent class, while the students' engagement and teachers' effectiveness will be considered as the major dependent classes.

THEORITICAL FRAMEWORK

The basis for this research will be formed by the TPACK framework, constructivist learning theory, and the concept of student engagement. Under the constructivist learning theory, learners actively construct their knowledge (Piaget, 1977). The theory places particular importance on the value of socially based learning and effective communication interaction. With respect to the area of TESL, constructivist learning is assumed to be supported using artificial intelligence, which creates an opportunity for interaction where students can react and work with linguistic content immediately.

Student engagement theory provides an appropriate theoretical framework for analyzing the interaction between students and instructional resources. Within the paradigm, there are three components of engagement: behavioral, emotional, and cognitive. Through encouraging active involvement, positive learning attitudes, and cognition enhancement, it is anticipated that the incorporation of AI will affect these three aspects.

The TPACK approach was proposed by Mishra and Koehler, suggesting that teachers must be technologically, pedagogically, and content-aware to be competent educators. Effectively using artificial intelligence tools in TESL classes will mean that instructors must be not only technologically savvy but also be able to incorporate these resources into pedagogical and linguistic purposes. To effectively integrate artificial intelligence into TESL instruction, the instructor must have the necessary technological skills and be proficient in incorporating these technological tools into their pedagogical and language-based content goals.

In this case, a theoretical framework with AI inclusion as an independent variable affecting both TE and SE under these concepts is outlined. Considering that the efficacy of teaching relies upon the joint impact of AI tools and the teacher's capability to utilize them, student engagement acts as a mediating variable for better performance. 451 The proposed associations can be mediated by extrinsic variables including ethics and digital literacy.

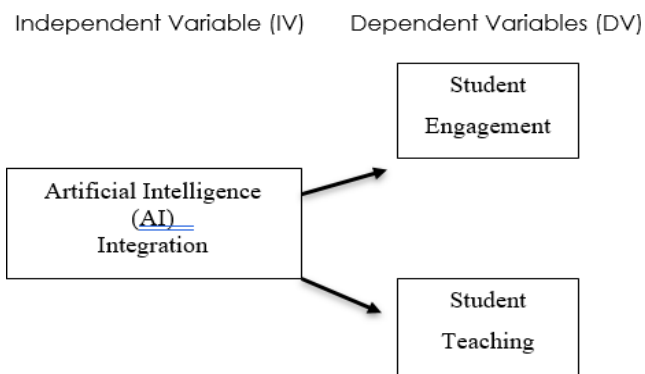
PROPOSED CONCEPTUAL FRAMEWORK

In order to describe the connection between the implementation of AI technology and its potential effect on educational outcomes in the TESL classes of Malaysia, the theoretical framework adopted in the study makes a number of assumptions. The research takes an approach based on a set of predictors (independent variables) and effects (dependent variables). Some of the proven theoretical approaches include constructivist learning theory, student engagement theory, and TPACK models, among others.

In the particular case of AI implementation, the independent variable includes the implementation of artificial intelligence in education, which can take a range of forms from using such programs as ChatGPT or other types of automation technologies, adaptive systems, and others. All these technologies are believed to change the nature of the educational process through providing personalized learning, engaging activities, and prompt feedback to learners. Student engagement, the first dependent variable, is described as a three-dimensional construct with behavioral, emotional, and cognitive components. AI integration is expected to have a favorable effect on students' behavioral engagement, that is, their increasing active participation in class activities, especially when it comes to interactive and technologically demanding assignments. Additionally, as the employment of AI tools may help create a more positive and less intimidating environment, which increases ELLs' (English language learners') motivation and confidence to use the language, emotional involvement is probably going to be better. AI is expected to promote deeper learning in terms of cognitive engagement since it encourages students to actively think while processing knowledge, consider feedback, and take part in problem-solving exercises.

"The extent to which a teacher is able to bring desired or expected outcomes of instruction closer to the intended outcomes of instruction" is the definition of teaching effectiveness, the second dependent variable. AI-powered automated grading or feedback systems will probably reduce teaching effort, allowing teachers to concentrate more on instructional design and student interaction, which will improve teaching effectiveness. Furthermore, the analysis provided by the AI can be useful in the facilitation of data-based decision-making which could help teachers tailor their methods of instruction according to the needs of the learners. This paradigm accounts for the role which external factors such as digital literacy, ethics, and institutional support can play in the relationship between adopting AI technology and the dependent variables. As previously mentioned, those two variables are identified as essential preconditions for ensuring success or failure in the usage of AI technology in the TESL context regardless of their inclusion in the presented research. Therefore, the use of the suggested conceptual framework would anticipate that the incorporation of AI in TESL education will have a favorable influence on both teaching efficacy and student engagement. The paradigm emphasizes the need of pedagogical alignment and provides a logical explanation of how technology-driven innovation might improve language learning experiences, with AI serving as the main agent of change. This approach will provide information for upcoming empirical research that will verify the viability of integrating AI in Malaysian TESL contexts and test the suggested correlations.

Figure 1: Proposed Conceptual Framework



Future Empirical Research Direction

Since the discussion in this paper is more conceptual than anything else, the methodology will take a different turn from the typical empirical research design. Instead of presenting an already-conducted empirical research study, the following framework may be used to conduct an empirical investigation on the relationship between AI implementation, engagement, and effective teaching in Malaysian TESL classrooms in the future. This is appropriate since the present research paper is concerned with theorizing the possible effects of implementing AI-based technology in teaching, rather than conducting primary research. Future researchers may use surveys in their study to gauge the extent to which the proposed variables affect Malaysian TESL classrooms where instructors and students make use of AI, including chatbots, automated feedback tools, adaptive learning systems, or AI-enabled writing tools.

Possible future studies can utilize PLS-SEM using the SmartPLS program for validation of the conceptual framework proposed in this paper. The PLS-SEM model is appropriate in cases where the focus of research is on predictive models or exploratory models as well as development of theories in new fields such as AI-based language education (Hair et al., 2022). In this regard, AI usage may be assessed based on variables such as frequency of AI use, perceived usefulness of AI, ease of AI usage, feedback offered by AI systems, and pedagogical compatibility of AI with educational needs of students (Fredricks et al., 2022). Student engagement may be assessed through behavioral engagement, emotional engagement, and cognitive engagement of learners. Teaching effectiveness can be assessed through a variety of indicators including clarity of instruction.

Possible moderating and mediating variables that should be studied include digital literacy among teachers, institutional support, ethical considerations, learner autonomy, and student readiness for adopting AI. This is significant because the impact of using AI technologies in education is influenced not only by the adoption of these technologies, but also by teachers' ability to integrate them with instructional goals. The concept of TPACK can provide support for this assumption by highlighting that integrating technologies into teaching requires interaction between knowledge about technology, pedagogy, and content (Mishra & Koehler, 2021). Consequently, the use of empirical studies to examine the influence of AI integration on TESL teaching and learning should not be limited to measuring its effects but also analyzing when such integration is beneficial for teaching practices.

In general, future research can be based on the proposed theoretical framework in terms of looking at the impact of the use of AI in enhancing student engagement and teaching efficacy in TESL classes. The findings from such research would enable researchers to transcend the realm of mere theorization and derive practical evidence about the involvement of AI in language education. This research area is especially significant for Malaysia, which requires pedagogical, teacher, and institutional considerations for the effective use of AI.

Implication For Tesl Practice and Research

The presented conceptual framework not only has significant theoretical but also practical implications regarding the usage of technology in the TESL context within higher education institutions, particularly in Malaysia, where the process of pedagogical innovation triggered by digital transformation is taking place. First of all, the model predicts and highlights the necessity for teachers to move from sporadic use of technology towards pedagogically based implementation of technology that plays a vital role as one of the key founders and facilitators of student engagement and quality instruction. In other words, it is necessary to utilize AI-powered instruments deliberately in order to enhance language instruction that is based on learner-centered principles and communicative competency. For example, solutions such as ChatGPT can be used in order to foster dialogic interactions, writing skills, and formative assessment.

In terms of the approach, it is expected that proper integration of TPACK in the activity of tutors would result in an innovative interpretation of education in regard to its design. In addition to technological literacy, tutors should also be capable of integrating AI functions into relevant language learning goals and methods. This consistency is especially important in TESL environments, because learning a second language involves the ability to communicate in a constantly changing reality. As a result, students should be encouraged to interact with AI in order to boost their

behavioral engagement through interactive activities, their emotional engagement through the mitigation of accentuated language anxiety through interaction with AI, and their cognitive engagement through thinking-aloud exercises and other cognitive strategies with AI support, like problem-solving exercises. Since AI is an augmentative technology that can improve the learning experience and the human element remains important to the learning process, the framework challenges educators to become facilitators. As a result, the duty of the educator is to manage.

Additionally, the framework highlights the importance of professional growth and institutional support as factors that influence the adoption of AI. TESL practitioners require professionally structured in-service training where they are introduced to technology tools and given a critical awareness of the pedagogical opportunities and limitations associated with them. Competencies related to the ethical application of AI, data privacy, and academic integrity are all more important in digitally mediated learning environments, yet this is the best practice in digital teaching and learning spaces. This framework provides practitioners with a lens through which they can develop capacity building strategies that will address the dichotomy between technological space and pedagogical sense making in Malaysia, a nation where policy pronouncements prioritize digital readiness and Education 4.0.

From a research standpoint, the suggested framework contributes to the expanding body of literature on AI in language education by offering a systematic model that can be empirically investigated using quantitative techniques like Partial Least Squares Structural Equation Modeling (PLS-SEM) with SmartPLS. Future studies can operationalize the constructs of AI integration, student engagement, and instructional effectiveness to examine the nature and strength of the relationships among these constructs across different TESL environments, proficiency levels, and institution types. Specifically, the paradigm enables future studies to investigate the moderating effects of characteristics including digital literacy, learner autonomy, and institutional preparedness, as well as the mediating function of student engagement.

Additionally, the approach opens the door for mixed-method and longitudinal studies to track how AI affects language learning over time. "In light of the evolving nature of AI technologies, there is an ongoing need for empirical re-validation that pedagogical practice is keeping pace with technological advancement." This kind of research would be very helpful in Malaysian higher education to direct the development of evidence-based policies and curricula. The framework will enable contextually significant and long-lasting TESL activities using theoretical conceptions based on locally pertinent educational imperatives.

The key conclusion from this paradigm is that the trinity of technology, pedagogy, and context must be harmoniously balanced for AI to be successfully integrated into TESL instruction. Even though AI has a lot of potential to increase student engagement and instructional efficacy, how we conceptualize and incorporate it within the greater educational ecosystem will ultimately determine its impact.

CONCLUSION

This study has the potential to be among the first theoretically motivated models to investigate how the integration of artificial intelligence (AI) affects student engagement and the efficacy of instruction in TESL classrooms in Malaysia. The research conceptualizes AI integration as the pivot that could affect important teaching and learning outcomes, drawing on constructivist learning theory, student engagement theory, and the Technological Pedagogical Content Knowledge (TPACK) framework. The approach provides a methodical way to investigate how technologically oriented innovations may change TESL pedagogy in today's classrooms by considering student engagement and teaching effectiveness as the primary dependent variables. The development of learner-centered, interactive, and responsive learning experiences is anticipated to be made possible by the use of AI tools, including programs like ChatGPT. Through more effective instruction, timely feedback, and data-driven educational decision-making, these advances are anticipated to increase students' behavioral, emotional, and cognitive engagement as well as teaching efficacy. This review does acknowledge, though, that the anticipated advantages of using AI in the classroom may vary depending on a number of contextual factors, including the level of institutional support, teachers' digital competency, and their ethical consciousness.

The model is expected to address the gap in the TESL research by providing a holistic representation for technological, pedagogical, and contextual aspects in AI integration. In this approach, it opens the door for studies that can use strong methods like Partial Least Squares Structural Equation Modeling (PLS-SEM) using SmartPLS to experimentally validate the proposed relationships. Such research will be essential to determining the potential influence of AI on education in terms of measurable improvements in language acquisition. Therefore, there seems to be a general growing awareness among TESL educators that AI will play a bigger role in TESL education, but the success of its integration will depend on having a well-rounded and pedagogically informed vision for TESL. The results reaffirm that technology must be firmly grounded in good teaching practices in order for innovation to promote meaningful language learning rather than interfere with it. It is anticipated that the insights gathered from this framework would direct practice and policy toward improved and sustainable TESL provisions as Malaysian higher education gradually moves toward digital transformation.

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