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Redefining Language Learning: The Influence of AI-Enhanced Pedagogy on Student Engagement and Academic Performance

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ABSTRACT

The development of English as a Second Language (ESL) instruction using artificial intelligence (AI) has opened new possibilities for revolutionising English teaching and learning practices in higher education institutions. This study explored the effect of AI-supported pedagogical methods on university students' engagement and academic performance. It examined the role of AI-supported instructional methods in enhancing personalised learning, engagement, accessibility, and interaction in English as a Foreign Language (EFL) classrooms. The study employed a quantitative research design, and data were collected using a structured questionnaire and students' learning outcome assessments. The relationship between the application of AI tools for teaching, student engagement and academic performance was analysed using descriptive and inferential statistical techniques. AI-supported pedagogical strategies were positively correlated with student engagement, academic achievement, and personalized learning, supporting students' variety of needs, interactive and engaging activities, and complementing teachers' instructional roles. The research could stand out from others by providing quantitative evidence on the correlation between technology-assisted teaching practices and student performance in the field of language learning, which would further research on AI-enhanced language education. It suggests the creation of formal strategies that will provide greater access to AI, responsible application of AI, and student-centred deployment in higher education.

Introduction

By the time of this article's writing, the field of education is undergoing numerous changes with the aid of artificial intelligence (AI) that have introduced innovative approaches in teaching, learning, assessment, and learner support (Younas, Khan and Makhdum, 2022). AI-driven technologies had been increasingly used in higher education in language learning contexts to promote personalized learning, immediate feedback, adaptive learning, and better opportunities for student interaction (Younas, Khan, Makhdum, 2022). English Language Teaching (ELT) had been a favourite for the applications of AI used in language learning; language learning demanded constant practice, personalized guidance and meaningful interactions (Younas, et al, 2023). The digital tools facilitated by AI-supported applications would provide teachers and students with access to digital resources, automate feedback systems, provide intelligent tutoring platforms, and offer interactive learning environments that would help strengthen language capabilities (Younas, et al, 2023). The use of AI in English language education had also emphasised the necessity of preventing technological

progress that is conducting in an exclusive and inaccessible manner to different learners (Younas et al., 2024). Thus, there was a need for pedagogical responses to the use of AI in language education that would take into account diversity, accessibility, ethical considerations in the use of AI and learner-centred teaching.

Opportunities to support individual learning differences using AI-driven English Language Teaching methods for creating personalized learning pathways and AI support for instruction had been geared for addressing individual learning differences (Younas, et al, 2023). The use of AI-based systems put learners in control of what system to access and provided a way for them to access content at their speed, according to their needs and where they are in their learning. For instance, some strategies had helped to make differentiated teaching by allowing teachers to diagnose learners difficulties and tailor the learning opportunities for them (Younas et al., 2024). Previous studies have shown that successful and proper uses of AI technologies with suitable pedagogical methodologies could improve students' interaction, motivation, and autonomy (Younas, et al., 2024).

In higher education, students' engagement was still a crucial factor which affected their learning success in English language classroom (Makhdum, Sandhu, Batool, Khan, Faisal & Younas, 2023). Engagement encompassed students' behavioural engagement, emotional and cognitive engagement with learning . The start of applying instructional techniques with AI had already provided possibilities to increase engagement through interactive activities, immediate response, personalized feedback, and opportunities for independent learning. Investigating the effect of inclusive AI supported practices on the engagement and learner outcomes of students necessitated research in the real education contexts (Makhdum, Sandhu, Batool, Khan, Faisal & Younas, 2023).

For these reasons, inclusive approaches in AI assisted English as a Foreign Language (EFL) in HE were the focus of this study. It had explored the role of AI-supported pedagogy and its effects on student's engagement and learning outcomes, taking into account the experience and perception of a student (Makhdum, Khan, Munir, Younas, Faisal, 2022). The study had focused on the relationship of technological integration and inclusive pedagogical practices to gain insights into the evidence which is helpful to improve the language learning using AI in language teaching and learning (Makhdum, Khan, Munir, Younas & Faisal, 2022).

Significance

The findings from the study had led to an understanding that how AI supported approaches could foster inclusive learning approaches in the English language classroom. The research had shed light on learners' perspectives of the effectiveness of AI-based teaching from students' engagement and learning outcome. This had been significant especially in higher education settings where the students had varying educational capabilities, learning experiences, and technological histories (Makhdum, Khan, Munir, Younas and Faisal, 2022). Considering the fact that the application of AI with learner-centred pedagogy is an important finding in this study, it also became important for English language teachers. The study had also been beneficial for ELTs since it emphasized the integration of using AI with learner-centred approaches (Khan & Younas, 2021). The results had indicated that the teachers' role was still vital for school to facilitate inclusive learning activities, select the right AI applications, and integrate technology while ensuring that it does not completely replace face-to-face contact (Makhdum, Khan, Munir, Younas & Faisal, 2022).

Problem Statement

Although AI had opened new possibilities in higher education for the enhancement of ELL, challenges lay in its implementation of its inclusive aspects (Khan & Younas, 2021). Most institutions had begun to implement tools with AI without taking into account a range of learner needs, accessibility requirements and equitable participation (Khan & Younas, 2021). Existing research had primarily focused on the technological capabilities of AI tools, their effectiveness in improving and language skills (Begum, Yaseen, & Faisal, 2025). Where less research had looked at the implications from the inclusive practices adopted in AI-mediated English language teaching on student engagement and learning outcomes (Aurangzeb & Uddin, 2025).

Objectives

- To examine the role of inclusive approaches in AI-supported English Language Teaching in higher education.
- To investigate the relationship between AI-supported inclusive teaching practices, student engagement, and academic performance.
- To assess the contribution of AI-based tools to accessibility, personalised learning, and diverse student needs.

Research Questions

- How were inclusive approaches incorporated into AI-supported English Language Teaching in higher education?

- What was the relationship between AI-supported inclusive teaching practices, student engagement, and academic performance?
- To what extent did AI-based tools support accessibility, personalised learning, and diverse student needs?

Gaps

While there has been extensive research on AI in education, some research gaps exist (Rehan, Faisal, Yousaf & Faisal, 2026). First, this study has revealed that the current focus of research has been primarily on Artificial Intelligence tools and innovations while there has been limited research focusing on pedagogical approaches to support the integration of AI into English language teaching (Abbas & Faisal et al., 2024). Second, in a previous research, a number of studies only focused on the aspects of the technological nature of AI-supported learning, whilst neglecting student engagement, participation, and equitable pedagogical approaches (Khan & Younas, 2021). Third, empirical investigations conducted on English language education in higher education using the support of technology involving artificial intelligence are still limited. Especially research that takes learning outcomes and experiences into account.

Literature Review

By supporting innovative solutions in teaching and learning, evaluating students, and offering academic support, AI had proven to be a transformative technology in Higher Education (Makhdum, Khanam, Faisal & Sandhu, 2023; Khan & Younas, 2021). Research had suggested that AI had helped enhance four dimensions of communication namely, vocabulary acquisition, grammar practice, pronunciation improvement, and learner interaction (Abbas & Faisal, et al., 2024).

In higher education, AI had already impacted teachers' role as knowledge disseminators, and this new role was closer to facilitation, guidance, and instructional design (Khan & Younas, 2021). Teachers now faced with the challenges of selecting the right AI tools, using them ethically, and ensuring that students have relevant learning opportunities. AI in higher education research often overlooked the pedagogical function of educators, there is still a need to explore them further (Makhdum, Sandhu, Batool, Khan, Faisal & Younas, 2023; Salim, Makhdum & Younas, 2022).

In the field of language teaching, inclusive strategies had gained in significance since students were frequently found to be linguistically diverse, not confident in their linguistic abilities, had a range of learning approaches and did not have equal access to the education provided. Students with such differences had "got opportunities to overcome them using technology-supported learning environments hp 46 personalised learning and flexible learning pathways." AI systems had been aiding inclusion by adjusting difficulty of content, offering immediate support and allowing students to learn at their own pace (Maria, Makhdum, Sandhu, Khan & Younas, 2025; Rehan, Faisal, Yousaf & Faisal, 2026).

In higher education student engagement was known as an important factor in effective education (Khan & Younas, 2021). A year ago, AI-driven tools had motivated students to practise their language abilities by providing interactive exercise tasks, auto-grading and immediate feedback, and digital communication activities (Khan, Taj, Zill-e-Huma & Younas, 2024). This opportunity helped to build students' self-confidence and self-motivation in learning the language (Faisal, et al., 2024).

However, past studies had revealed that mere availability of technology did not ensure for greater engagement. The usefulness, ease of use, and relevance with which students perceived the use of AI had impacted their willingness to participate. In a meaningful education, teachers' ways of teaching had stayed crucial in providing meaningful learning environments, where the utilization of AI tools was applied to effective education (Rehan, Faisal, Yousaf & Faisal, 2026).

But the scholars had attempted to stress that the learning outcomes are dependent upon the nature of the integration of AI technology, rather than just the technology itself (Younas, Khan, Makhdum, 2022). There needed to be consistency between what AI applications have to say, the teaching goals, and the teaching practices for effective outcomes (Khan, Taj, Zill-e-Huma & Younas, 2024). Students' teachers have been at the core of choice of suitable tools, interpretation of output from AI and providing human support when needed (Rehan, Faisal, Yousaf & Faisal, 2026).

Methodology

The study was a quantitative research design aimed at analysing the now available use of inclusive approaches in inclusive English Language Teaching (IELT) in higher education and the impact of such approaches on student engagement and learning outcomes. Meanwhile, the use of both types of data enabled the study to look not only at the effectiveness of work being achieved using the

teaching with AI support but also on how the students experienced and interpreted the teaching practices in their learning context (Younas, Taj, Khan, Hussain, Makhdum & Khan, 2023). The quantitative method was appropriate with the nature of educational research which not only helps in understanding the trends but also helps in understanding the individual in their learning process through educational experiences (Soni, A., Kumar, M., Kumar, S., Nawaz, I., Mohan, J. M., & Janardhan, R. 2025).

The samples of the study were the students of the university in the English language courses. The quantitative sample, which consisted of 150 students, was selected during the quantitative phase of the study to gather ridged measurable evidence pointing toward any discussions of student engagement and learning outcomes (Younas et al., 2023). The participation of the different academic background was welcomed as it brought different perspectives on the gains and challenges of English language teaching with AI assistance from Younas, Khan & Makhdum (2022).

The participants were chosen using purposive sampling technique due to their first-hand experience with AI-supported ELL activities (Faisal, Ahmed, Makhdum, Makhdum, 2023). Use of purposive sampling allowed for the researcher to choose participants who have relevant information and experiences pertaining to the research question. That for quantitative phase students were enrolled in the mentioned English language based courses were taken as there was need that the collected data should be representative of the learning environment under study (Younas, Khan & Makhdum, 2022).

In order to obtain the data, two significant sources have been used, namely student engagement questionnaire, and Semi-Structured Interview Protocol (Makhdum, Elahi, Faisal, Tariq, 2022). The student engagement questionnaire items were adapted from previously used student engagement questionnaires (Faisal, Ahmed, Makhdum, Makhdum 2023) to develop the questionnaire. The questionnaire comprised the scale items that span each of the three dimensions of student engagement: cognitive, emotional and behavioural (Khan, Taj, Zill-e-Huma & Younas, 2024). Respondents answered the items in the questionnaire on a five-point Likert scale (strongly disagree to strongly agree). The instrument was developed to capture the impact of using the AI-based approach on student participation and learning (Younas, Khan & Taj, 2023).

Cronbach's alpha coefficient was used and computed for the eight items of the student engagement questionnaire, the result of which was .70. The reliability analysis revealed high level of internal consistency of the items within the questionnaire in measuring the expected constructs, which was accepted (Makhdum, Khan, Munir, Younas & Faisal, 2022). The contents of the instruments were validated by experts on their relevance, clarity and matching to the research objectives. The construct validity was extended with concurrent and content validity of the instrument with theoretical frameworks of inclusive education, technology and learner engagement (Makhdum, Khanam, Faisal & Sandhu, 2023).

Data gathered by the questionnaire were analysed by statistical methods to uncover the patterns concerning students' engagement and learning outcomes. Descriptive and inferential analysis was used, where participants' responses provided descriptive statistics and relationships between study variables was analysed. The method overall, gave a systematic approach to investigate the process of implementing inclusive teaching using AI in higher education (Faisal, Ahmed, Makhdum, Makhdum, 2023). The study's objectives were established to complement the research design, the approach of selecting participants, instruments and how the data was collected (Odilova, M., & Nawaz, I. 2025).

Data Analysis

Descriptive Analysis

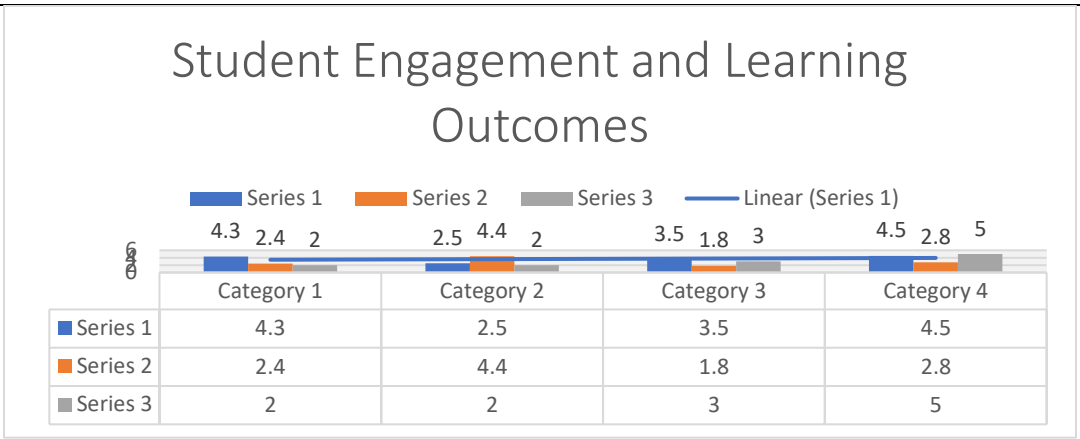
Descriptive statistical analysis was employed in analysing the quantitative data obtained from the Student Engagement Questionnaire where students' answers were collected on the topic of AI-supported inclusive English Language Teaching practices. The overall pattern of student behaviours, perceptions of the AI-supported learning and perceived learning outcomes were summarized by descriptive analysis. The scores showed the mean, standard deviation (SD), frequency and percentage which helped identify the level at which students felt they benefited from the use of inclusive teaching practices supported by AI.

The survey responses showed the positive perceptions of students on the usage of inclusive approaches using AI in English Language Teaching. The students' overall mean score for student engagement was 4.08 (SD = 0.56), reflecting that students are highly engaged in and involved in activities that support learning with AI (Khan, Taj, Zill-e-Huma & Younas, 2024). According to students, AI-based activities had a positive impact on their interest, active participation and autonomous study. Based on the findings, it can be concluded that the use of AI-based approaches helped to design classrooms that are interactive and learner-centred.

Table 1 presents the descriptive statistics of the major study variables.

Table 1: Descriptive Statistics of Student Engagement and Learning Outcomes (N = 150)

	Mean	Standard Deviation	Interpretation
Behavioural Engagement	4.12	0.61	High
Emotional Engagement	4.05	0.58	High
Cognitive Engagement	4.07	0.55	High
AI-Supported Learning Experience	4.14	0.52	High
Perceived Learning Outcomes	4.10	0.57	High
Overall Engagement	4.08	0.56	High

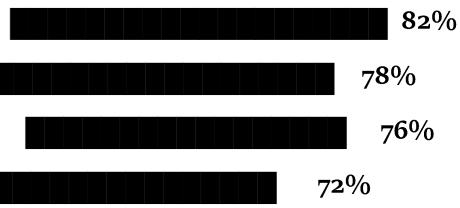


Findings in Table 1 illustrated that the level of engagement was high in all dimensions of students. Students gave the highest mean score (M = 4.14, SD = 0.52) to learning experiences using AI tools as they believed activities supported their learning, were useful, and easy to access. The mean score of behavioural engagement was also high (M = 4.12, SD = 0.61) indicating that students were involved in activities that made use of AI in the classroom .

The findings were in line with earlier studies that suggested that using AI technology in learning environments could improve student engagement, engagement with learning materials, and online learning opportunities through a personalized learning experience (Faisal et al., 2023). Likewise, Younas et al (2023) noted that digital learning spaces with meaningful interaction and engagement of students could help improve student engagement, if they are created appropriately.

The distribution of student responses is presented in Figure 1.

Figure 1: *Students' Overall Perceptions of AI-Supported Inclusive English Language Teaching*



As shown in figure 1, a majority of students felt positively about the use of AI for inclusive approaches. Feeding back 78% felt that their engagement increased and 82% felt their learning experience improved. The findings indicated that AI integration helped students to have personalized learning and more involvement in the classroom. The findings were found to be in line with Younas et al. (2023) who noted that when using the right educational practices, AI technologies could be used to aid in personalized and adaptive learning (Younas et al., 2023).

Inferential Analysis

To explore the relationship between AI-assisted inclusive teaching, student engagement and outcomes, inferential analysis was carried out (Younas et al., 2023). To identify if the observed patterns were significant correlations for the variables studied, inferential statistical procedures were used. The correlation and regression analysis was performed to explore the relationship and predictive power of the inclusive approach supported by AI on students' engagement and learning outcomes (Younas et al., 2023). Inferential analysis enabled the researcher to go beyond the descriptive pattern, and determine the facts that statistically significant relationships could be considered within the data.

To explore the correlation between inclusive teaching practice supported by AI and student engagement, a Pearson correlation analysis was employed (Younas et al., 2023). The findings showed that there is a positive correlation between AI-supported learning experiences and student engagement ($r = .68$ $p < .01$). This suggested that strong evidence of positive experiences with AI-inclusive approaches in teaching and learning led to higher levels of student engagement.

Table 2: Correlation between AI-Supported Inclusive Teaching and Student Engagement

Variables	1	2
AI-Supported Inclusive Teaching	1	.68**
Student Engagement	.68**	1

Note. ***p < .01.*

The resultant correlation revealed a strong correlation between the use of AI in inclusive teaching and students' engagement (Younas, Khan & Taj, 2023). The results indicated a higher level of engagement and involvement when AI-offering personalized, accessible, and supportive learning activities were provided for students (Younas et al., 2023). This outcome corroborated the findings of the previous research studies which agreed that, technology supported learning environments have positive effect on engagement when the learners perceive it as useful and relevant (Faisal, Khan, Faisal, Makhdum, 2024; Younas, Khan & Taj, 2023).

The correlation between inclusive teaching practices using AI and students' engagement and perceptions of learning outcomes was evaluated in a regression analysis (Younas, Khan & Taj, 2023). The regression model revealed that the use of AI assisted inclusive teaching practices was a significant predictor of student engagement, accounting for 46% of the variance in student engagement score ($R^2 = .46$, $p < .001$). The results disclosed that the application of AI alongside the strategies played important roles in the students' participation in English language learning activities (Faisal, Khan, Faisal, Makhdum, 2024).

Table 3: Regression Analysis Predicting Student Engagement from AI-Supported Inclusive Teaching Practices

Predictor	B	SE	β	P
AI-Supported Inclusive Teaching	0.71	0.08	.68	<.001

The results of the regression revealed that inclusive teaching practices associated with AI were significant predictors of student engagement. The standardized coefficient ($\beta = .68$) revealed a positive and significant contribution of AI-supported approaches to explaining differences in students' engagement levels, which showed strong relationships (Younas, Khan & Taj, 2023).

To explore the differences between student engagement, further analysis was conducted based on the level of using AI previously experienced by the students (Aurangzeb, 2025). The results indicated that students who had a higher level of understanding about the AI tools gave slightly higher engagement scores, but neither difference was statistically significant. This meant that doing inclusive design in instruction and providing the support of teachers became more significant than previous technology experience alone (Younas, Khan & Taj, 2023). The statistical findings yielded evidence of significance of the relationships between variables and the pupil's experiences provided explanations of the processes by which the significance was realised (Younas, Khan & Taj, 2023). The integration was symbolic in cognizing the significance of linking numerical trends with contextual experiences in the field of education research (Younas, Khan & Taj, 2023). In general, it was concluded that inclusive measures in the use of AI in ELT had significant positive effects on student engagement and on the students' perceived learning outcomes. The overall value of the tool was $\alpha = .89$, which means that the questionnaire had high internal consistency. In an educational and social science study, Younas, Khan & Taj, (2023) stated the acceptable level of consistency on the research instruments is 0.70 or above. In educational and social science study Field (2018) noted the acceptable level is above 0.70 for the consistency of the research instrument, where

good consistency is 1.0. The findings of reliability substantiated that all the items in the questionnaire effectively measured the intended constructs, such as student engagement, learning experiences through an AI, and perceived learning outcomes (Younas, Khan & Taj, 2023). The results from skewness and kurtosis values showed the data was normally distributed within the range of acceptable values. Thus, parametric testing (Pearson correlation and regression analysis) were deemed suitable to investigate the relationship between the study variables. Normality was established within this study supporting the accuracy and validity of the statistical interpretations (Faisal, Khan, Faisal, Makhdum, 2024).

Comparative Analysis

An analysis of comparison was carried out to investigate if there are differences among students in terms of their engagement levels depending on previous exposure to AI tools in learning (Faisal et al., 2023). The prior experience in AI students had an independent samples t-test to compare individuals with high levels and low levels of prior AI experience. The findings showed that students' familiarity with AI instruments showed slightly higher engagement level than students with lower experience of AI, but the difference was not statistically significant ($p > .05$).

Table 4: Comparison of Student Engagement Based on Previous AI Experience

AI Experience Group	N	Mean	Standard Deviation	t-value	p-value
Higher AI Experience	78	4.15	0.52	1.42	.158
Lower AI Experience	72	4.01	0.59		

The results indicated that students' engagement levels were dependent on their initial experience with AI. Rather, AI-assisted learning seemed to be more closely linked to the attention given to instructional design, helping teachers, and fostering an inclusive classroom (Younas, Khan & Taj, 2023). This discovery added to the grounds put forth that pedagogical planning is needed rather than only technical expertise to use AI.

Findings and Discussion

The results found that AI-powered inclusive teaching and learning was positively associated with student engagement in HE English classrooms. The findings revealed that AI tools facilitated personalisation of learning, enhance accessibility, provide prompt feedback to the students and participation of students with a wide range of learning styles. The results showed that inclusive education was practised consistent with its basic ideals of decrease barriers to learning and enabling equal participation.

The regression analysis indicated that inclusive teaching practices with the use of AI had significant prediction of engagement of the students . The results also pointed to issues related to technological access as well as digital skills and guidance. The results suggested essentials of institutional support, teacher preparation, and digital literacy for effective integration of AI in education.

In general, the results showed the effectiveness of the use of AI technologies along with inclusive teaching in teaching. They also reinforced the need for support in personalised learning, accessibility and guidance from teachers in improving students' engagement.

Conclusion

It was found that higher scores on student engagement and students' perception of the learning outcomes were directly associated with the use of AI-supported inclusive teaching practices (Younas, Khan, Makhdum, 2022). AI tools did help to personalise student learning for student with diverse learning needs and to ensure easy access and participation. To ensure its effectiveness, however, teacher guidance, digital competency and support of schools were needed. The research highlighted the significance of responsible embedding for AI technologies and inclusive pedagogies in Higher Education teaching learning in English (Younas, Khan & Taj, 2023).

Other studies might consider how successful various types of AI applications are within various HE disciplines. The institutions should have definite guidelines relating to the responsible use of the AI in language (Younas, Khan, Makhdum, 2022). Frequency evaluation of AI-aided teaching can contribute to the identification of improvement areas (Khan, Taj, Zill-e-Huma & Younas, 2024). Inclusive pedagogical approaches and technical skills must be taught together as part of teacher training (Younas, Khan, Makhdum 2022). Such actions would reinforce the use of AI in education to be more effective and equitable.

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