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Issue 12 of *Revue ITEC*, entitled “*Inclusive Education and Innovative Technologies*,” brings together a collection of scholarly contributions that explore emerging approaches, policies, practices, and innovative technologies that contribute to creating more inclusive, accessible, and learner-centred educational environments. At a time when educational systems are undergoing profound transformations, the intersection between inclusion and technological innovation has become increasingly significant.

Inclusive education extends beyond ensuring access to learning; it encompasses the creation of equitable educational environments that recognise learner diversity, reduce barriers to participation, and respond to different needs, abilities, and backgrounds. At the same time, the rapid development of digital and emerging technologies is creating new possibilities for enhancing teaching and learning, expanding access to educational resources, and responding to diverse learner needs.

The contributions in this issue address a range of topics, including inclusive education, special needs education, innovative pedagogies, teacher education and professional development, as well as the role of emerging technologies in expanding learning opportunities and addressing the diverse needs of learners. Collectively, the articles underscore the importance of combining pedagogical innovation with inclusive practices to promote equity, active participation, learner empowerment, and lifelong learning.

By bringing together perspectives from different disciplines and educational contexts, **Issue 12** seeks to contribute to current discussions on how innovation and technology can be harnessed to address contemporary educational challenges and foster more inclusive and learner-centred educational environments.

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The Role of AI as a Scaffolding Tool in Promoting Students' Sense of Inclusion in Higher Education

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ABSTRACT

The aim of this study is to investigate the impact of AI as a scaffolding tool on undergraduate students' perceived inclusion in higher education. To this purpose, we adopted an explanatory mixed-method design, whereby numerical data were gathered, first, from an online questionnaire distributed to 69 respondents and, later, from a different set of interviewees. The results showed that there is a significant positive correlation between AI-assisted learning and participants' perception of inclusion ($r_s = .617$, $p < .001$). Specifically, AI-assisted learning accounted for almost 35% of the variance in their perception of inclusion. Moreover, the qualitative findings revealed that AI is perceived as a learning resource, a non-judgmental environment, and a tool that provides self-assurance to learners. That said, issues such as reliability, inequity, and the role of human contact were also mentioned.

Keywords: AI-Assisted Learning, Scaffolding, Higher Education, Student Inclusion, Inclusive Learning, Mixed-Methods Research

Introduction

Background of the Study

Artificial Intelligence (AI) has changed the way students study and learn. In higher education (HE), AI applications are now commonly used for various learning activities, such as understanding complex content, organizing ideas, and writing papers (Vieriu & Petrea, 2025). This immediate access to information has made it easier for students to complete their academic duties (Madanchian & Taherdoost, 2025). With technological advances making these innovations accessible to a wider audience, scholars and teachers have begun to recognize how these tools can help address long-standing challenges in HE. One such challenge is the difficulty of creating a learning environment that is truly inclusive for all students (Schmidt et al., 2025; Conceição & Van Der Stappen, 2025).

The concept of inclusion in HE entails more than simply having access to a place of learning. It involves active participation, academic engagement, and a sense of belonging in the educational setting (Fitas, 2025). Although many studies have examined how the use of artificial intelligence affects students' academic outcomes, relatively few have explored the influence of AI-aided learning on students' perceptions of inclusion.

Problem Statement

As much as the incorporation of AI in tertiary institutions is becoming more widespread, there seems to be a crucial gap in the current literature. Most scholars limit their research to quantifiable outcomes, such as strong academic performance, high test scores, and completion rates, without considering the quality of the learning process itself. In addition, the belief that AI is intrinsically inclusive is seldom examined. When one considers the reality of AI-facilitated learning, the outcomes are often unequal, that is, those who are more confident, tech-savvy, and committed to their education tend to benefit the most, whereas those who are already disadvantaged may gain even less or encounter new barriers. The real issue is not whether AI works, but for whom it does.

Purpose, Significance, and Scope

The purpose of this study is to examine the relationship between AI as a pedagogical scaffolding and students' perceived inclusion in HE. The study aims to explore how students describe the role of AI in supporting their participation and engagement in academic activities. This study holds of a significance for it shifts the focus from achievement outcomes to the learning experience itself. In so doing, this research contributes to ongoing debates about AI applications in HE by examining their possible implications for inclusion, which is an important objective to HE institutions. The study limits its scope to undergraduate students who use AI tools as part of their academic learning; the emphasis is on AI as an auxiliary educational tool and just as a general applications and non-academic uses of such software.

Research Questions and Hypotheses

This study is guided by the following research questions:

RQ1: Is there a significant relationship between AI-supported learning and undergraduate students' perceived inclusion in higher education?

RQ2: How do undergraduate students describe their experience of inclusion in relation to their use of AI tools for learning?

With respect to the quantitative dimension of the study, the following hypotheses are proposed:

H1: There is a significant positive relationship between AI-supported learning and students' perceived inclusion.

H0: There is no significant relationship between AI-supported learning and students' perceived inclusion.

Review of Literature

AI technologies play a prominent role in HE, because they enable students to receive instant support through writing assistants, language models, and personalized learning applications (El Guermat & Bekkaoui, 2026). Studies show that students mainly use these technologies to understand complex topics, improve their writing skills, and reduce cognitive load (Crompton & Burke, 2023; Zawacki-Richter et al., 2019). The effectiveness of these tools is not uniform, as it depends on learners' digital skills and readiness (Holmes et al., 2019).

Scaffolding, a term coined by Vygotsky (1978) to refer to support provided to help learners complete tasks beyond their independent capabilities, offers a perspective through which the role of AI in the classroom can be understood. The use of such tools provides assistance to students who may be experiencing difficulties, helping them persist rather than withdraw from learning activities. Research has shown that this type of support leads not only to increased achievement but also to greater confidence and participation in class activities (Belland et al., 2017; Ouyang & Jiao, 2021). For example, Younas et al. (2025) conducted a systematic review of peer-reviewed research, published between 2020 and 2025, by examining the roles, advantages, and challenges of the AI-LTs like ChatGPT, Deep Seek, Gemini, and Meta AI. The study reported that “AI tutoring systems and virtual teaching assistants elevate academic performance, foster collaboration, and lead to higher student achievement” (p. 6)

In HE, inclusion encompasses three main elements: participation, engagement, and a sense of belonging (Ainscow, 2020; Thomas, 2012). Learners who feel included tend to remain in school and succeed, whereas those who feel neglected are at high risk of disengagement (Strayhorn, 2012). In HE environments characterized by large classes, multilingual settings, and limited individual attention, such as in Morocco, fostering inclusivity remains challenging. However, few studies have examined whether artificial intelligence (AI) promotes learners’ sense of belonging ((Bull, 2026).

Considering the above review, the present study draws on several theoretical frameworks to guide the research. First, it uses the Technology Acceptance Model (Davis, 1989), which explains students’ engagement with AI in terms of perceived usefulness and perceived ease of use. The former refers to the extent to which students believe that AI improves their learning performance, while the latter relates to how easy they find these tools to use. Second, given the role of AI tools as assistants, the study draws on Scaffolding Theory (Vygotsky, 1978). According to this theory, AI can act as a bridge that helps learners access tasks beyond their current abilities and gradually become more independent. Finally, the study adopts an Inclusive Learning framework informed by Universal Design for Learning (UDL) principles (Rose & Meyer, 2002), which views inclusion as an ongoing process of reducing barriers and expanding opportunities for diverse learners.

Methods

A mixed-methods explanatory research design was adopted in this study, as it best fits the characteristics of the research questions under investigation. The design enables the measurement of the relationship between two main variables, namely the use of AI as a scaffolding tool and students’ sense of belonging, along with an exploration of their experiences of this relationship. The first research question was examined quantitatively, whereas the second was addressed qualitatively. A convenience sampling technique was employed to select a sample of undergraduate students from the Department of English at Mohammed First University. A total of 69 students participated in this study, which is sufficient given its exploratory nature.

For the purpose of collecting quantitative data, an online questionnaire was distributed which was divided into three main sections: the first section collected demographic data; the second part collected the data related to using AI as a scaffolded learning tool, which included six items based on TAM; and finally, the last section collected data related to students’ perceived inclusiveness, comprised of six items as well. The Likert scale was used in all three parts which comprised of values from one to five. As for the qualitative data, a separate online questionnaire was designed. The questionnaire involved five questions that aimed to explore different aspects

of AI use and perceived inclusion in learning in the context of higher education. In total 24 participants completed the qualitative questionnaire. The questionnaire's questions were as follows:

1. How do you use AI tools (e.g., ChatGPT, Gemini, DeepSeek) in your studies?
2. Can you describe a situation where an AI tool helped you understand or complete an academic task?
3. Do AI tools make it easier for you to participate in your learning? Why or why not?
4. Do AI tools help you feel more confident or included in your classes and academic activities? Please explain.
5. Have you experienced any difficulties or barriers when using AI tools for learning? If yes, what are they?

With this in mind, the questionnaire was tested to check whether its items were consistent and reliable. The internal reliability of the instrument was assessed using Cronbach's Alpha, with a threshold of .70 considered acceptable (Nunnally, 1978). The results revealed a Cronbach's Alpha coefficient of .808 across the 14 items, indicating a good level of internal consistency and suggesting that the questionnaire was sufficiently reliable for data collection and analysis.

Table 1

Reliability Results of the Questionnaire Scales

Cronbach's Alpha	N of Items
.808	14

The quantitative data were analyzed in three major phases. First, measures such as means and standard deviations were used to describe general trends in the use of AI technology and its influence on perceptions of inclusion. In the second phase, the correlation between the two variables was examined using a Spearman correlation test. This test permits identification of the nature of the relationship and testing of H1. Finally, a simple linear regression analysis was performed to determine the extent to which inclusion can be predicted from AI-supported learning. The qualitative data were analyzed using thematic analysis (Clarke & Braun, 2006). The qualitative data analysis software MAXQDA was used to help in the process of thematic analysis.

Results & Discussion

Quantitative Results

Descriptive Results

A total of 69 respondents participated in the study. The majority of the respondents (60.9%, $n = 42$) were female, while 39.1% ($n = 27$) were male. As far as age is concerned, 60.9% ($n = 42$) of the respondents belonged to the age range of 25–29 years, while 24.6% ($n = 17$) belonged to the age group of 18–24 years, and 14.5% ($n = 10$) belonged to the age range of 30 years or above.

Table 2

Demographic Characteristics

Variable	Category	n (%)
Gender	Male	27 (39.1)

Variable	Category	n (%)
Age	Female	42 (60.9)
	18–24	17 (24.6)
	25–29	42 (60.9)
	30 or above	10 (14.5)
Current Semester	S2	12 (17.4)
	S4	27 (39.1)
	S6	30 (43.5)

RQ1

In order to determine whether a relationship existed between the variables in the study, a normality test was conducted on the data. Normality was assessed using the Shapiro-Wilk test. The results showed that AI-Supported Learning ($W = .961$, $p = .032$) and Perceived Inclusion ($W = .956$, $p = .016$) did not meet the assumption of normality (see Table below).

Table 3

Tests of Normality

	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Mean: AI Supported Learning	.128	69	.007	.961	69	.032
Mean: Perceived Inclusion	.164	69	.000	.956	69	.016

a. Lilliefors Significance Correction

Thus, a Spearman correlation test was performed. The findings indicated a statistically significant positive relationship between the two variables ($r_s = .617$, $p < .001$), showing that increased AI-based learning was associated with increased inclusion. This finding is in line with the alternative hypothesis, suggesting that AI can potentially have a positive impact on student inclusion in HE, provided that the technology is perceived as a learning tool.

Table 4

Correlation Analysis

			AI Supported Learning	Perceived Inclusion
Spearman's rho	Mean: AI Supported Learning	Correlation Coefficient	1.000	.617**
		Sig. (2-tailed)	.	.000
		N	69	69
	Mean: Perceived Inclusion	Correlation Coefficient	.617**	1.000
		Sig. (2-tailed)	.000	.
		N	69	69

***. Correlation is significant at the 0.01 level (2-tailed).*

Moreover, a simple linear regression analysis was conducted to determine whether AI-Supported Learning significantly predicts students' Perceived Inclusion. The results showed that the model had an R value of .592, while its R² value was .350, which implies that 35% of the variation in students' inclusion was explained by AI-Supported Learning. This finding proves that there is a medium-level predictive relationship between AI-Supported Learning and students' inclusion in HE. The result strengthens the hypothesis that using AI as a scaffolding mechanism for learning may be beneficial to students' involvement in the learning process.

Table 5

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.592 ^a	.350	.341	1.33672

a. Predictors: (Constant), Mean: AI Supported Learning

Discussion of Quantitative Results

What is noteworthy about this moderate positive correlation ($r_s = .617$) between AI-enabled learning and perceived inclusion is the fact that there is more to AI than what can be considered purely practical. In other words, AI involves a socio-affective element that affects how students perceive the environment in which they study. This is of paramount significance given that inclusion has so far been viewed as something to be addressed through policies and pedagogy, but the present results suggest that students themselves experience a sense of academic belonging through their interaction with AI tools, which is worthy of investigation.

The regression analysis that accounted for 35% of the inclusion variance suggests a real, though partial, correlation. It is important to note, however, not the 35%, but the 65% that does not fit into the analysis. Such a difference proves beyond any doubt that inclusion cannot be provided by AI alone and that it serves as only one of many such enablers. Students' feelings of inclusion probably come from a combination of several aspects, such as human interaction, institutional support, and peers, while AI is merely another supportive element among them.

These findings cast doubt on the idea that the application of AI within higher education institutions must necessarily be inclusive in nature. The correlation does exist and is statistically significant; however, because of its moderate strength, there is no uniformity in how students perceive the inclusivity of using AI in their studies. It should be noted that not all students feel equally empowered by the implementation of AI technology, which raises questions about their level of digital literacy and familiarity with technology.

Qualitative Results

To answer RQ2, qualitative data were collected through a questionnaire consisting of five open-ended questions. The responses were analyzed thematically to identify recurring patterns and themes related to students' experiences of using AI for learning and inclusion.

4.2.1. Thematic Analysis Results

This section presents the results of the thematic analysis of participants' responses to the qualitative questionnaire. The section is divided into four subsections. The first presents the themes identified in the participants' responses to question one and two. Each of the remaining subsections presents the themes identified in the responses to the other three questions. The

responses to question one and two were analyzed together since they explored closely related aspects of AI use and learning experiences.

4.2.1.1. Students' Uses and Experiences of AI in Learning

Based on participants' responses to Questions 1 and 2, four main themes were identified: 1) AI as a learning support tool, 2) AI as a tool for completing academic tasks, 3) AI as a study and revision aid, and 4) AI as a tool for reducing learning barriers.

Theme 1: A Learning Support Tool

Many participants reported using AI as a learning support tool. As such, it helps them in understanding difficult concepts, clarifying confusing lessons, and simplifying complex academic content. As a learning support tool, AI is also used by students as a guide that provides additional explanations, examples, and personalized support that fits their learning needs. As one participant explained:

"I would use AI tools to provide me some extra explanations concerning some lessons that I find a little bit confusing, and I use AI to give me more exercises to practice. So I use AI as kind of a guide." (P2)

Similarly, another participant stated:

"I use AI tools to explain difficult concepts, summarize articles and lectures, generate ideas for assignments, improve my writing, and help me prepare for exams." (P6)

Participants add that AI not only provides answers, but it helps them develop a deeper understanding of course materials as it can present information in simpler language and offer step-by-step explanations. Thus, AI can be described as a learning companion that helps with independent study.

Theme 2: Completing Academic Tasks

Another common theme is using AI to complete academic tasks. Participants particularly highlight using AI to summarize lengthy articles, handouts, books, lecture notes, and PDF documents. Students also utilize AI to improve their writing, organize ideas, generate academic vocabulary, correct grammatical errors, and brainstorm ideas for essays, assignments, and presentations. One participant described how AI supported the completion of an academic assignment:

"While working on a research project, I had difficulty understanding some academic articles. I used an AI tool to explain the main ideas in simpler language and summarize key points. This helped me complete the assignment and better understand the topic." (P9)

Another participant explained how AI helped to prepare a class presentation:

"I didn't have enough time and AI provided me with the axes I will discuss and also gave me great examples to use during the presentation." (P11)

This theme indicates that AI has an important role in improving academic productivity and helping students manage academic workloads.

Theme 3: Exam Preparation

Participants also pointed to using AI for exam preparation. For example, it can create quizzes, generate practice exercises, summarize course materials, and provide review activities. This helps students identify their strengths and weaknesses and focus on the areas that require more attention. As one participant explained:

"I used Gemini to create a quiz to help me test myself before an exam in Grammar. It assisted me a lot because I was able to know my weak spots that need more work." (P13)

Likewise, another participant simply noted: *"I use it every time when I prepare for the exams."* (P7)

These responses suggest that AI can serve as a valuable revision tool that enables students to prepare more effectively for examinations.

Theme 4: Reducing Learning Barriers

AI tools can also help students overcome certain learning challenges such as difficult academic texts, limited preparation time, concentration difficulties, unfamiliar concepts, etc. AI makes learning more accessible by simplifying information, providing examples, and making concepts easier to understand. As one participant explained:

"Last year I was about to have an exam in grammar, and there was a lesson so confusing... I sent the lesson to AI (ChatGPT), and it provided me with the easiest explanation a person could find, in addition to some practicing exercises... by the end of the day I was able to differentiate between all the types of sentences." (P2)

Another participant emphasized AI's ability to simplify difficult material:

"It helps turn dry theories and difficult equations into simple real-life examples and analogies." (P24)

AI, therefore, can also adapt explanations to students' needs and learning styles, and this can help them overcome difficulties that might otherwise limit their engagement with academic content.

4.2.1.2. AI and Participation in Learning

Three main themes were observed in responses to Question 3: 1) accessible and immediate support, 2) confidence and active learning, and 3) participation benefits depend on context and effective use.

Theme 1: Accessible and Immediate Support

Many participants pointed out that AI makes participation in learning easier as it provides immediate support whenever students need it. Such support involves receiving quick explanations, asking questions at any time, and getting responses that fit students' level of understanding. This accessibility allows students to clarify misunderstandings independently and engage more actively with course content. As one participant explained:

"AI tools make it easier for me to participate in my learning because they give quick explanations and help me understand difficult concepts, and answer my questions at any time." (P1)

Similarly, another participant stated:

"AI tools make learning more interactive and accessible. I can ask questions at any time and receive immediate explanations, which encourages me to participate more actively in my studies." (P9)

Moreover, AI can offer different ways of explaining concepts, which makes learning more flexible and accessible. Accessible and immediate support makes students feel more confident in understanding lessons and actively engaging in their learning.

Theme 2: Confidence and Active Learning

This theme describes how AI can make students feel more confident as it allows them to ask questions freely without fear of judgment. Students can review material, clarify doubts, and receive repeated explanations, which certainly makes students feel more prepared to engage with academic content. One participant commented:

“AI tools make it easier because I can ask questions anytime without feeling shy in class. They explain things in my way until I get it, so I participate more and feel confident.” (P21)

Another participant highlighted AI's role in promoting active learning:

“AI tools make learning easier because they let me ask questions and get instant feedback, so I participate actively instead of just memorizing passively.” (P22)

AI, in addition, encourages a more active approach to learning. Instead of simply memorizing, students use AI to ask questions, seek feedback, and explore topics more deeply, which helps them become more involved in their own learning.

Theme 3: Limitations of AI in Learning

Despite the positive benefits of AI, certain limitations were highlighted. For example, AI can be very helpful outside the classroom, but it does not necessarily guarantee direct classroom participation. As one participant explained:

“If participation here refers to class participation, AI tools do not affect it in any meaningful way. They mainly help in tasks that are done outside the actual learning environment.” (P23)

Another participant pointed to practical limitations that may reduce AI's effectiveness:

“It helps a lot. It just does the boring manual work, and it saves time and energy. However, it can be sometimes annoying because Ai doesn't give you exactly what you need because of your poor wording or some glitches.” (P13)

Participation in learning might also be hindered by difficulties related to AI's inaccurate responses, ineffective prompts, technical issues, or personal hesitation when using AI. This shows that the benefits of AI for participation in learning may depend on individual needs, learning contexts, and patterns of use.

4.2.1.3. AI, Confidence, and Inclusion

Based on participants' responses to Question 4, three main themes emerged: 1) Increased confidence through preparation and understanding, 2) A judgment-free learning space, and 3) The importance of human connection.

Theme 1: Increased Confidence through Preparation and Understanding

AI can help students feel more confident as it improves their understanding of academic content and also helps them prepare before class. Reviewing lessons, clarifying difficult concepts, and practicing with AI enables students to participate more comfortably in classroom activities. As one participant explained:

“Yes, they help me feel more confident because I can review topics independently before class and clarify anything I do not understand. As a result, I feel more prepared to participate in discussions and academic activities.” (P9)

Similarly, another participant stated:

“Yes, AI tools help me feel more confident because I can review lessons, practice concepts, and clarify doubts before class. This makes me more comfortable participating in academic activities.” (P14)

Moreover, being better prepared helps students feel more capable of contributing to discussions and classroom activities and reduces feelings of being left behind when they struggle with difficult topics.

Theme 2: A Judgment-Free Learning Space

AI can create a more comfortable learning environment because students can ask questions as many times as they need without feeling embarrassed or judged. Some students feel shy or reluctant to speak in class, and AI can become a private learning space that provides an opportunity to practice, make mistakes, and improve understanding before interacting with teachers or classmates. As one participant explained:

“When the brain is tired, we don't pay attention during the lesson with the teacher, and perhaps we miss just one sentence, and the whole lesson is lost. But with AI, we can ask it questions without embarrassing ourselves and asking the teacher to repeat something.” (P11)

Another participant similarly noted:

“AI tools can make you feel more confident and included in class. When you're unsure about a topic, you can practice with an AI first without fear of being judged. You ask it the same question 5 times if you need to, and it explains it in different ways until it clicks. That practice means when the teacher calls on you, you already know the answer.” (P22)

This increases confidence and readiness to participate in class.

Theme 3: The Importance of Human Connection

Despite its numerous benefits, feelings of inclusion in the learning process are influenced by interactions with teachers and peers. That is, AI can provide a useful educational resource, but it cannot replace the social and emotional support provided through classroom relationships. As one participant explained:

“Honestly, I do not always rely on ChatGPT. Although it provides detailed answers, makes learning easier, and saves time, I still need confirmation and clarification from my teacher to feel more confident. My teacher's explanations help me understand the subject better and make sure that the information is correct.” (P1)

Similarly, another participant emphasized the importance of human interaction:

“I think it depends on the subject, how the teacher runs his session, and the kind of activities you have in class. But in general, I think that AI tools do not make me feel neither confident nor included, because I prefer learning independently and interacting directly with teachers and classmates.” (P2)

Moreover, confidence, belonging, and inclusion develop through meaningful engagement with others rather than through technology alone. AI could be regarded as a supplement to, rather than a substitute for, human interaction.

4.2.1.4. Barriers to AI-Supported Learning

Four themes were observed after the analysis of the responses to Question 5: 1) concerns about the reliability and accuracy of AI, 2) difficulties communicating effectively with AI, 3) risks of dependence and reduced independent learning, and 4) unequal access to AI resources.

Theme 1: Concerns About the Reliability and Accuracy of AI

The reliability and accuracy of AI were emphasized as the main barriers to using AI for learning. AI might give inaccurate answers, fabricated references, incomplete explanations, or misleading information. One of the participants mentioned that:

“Sometimes AI tools provide inaccurate or incomplete information, so I need to verify the answers with reliable sources. Another challenge is that relying too much on AI can reduce independent thinking if it is not used carefully.” (P9)

Similarly, another participant pointed to the tendency of AI to generate unreliable references:

“AI can be very ‘stupid’, for example, you can tell them: ‘Cite sources’ and they won’t do so or cite from themselves (I mean the citation will be AI itself) or it would make up fake citations.” (P13)

This shows that some students are aware that AI-generated content needs to be verified through teachers, textbooks, academic sources, or other trusted resources.

Theme 2: Difficulties Communicating Effectively with AI

Another barrier that was underlined revolves around difficulties communicating with AI. Participants mentioned that obtaining useful responses from AI often depends on the quality of the prompts provided. Vague or unclear prompts might result in inaccurate, incomplete, or irrelevant answers. As one participant explained:

“Prompts need to be so detailed in order to get what you are looking for. And the more detailed the prompt is, the more accurate the response is.” (P4)

Another participant similarly noted:

“When I first started using AI, I didn’t know how to give a specified prompt, and the result is not detailed and out of topic.” (P17)

Thus, effective use of AI requires a certain level of digital and communication skills.

Theme 3: Risks of Dependence and Reduced Independent Learning

One of the concerns that were raised is the excessive reliance on AI. Some participants believe that such reliance might discourage problem-solving and active engagement with academic content. As one participant stated:

“I’ve become too dependent on [AI], but the main reason for this is that we don’t have enough time.” (P11)

Similarly, another participant observed:

“Relying too much on AI can reduce independent thinking if it is not used carefully.” (P9)

Because of such concerns, the need for balanced and responsible use of AI was stressed.

Theme 4: Unequal Access to AI Resources

Another barrier that was underlined is accessibility to AI. Subscription fees, limited free features, usage restrictions, and unstable internet connections sometimes prevent students from fully benefiting from AI tools. As one participant explained:

“The main barrier is that the best features in these AI tools are paid features. For example, in the free plan of ChatGPT you can only upload 3 files a day, and you can only ask a certain amount of questions/requests regarding those files/documents. The same for NotebookLM, which only allows 3 video or audio summaries per day.” (P23)

Participant 14 similarly noted:

“Yes, sometimes AI provides inaccurate information, so I need to verify the answers with reliable sources. Internet access and limited free features can also be barriers.”

These responses point out that AI-supported learning opportunities are not always equal. Lack of accessibility can affect the extent to which students can benefit from these technologies in their academic studies.

4.2.2. Discussion of Qualitative Results

The qualitative findings provide us with a deeper understanding of the relationship between AI-supported learning and students' perceived inclusion. AI is portrayed as a beneficial learning support tool that helps students understand difficult concepts, complete academic tasks, prepare for exams, overcome learning barriers, etc. These qualitative findings support the quantitative ones that pointed to a positive relationship between AI-supported learning and perceived inclusion.

One of the main findings that the qualitative results is that AI seems to promote inclusion by helping students feel more confident and better prepared for class. The participants stressed how AI help them clarify misunderstandings, review lessons, and practice before class. This allows them to feel more confident and capable of participating in learning activities. These findings are consistent with Scaffolding Theory (Vygotsky, 1978), which suggests that learners benefit from support that enables them to accomplish tasks beyond their current level of ability.

Another observation that can be made in the data is that the importance of AI as a judgment-free learning environment. AI allows students to ask questions repeatedly without fear of embarrassment or criticism, and because of this it reduces some of the emotional barriers associated with traditional learning and which might limit participation and engagement in learning.

Another main finding is that AI alone is not enough to create a fully inclusive learning environment. Students' sense of belonging and inclusion still depends on their relationships with teachers and classmates. The quantitative results similarly showed that AI contributes to inclusion, yet, it does not fully explain it. Human connections remain an essential part of meaningful learning experiences.

Finally, various challenges were underlined by the participants, including concerns about accuracy, difficulties with prompt writing, overreliance on AI, and unequal access. These challenges are not equally available to all students. As a result, AI's contribution to inclusion depends not only on the technology itself but also on how it is used and accessed.

5. Conclusion

This study examined the relationship between AI-supported learning and undergraduate students' perceived inclusion in higher education. The quantitative findings revealed a statistically significant positive relationship between the use of AI as a learning support tool and students' perceptions of inclusion. In addition, AI-supported learning was found to be a significant predictor of perceived inclusion.

The qualitative findings offer more insight into this relationship. AI helps students better understand academic content, complete learning tasks, prepare for exams, and overcome various learning challenges. In addition, it increases their confidence, provides a judgment-free learning environment, and encourages more engagement in the learning process. Nevertheless, inclusion does not depend only on technology but also on meaningful interactions with teachers and peers.

The findings show that AI can contribute positively to inclusive learning. It provides accessible and personalized support, but it should be considered as a complementary educational resource rather than a replacement for human interaction and traditional institutional support.

5.1.Implications & Recommendations

What the findings of this study reveal is that AI tools can play an important role in providing a more inclusive learning environments in higher education. To benefit from these benefits of AI, teachers need to guide students in using AI in a responsible way, whether to better understand course content, review lessons, or work more independently. Universities also need to provide guidance on how AI can be used responsibly and effectively. More importantly, improving access to these technologies remains essential if their benefits are to reach all students.

5.2.Limitations

There are some limitations that could have impacted the quality and generalizability of the findings. The study was conducted with a relatively small group of students from a single department at one university. This means that the results may not reflect the experiences of students in other contexts. Moreover, the study relied on participants' own accounts of their experiences and AI use. These experiences, however, may be different from their actual practices.

5.3.Future Directions

This study involved a specific group of students, so it would be useful to investigate the relationship between AI-supported learning and inclusion in higher education in different educational contexts. Another area worth exploring is how students' perceptions of inclusion develop as they continue using AI over longer periods of time.

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