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The Role of AI Tools in Developing English Language Skills Among Students: A Field Study on a Random Sample of English Learners in Sana'a Capital

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Abstract

This study investigates the role of artificial intelligence Tools (AI) in Developing English Language Skills Among Students: A Field Study on a Random Sample of English Learners in Sana'a Capital. Employing a descriptive-analytical methodology, the research systematically examines data collected from a Random Sample of English Learners in Sana'a Capital. Utilizing advanced statistical analysis, the findings demonstrate a statistically significant positive influence of AI Tools in Developing English Language Skills, with a measured effect size of ChatGPT (β = 0.747). Furthermore, the implementation of DeepSeek (β = 0.671) and AI-tools Gemini (β = 0.570) was found to exert a substantial and statistically significant effect on English Language Skills Development. The study also highlights a pronounced sector-wide shift toward AI Tools adoption, propelled by increasing digital literacy among Students and ongoing advancements in AI-Tools infrastructure. participants perceived ChatGPT as significantly contributing to enhancing sentence formulation, error correction, providing clear explanations, developing writing and conversational skills. Meanwhile, DeepSeek excelled in supporting comprehension of complex texts and advancing academic writing, whereas Gemini demonstrated effectiveness in improving speaking skills, vocabulary development, and use of modern conversational techniques. All these results reflect a positive and consistent awareness among respondents regarding the role of AI tools in fostering language skills, with slight variations in evaluations based on the specific competencies each tool serves.

1. Introduction:

The current era is witnessing an unprecedented acceleration in technological advancement, significantly and rapidly impacting various fields, particularly education and language learning. Innovative tools and technologies, previously unavailable, have emerged, offering exceptional educational opportunities. These enable flexible language practice and skill development anytime, anywhere, without the necessity of physical presence in traditional classrooms. Students and educational institutions can now effortlessly leverage advanced educational resources across borders. Despite the immense benefits offered by these technological tools, such as enhancing learner autonomy and providing personalized instruction, their full potential in specific educational contexts, such as English language teaching in developing environments, still requires thorough exploration and evaluation. In this context, advanced artificial intelligence tools such as ChatGPT (OpenAI), DeepSeek, and Gemini have emerged as promising technologies capable of revolutionizing English language acquisition. AI has notably influenced language teaching and learning methodologies, with growing recognition of its transformative capabilities and exploration of its integration to support legitimate educational activities. These tools facilitate immediate linguistic interaction and the creation of tailored educational content, empowering students to develop their language skills with unprecedented proficiency and confidence [1]. This study explores the role of these innovative tools, specifically ChatGPT, DeepSeek, and Gemini, in developing English language students' language skills (listening, speaking, reading, writing) in Sana'a.

2. Literature Review:

[2] examined the prevalence of ChatGPT use among university students for written assignments, explored students' utilization patterns, and investigated their perspectives on the ethical aspects of its use. An online questionnaire collected data from 201 students at public and private universities in Croatia. Results indicated that over half of participants use ChatGPT for written assignments, primarily for generating ideas. At the same time, many also use it for summarization, paraphrasing, proofreading, and even writing parts of assignments on their behalf. Participants deemed idea generation the most ethically acceptable use, whereas many viewed other applications as unethical; however, this did not deter some students from engaging in unethical behaviors. [3] sought to uncover the role of AI in language learning, the effectiveness of AI-powered language learning platforms, its impact on learning experiences, and the potential of AI technologies in language acquisition, along with associated challenges and future trends. The study concluded that researchers, educators, and practitioners should harness AI's full potential to enhance language learning outcomes. [4] aimed to determine the role of AI in education through a systematic literature review (SLR) using PRISMA analysis. Key findings revealed that AI technology, which simulates human intelligence to conclude, make judgments, and offer predictions, provides personalized guidance, support, and feedback to students, assisting teachers and improving learning efficiency and effectiveness. However, the study emphasized that AI is not a substitute for teachers, whose role as facilitators and learning supporters remains vital in AI-integrated contexts.

[5] investigated AI's role in addressing challenges high school teachers face in the current technological era. Findings indicated that technological advancements have rapidly transformed teaching methods, successfully impacting teachers' roles and responsibilities. AI provides significant potential for personalized learning but remains an effective tool rather than a complete replacement for teachers. [6] explored the integration of AI chatbots in English language teaching, focusing on their ability to enhance educational outcomes. The study addressed various uses of AI chatbots to improve English proficiency, grammar, and vocabulary. Employing a mixed-methods approach, it combined quantitative insights from teacher surveys with qualitative data interpretation. Results demonstrated that teacher guidance in AI chatbots significantly boosts student engagement and motivation to improve English competencies. Future research should focus on enhancing chatbots' contextual understanding and integration with other educational technologies. [7] examined the history of AI, its characteristics in language learning, its objectives, and the changes it has brought to language learning in Arab countries. Key findings indicated that AI use in Arab language learning aligns with contemporary developments, is a comparative tool to human methods, functions as a self-learning resource, and provides new mechanisms for simulating educational processes. [6] evaluated the effectiveness of learning English via multimodal AI (Gemini). Results showed improved writing skills, enhanced software proficiency, and the ability to paraphrase ideas correctly and positively among third-level students.

Developing English language skills (listening, speaking, reading, writing) among students in Yemen (Sana'a) remains a significant challenge for the educational system, particularly amid rapid technological advancement and the growing shift toward digital solutions in education. AI tools emerge as promising solutions to address these challenges due to their capabilities in providing interactive, personalized instruction and immediate feedback. This study explores the role of AI tools, specifically ChatGPT, DeepSeek, and Gemini, in supporting and developing the language skills of English learners in Sana'a. It seeks to analyze these tools' capacity to achieve desired educational outcomes and evaluate their effectiveness locally. Despite increasing interest in using AI tools in academic practices, their employment in language skill development faces numerous technical, pedagogical, and regulatory challenges, especially in Yemen's educational environment. This necessitates an in-depth study to understand these issues and propose appropriate solutions. Preliminary practices reveal a gap between these tools' theoretical potential and practical application, alongside challenges related to output quality, contextual suitability, infrastructure deficiencies, integration with existing curricula, and a shortage of qualified personnel. Hence, there is a need to analyze these challenges to develop strategies for the more effective implementation of AI tools in language skill development in Sana'a. The problem Statement is encapsulated in the following central question.

"Do AI tools (ChatGPT, DeepSeek, Gemini) play a role in developing English language skills (listening, speaking, reading, writing) among students in Sana'a?"

Sub-questions include: 1) Does ChatGPT play a role in developing English language skills among students in Sana'a? 2) Does DeepSeek play a role in developing English language skills among students in Sana'a? 3) Does Gemini play a role in developing English language skills among students in Sana'a?

Based on the problem and sub-questions, the following hypotheses were formulated. The central hypothesis is stated: " AI tools (ChatGPT, DeepSeek, Gemini) have no statistically significant role in developing English language skills (listening, speaking, reading, writing) among students in Sana'a. While the sub-hypotheses: ChatGPT has no statistically significant role in developing English language skills among students in Sana'a., DeepSeek has no statistically significant role in developing English language skills among students in Sana'a., Gemini has no statistically significant role in developing English language skills among students in Sana'a. Based on the research questions and hypotheses, Figure 1 shows the conceptual framework of this study.

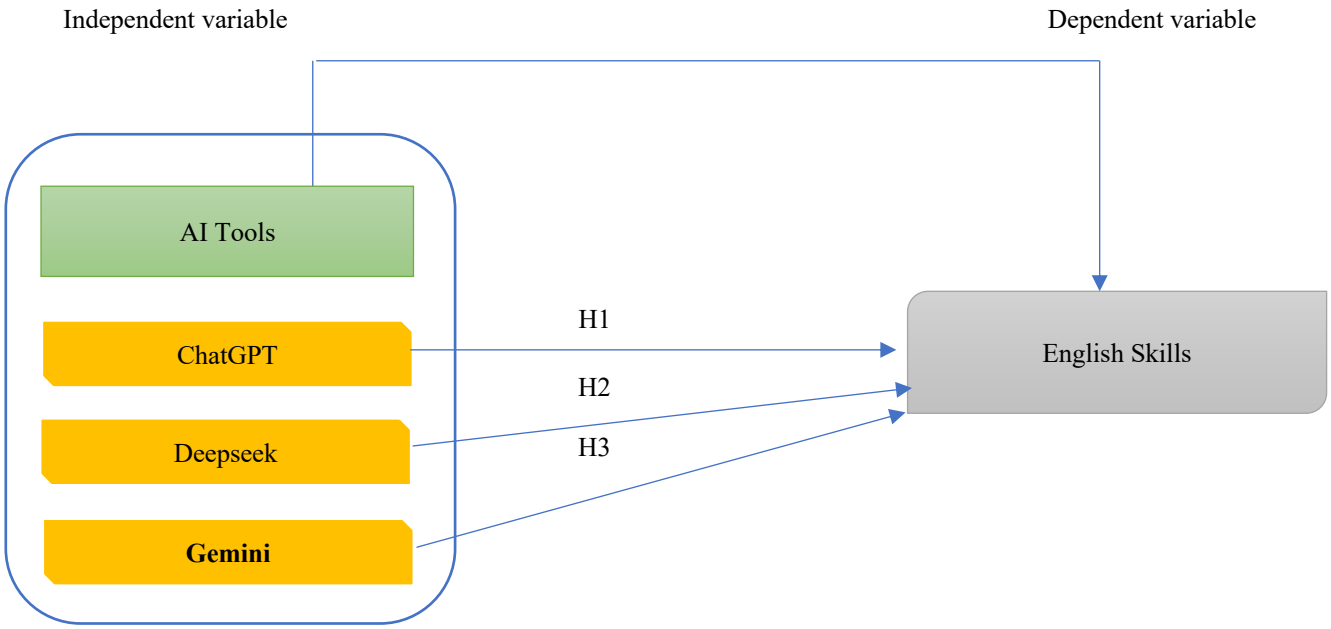

Figure 1: Conceptual Framework

3. Study Methodology

The researchers in this study will use statistical analysis using SPSS to calculate the arithmetic mean, standard deviation, and t-test for the study's hypotheses. The study population consists of a Random sample of English learners in Sana'a, Yemen. The study sample consisted of 150 individual English learners in Sana'a Capital. The study sample consisted of 150 individual English learners in Sana'a Capital. The study distributed 150 questionnaires to English learners in Sana'a Capital. However, 145 questionnaires were obtained, and 5 one was discarded due to their invalidity. The remaining (145) questionnaires were accepted and analyzed, and the number of valid questionnaires was (145).

Firstly: AI Tools:

ChatGPT: Developed by OpenAI, it is an advanced language model based on the GPT architecture. Trained on vast text datasets, it excels in tasks like text generation, translation, and summarization. Its Transformer-based architecture uses self-attention mechanisms. Widely adopted for generating coherent and contextually relevant text (Rahual Dandage, 2025; Petekar, 2023). Studies note its role in improving research skills and language proficiency (Marwa Al-Amari et al., 2024).

DeepSeek: A Chinese startup emerging from High-Flyer, focusing beyond financial applications. Its open-source model challenges Western tech giants (Microsoft, Meta, Google), promoting technological diversity and innovation in AI (Ramadan, 2024).

Gemini: Its use aligns with educational theories like Constructivism, Social Constructivism, Cognitive Load Theory, and Information Processing Theory, enabling active knowledge construction by learners (Kashmiri et al., 2025).

Table (1): Comparative Analysis of AI Tools

Feature / Tool	Gemini (Google)	DeepSeek (AI)	ChatGPT (OpenAI)
Language Support	High-quality English, excellent contextual understanding	Precise English, especially in writing/reading	Fluent English, advanced levels
Voice Interaction	Supports voice I/O (useful for listening/pronunciation)	Currently unavailable	Unavailable (except in paid versions)
Writing Enhancement	Error correction, tone adjustment	Precise grammar analysis, academic fluency suggestions	Grammar correction, rephrasing, style improvement
Interactive Chats	Multi-turn conversations, smart context	Trained on daily/professional dialogues	Realistic conversations, role-playing

Reading Support	Key idea extraction, Q&A on text	Explains complex passages, simplifies academic language	Text summarization, term explanation, text analysis
Listening Support	Speech-to-text, interactive exercises	No voice support	No voice support (text only)
Limitations	Requires strong internet connection	Limited in audio/visual features	May occasionally produce inaccurate information

Source: Compiled by the Researchers

Secondly: English Language Skills:

Concept: A performance characterized by speed, accuracy, and efficiency while adhering to linguistic rules (spoken/written), encompassing listening, speaking, reading, and writing (Ramadan & Abdel Basset, 2020).

Importance: Learning through practicing distinct skills is optimal. Knowing rules differs from applying them functionally (e.g., grammar knowledge ≠ , fluent reading). Listening requires active cognitive engagement for comprehension and communication (Habshi & Tajani, 2023).

Skill Definitions:

Speaking: Ability to define conversation goals, use appropriate expressions (e.g., greetings, interruptions, opinions), engage in dialogue/discussion, and steer conversation (Rashida, 2017; Al-Aqeel, 2017).

Listening: An intentional mental activity requiring concentration to understand auditory messages, involving comprehension, retention, and connecting ideas (Mohammed, 2016).

Writing: Ability to record thoughts and sounds into written symbols for future reference and preservation (Touiki & Abada, 2017).

Reading: A visual (silent or vocal) act for understanding, expression, and influence. A cognitive process involving decoding symbols to achieve comprehension and perception (Al-Asaf, 2016; Khojah, 2015).

Relationship Between AI Tools & English Skill Development. AI tools like ChatGPT, DeepSeek, and Gemini offer advanced capabilities for developing English skills through NLP and deep learning. They act as interactive partners providing continuous, intensive language exposure in diverse contexts, enhancing reading comprehension and auditory processing. Text generation features create graded texts, aiding vocabulary expansion and grammatical mastery. These tools provide instant spelling, grammar, and phrasing feedback, promoting self-correction. They support academic/professional writing development through text analysis and suggestions for clarity/cohesion. For speaking, simulated chatbot conversations offer low-pressure oral practice, with some platforms integrating speech recognition for pronunciation feedback. Content customization based on user level/interests enables personalized learning paths. Access to rich linguistic resources (e.g., contextual examples, synonyms, stylistic analyses) is facilitated. However, effectiveness relies on conscious practice and integration with human sources to acquire pragmatic/cultural skills that current models may lack. Preliminary studies show structured use improves fluency and accuracy, especially within a purposeful pedagogical framework (Ahmed, K. et al., 2023).

Methods and Instruments of the Study:

The study employed the descriptive, analytical, and causal-correlational approach to describe the relationship between artificial intelligence (AI) tools and the development of English language skills.

Study Instrument

The researcher used a questionnaire as the primary data collection tool to collect the necessary data. The questionnaire consisted of two sections:

- *Section One included three demographic variables related to the participants:*
    1. Gender
    2. Age
    3. Educational level
- *Section Two contained the main variables of the study, organized into two principal axes:*
    1. Axis One measured the use of AI tools and included three dimensions:
        - The first dimension: ChatGPT, comprising seven statements
        - The second dimension: DeepSeek, comprising seven statements
        - The third dimension: Gemini, comprising seven statements
    2. Axis Two assessed the development of English language skills and consisted of 7 statements

Population and Sample of the Study

The study population included all English language learners who use artificial intelligence tools in the Capital Municipality of Sana'a. A simple random sampling method was used. The questionnaire was designed using Google Forms and distributed electronically. One hundred fifty individuals received the questionnaire, and 145 responses were collected. All responses were valid and suitable for analysis, as shown in Table 1.

Table (2): Distributed, Returned, and Analyzable Questionnaires

Statement	Distributed/Received	Percentage
Number of English language learners who received the questionnaire link	150	100%
Number of responses received	145	96.7%
Net number of valid and analyzable responses	145	96.7%

Table (3): Criteria for Coding the Study Sample's Responses and the Arithmetic Mean Scale by Its Dimensions

Mean Score Range	Level of Acceptance
From 1.00 to less than 2.33	Low
From 2.33 to less than 3.66	Moderate
From 3.66 to 5.00	High

Verification of the Instrument's Reliability (the Questionnaire): Cronbach's Alpha coefficient was used to verify the reliability of the measurement instrument. The coefficient was calculated to determine the reliability of the study items according to each dimension. Table 4 illustrates the results.

Table (4): Cronbach's Alpha Reliability Coefficients for the Dimensions of Electronic Payment Methods and Money Laundering

Phrases	No Of Phrases	Cronbach's Alpha
Chatgpt:	7	83.1%
Deepseek:	7	82.5%
: Gemini	7	85.3%
Total	21	89.7%
English Language Skills Development	7	89.1%
Total	28	92.8%

It is evident from the results of Table 4 that the reliability coefficients (Cronbach's Alpha) for the Artificial Intelligence Tools dimension reached 89.7%, while for the English Language Skills Development dimension, it was 89.1%. For the entire questionnaire, the reliability coefficient was 92.8%. All these values are statistically significant, exceeding 60%, indicating that the study instrument (questionnaire) used to collect the sample data is highly reliable, fulfilling the research objectives and ensuring the statistical analysis is valid and acceptable.

Statistical Methods Used:

- Reliability tests using Cronbach's Alpha coefficient: To assess the reliability of the questionnaire items.
- Percentages and frequencies: Primarily used to describe the characteristics of the study sample.
- Mean (Arithmetic Average): An indicator to rank the dimensions and statements according to their importance from the sample's perspective, aiming to identify the level of implementation of the study variables.
- Standard deviation: To understand the extent of variation in the responses of the study sample for each statement from the mean.
- One-sample t-test: To test the level of sample responses on the study's dimensions and items. A positive t-value and a significance level less than 0.05 indicate no significant difference in viewpoints among sample members regarding the statements comprising the study dimensions.
- Simple regression analysis: To test the statistical significance of the sub-hypotheses of the central hypothesis, by measuring the effect of each independent variable individually on the dependent variable.

Analysis of Demographic Variables Data (General Information)
Table (5): Frequency Distribution of Demographic Variables

Variable	Category	n	%
Gender	Male	84	57.9
	Female	61	42.1
	Total	145	100.0
Age	18 - 20	4	2.8
	21 - 23	22	15.2
	24 - 26	29	20.0
	27 years and above	90	62.1
	Total	145	100.0
Educational Level	Diploma	8	5.5
	Bachelor	96	66.2
	Postgraduate	41	28.3
	Total	145	100.0

The study sample consisted of 145 English learners using AI tools in Sana'a. Among them, 57.9% were male and 42.1% were female, indicating a slightly higher participation of males. In terms of age distribution, the majority of participants (62.1%) were aged 27 years and above, followed by 20% aged 24 to 26, 15.2% aged 21 to 23, and only 2.8% were between 18 and 20 years old, showing that most users are adults. Regarding educational level, most respondents held a bachelor's degree (66.2%), with 28.3% pursuing postgraduate studies, and a small portion (5.5%) having a diploma. Overall, the sample reflects a group of predominantly well-educated adult males, which provides a clear demographic context for understanding the use of AI tools in developing English language skills in Sana'a.

Presentation and Analysis of the Basic Study Variables

Table (6): Descriptive Statistics for the Use of Artificial Intelligence Tools

No.	Tools	N	Mean	Std. Deviation	Relative Importance %	Test Statistic	Significance Level	Rating	Rank
1	Chatgpt:	145	4.03	0.516	80.6%	8.617	0.000	High	1st
2	Deepseek:	145	3.78	0.518	75.6%	2.822	0.005	High	3rd
3	Gemini	145	3.81	0.539	76.2%	3.389	0.001	High	2nd
	Total/Average	145	3.87	0.430	77.5%	6.002	0.000	High	1st
	Development of English Language Skills	145	4.01	0.578	80.2%	7.308	0.000	High	

Based on the results of Table 6: Descriptive Statistics for the Use of Artificial Intelligence Tools, it is evident that the sample members demonstrated a high level of usage for all three studied tools, with mean scores ranging between 3.78 and 4.03 on the five-point Likert scale, all classified as "high." ChatGPT ranked first with a mean of 4.03 and a relative importance of 80.6%, indicating it is the most used AI tool among those studied. Gemini followed it with a mean of 3.81 and relative importance of 76.2%, then DeepSeek with a mean of 3.78 and relative importance of 75.6%. The t-test results supported these differences, showing statistically significant test statistics below 0.05 for all tools, indicating that the mean usage levels significantly differ from the neutral value.

These findings suggest that ChatGPT is the most preferred and widely used tool among participants, likely due to its ease of use, wealth of information, and multilingual support. Although the other two tools also achieved high percentages, they ranked lower, which may reflect lower awareness or limited use in certain specialties. It can be said that artificial intelligence has become strongly present in the participants' work or study environment, particularly through text-generation tools like ChatGPT.

Furthermore, the results indicate that participants' assessments of the role of AI tools in developing English language skills were high, with an overall mean score of 4.01 and a standard deviation of 0.578, reflecting a relative consensus among the sample regarding the effectiveness of these tools. The relative importance percentage was 80.2%, a strong

indicator of the positive impact of these tools. The t-test results showed a highly significant statistical significance at the 0.000 level, enhancing the reliability of the findings.

It can be concluded that participants have a clear conviction about the effectiveness of AI tools in developing all aspects of the English language, especially vocabulary, professional communication, and writing. This points to the potential of adopting these tools as complementary or alternative educational resources in specific contexts, promoting learner autonomy and supporting student-centered education.

Hypothesis Testing:

Table (7): Indicators of Simple Regression Analysis to Test the Effect of Using Artificial Intelligence Tools on Developing English Language Skills

	Tool	β	Std. Error	t	P	R	R^2	
1	Chatgpt:	0.747	0.070	10.714	0.000	0.667	0.441	Significant
2	Deepseek:	0.671	0.075	8.981	0.000	0.601	0.356	Significant
3	Gemini	0.570	0.076	7.512	0.000	0.532	0.278	Significant
	Total	0.983	0.077	12.805	0.000	0.731	0.531	Significant

Table 7 presents the results of the simple regression analysis used to examine the effect of different artificial intelligence tools on developing English language skills among the study sample. The findings indicate that all three tools—ChatGPT, DeepSeek, and Gemini—have a positive and statistically significant impact on language skill development, with p-values of 0.000 confirming the robustness of these effects.

Specifically, ChatGPT shows the most decisive influence, with the highest regression coefficient ($\beta = 0.747$), indicating a substantial and meaningful contribution to improving English skills. This may be attributed to ChatGPT's user-friendly interface, versatile content generation capabilities, and strong support for conversational practice and language exercises, making it highly effective for learners.

DeepSeek follows with a regression coefficient of $\beta = 0.671$, reflecting a substantial positive impact, though somewhat less pronounced than ChatGPT. This difference could stem from DeepSeek's focus, which may emphasize textual understanding and academic writing support more than interactive conversation, making it slightly less comprehensive for overall language development.

Gemini, while having the lowest regression coefficient among the three ($\beta = 0.570$), still demonstrates a significant effect, particularly in enhancing vocabulary and modern conversational skills. The correlation coefficients (R) and adjusted determination coefficients (R^2) further support this ranking: ChatGPT explains 44.1% of the variance in English skill improvement ($R = 0.667$), DeepSeek accounts for 35.6%, and Gemini explains 27.8%.

Looking at the combined model, which includes all three AI tools, the total regression coefficient reaches 0.983, with a correlation of 0.731 and an adjusted R^2 of 53.1%. This indicates that over half of the variation in language skill development among participants can be explained by the collective use of these AI tools, underscoring the significant role of AI technologies in language learning.

In conclusion, while all three AI tools significantly enhance English language skills, ChatGPT stands out as the most effective, followed by DeepSeek and Gemini. This suggests that learners may benefit most from focused integration of ChatGPT, supplemented by the complementary strengths of DeepSeek and Gemini, to maximize the impact of AI-assisted language learning.

4. Findings

The results of the simple regression analysis showed that using artificial intelligence tools such as ChatGPT, DeepSeek, and Gemini has a positive and statistically significant effect on developing English language skills for English students in the capital, Sana'a. All regression coefficients (β) were positive and statistically significant at the level ($p < 0.001$), indicating that increased use of these tools is linked to a noticeable improvement in English skills. The most important effect was for ChatGPT, which recorded the highest regression coefficient ($\beta = 0.747$), followed by DeepSeek ($\beta = 0.671$), and then Gemini ($\beta = 0.570$). The regression models showed strong correlation levels, with correlation coefficients (R) ranging between 0.532 and 0.667, and adjusted determination coefficients (R^2) between 0.278 and 0.441, confirming that these tools explain a significant portion of the variance in language skills.

These results emphasize the growing importance of AI tools in supporting and developing English skills. They call for enhancing their use within language education programs, focusing primarily on the tool that achieves the highest impact to improve learning outcomes. The findings revealed that AI tools play a positive and effective role in developing English language skills for students in Sana'a, demonstrated by relatively high average responses from the sample, reflecting a general awareness of the importance of these tools in enhancing listening, speaking, reading, and writing skills. The

independent samples t-test results showed no statistically significant differences attributed to gender (male/female) in evaluating the role of AI tools, meaning both genders agree on the effectiveness of these tools in developing language skills. The one-way ANOVA results indicated that the educational level of respondents (bachelor's, postgraduate) had no statistically significant effect on their evaluation of the role of AI tools, reinforcing the idea that awareness of these tools' importance goes beyond educational differences.

The results point to a shared awareness among the sample regarding the importance of integrating AI technologies in the educational process, especially in English language teaching, with no apparent demographic differences (gender, education level), which calls for adopting educational policies that support this trend and promote the use of these technologies to develop language skills. The AI tools used in the study — ChatGPT, Gemini, and DeepSeek — enjoyed high levels of appreciation and positive feedback from participants concerning their role in developing English language skills.

ChatGPT recorded the highest average score (4.03) with a relative importance of 80.6%, followed by Gemini with an average of 3.81 and 76.2%, and then DeepSeek with an average of 3.78 and 75.6%, indicating wide acceptance of these tools and their noticeable impact on the educational process. Results showed that participants believe ChatGPT significantly improves sentence construction, error correction, and clear explanations, as well as develops writing and speaking skills. DeepSeek stood out in supporting understanding complex texts and academic writing, while Gemini effectively enhanced speaking skills, vocabulary development, and modern conversational methods. Overall, the results reflect a positive and consistent awareness among the sample about the role of AI tools in developing language skills, with slight differences in the evaluation of each tool based on the specific skills it supports.

5. Implication

The findings of this study provide valuable insights into the role of AI tools—ChatGPT, DeepSeek, and Gemini—in developing English language skills among students in Sana'a, Yemen. The results indicate that these tools significantly enhance listening, speaking, reading, and writing skills, with ChatGPT emerging as the most impactful. Below, we discuss the theoretical and practical implications of these findings. This study enriches the literature on AI-assisted language learning, particularly in under-resourced educational contexts like Yemen. It confirms that AI tools can effectively support language acquisition, aligning with previous research. The study provides empirical evidence supporting Constructivist and Social Constructivist learning theories, as AI tools facilitate interactive, learner-centered experiences where students actively engage in knowledge construction. The findings highlight that ChatGPT outperforms DeepSeek and Gemini in language skill development, likely due to its advanced conversational abilities, immediate feedback, and adaptability to different proficiency levels. The study also introduces DeepSeek—a less-researched AI model in the context of language learning—and positions it as a viable alternative, particularly for reading and writing enhancement.

Schools and universities in Sana'a should consider incorporating AI tools into English language courses as supplementary resources. For instance, ChatGPT can be used for writing practice, grammar correction, and conversational simulations. DeepSeek can assist in academic reading comprehension and structured writing tasks. Gemini can enhance listening and pronunciation practice through voice-based interactions. Teacher Training: Educators should receive professional development on effectively integrating AI tools into their teaching strategies while maintaining a balance with human instruction. For Students and Self-Learners, students can leverage AI tools for self-paced learning, particularly in environments where access to quality English instruction is limited. Overcoming Infrastructure Challenges: Since AI tools require a stable internet, institutions and policymakers should improve digital infrastructure to ensure equitable access.

6. Conclusion

Artificial intelligence tools, including ChatGPT, DeepSeek, and Gemini, have a statistically significant and positive impact on enhancing English language skills among students in Sana'a, confirming their value in language education. Among the tools studied, ChatGPT demonstrated the most decisive influence on skill development, suggesting it is particularly effective in fostering language proficiency compared to DeepSeek and Gemini. The strength of the regression and correlation coefficients indicates that AI tools meaningfully explain the variance in students' English performance, highlighting their potential as reliable educational interventions. Students exhibited a high level of awareness and appreciation for the role of AI tools in improving core language skills—listening, speaking, reading, and writing—based on the elevated response averages. The absence of statistically significant gender-based differences in perceptions suggests that the effectiveness of AI tools in language learning is universally recognized among both male and female learners.

The educational level did not significantly influence participants' evaluation of AI tools, indicating that appreciation and perceived value for these technologies transcend academic background. The consensus among participants supports the integration of AI tools into language learning environments, pointing to a shared vision of their role in modernizing education. The high levels of satisfaction reported by participants across all three tools confirm their overall acceptance and perceived effectiveness in improving English language skills. ChatGPT's leading average score, and relative importance emphasize its dominant role in the educational experience, making it a prime candidate for more focused implementation. Each tool demonstrated strength in specific areas: ChatGPT in writing and speaking accuracy, DeepSeek

in complex text comprehension and academic writing, and Gemini in vocabulary expansion and conversational skills—indicating complementary applications across different language domains. Overall, the findings reflect a consistent and positive perception among learners regarding integrating AI technologies in language education, reinforcing the need for strategic adoption and tailored use based on tool strengths.

Higher education institutions and English language teaching bodies in Sana'a and Yemen should encourage using AI tools like ChatGPT, DeepSeek, and Gemini in curricula and training programs because of their proven positive effect on language skills development. Focus on training users to effectively use other tools like Gemini and DeepSeek to maximize the benefits of various AI technologies and encourage balanced usage. Since ChatGPT has had the most substantial impact on improving language skills, more resources should be dedicated to training teachers and students to use it effectively and take advantage of its educational features. Provide ongoing workshops and courses for teachers and students to learn how to use AI tools properly, enhancing their language abilities and academic outcomes. Use multiple tools (ChatGPT, DeepSeek, Gemini) together in a complementary way to help develop diverse language skills such as speaking, reading, writing, and listening. Integration of these tools should be encouraged. Ensure equal opportunities for all students to benefit from this technology, regardless of their social or educational background. Educational policymakers should adopt clear strategies to introduce and expand AI use in language teaching, including providing suitable digital infrastructure and guaranteeing access for all students. Encourage continuous research to assess the impact of AI tools on other language skills and at different education levels to expand knowledge and ensure optimal use of this technology.

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