

An Exploration of Effectiveness of Artificial Intelligence (AI) Tools in English Language Learning at the Undergraduate Level in Pakistan

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ABSTRACT

Aim of the Study: The purpose of the study was to explore the efficacy of artificial intelligence-powered tools in the learning of English as a second language at undergraduate level in Pakistan.

Methodology: A mixed-method approach was adopted to accomplish the set-out objectives. Davis's (1989) Technology Acceptance Model was utilized to explore the elements that influenced ESL undergraduate students' decisions to accept or reject AI language learning technology. An online questionnaire was administered to 67 randomly selected ESL undergraduate students in order to gather numerical (quantitative) data. Semi-structured interviews were done with 12 ESL respondents who were purposefully chosen to get qualitative data. In terms of data analysis, SPSS version 27 was used to analyze the numerical data.

Findings: The results of the study showed that AI tools such as Grammarly, Duolingo, ChatGPT, Quillbot, and ELSA were used by the participants and improved their English language skills (speaking, writing, reading, and listening). The study's results also indicate that ESL students had positive opinions about using AI tools to learn English. Finally, the study identified the difficulties that ESL students had to overcome, such as contextualization problems, internet connectivity problems, a lack of human interaction, and technological limitations. Furthermore, the results derived from the open-ended questions in the semi-structured interviews were interpreted using Braun and Clarke's (2006) theme analysis approach. Five themes were generated: AI enhance/improve English language proficiency, immediate feedback and suggestions, customized learning, engaging and effective learning, and accuracy issues.

Conclusion: The study's findings demonstrated that factors like the usefulness of AI tools, their ease of use, and their capacity to function anywhere, at any time, influenced students' acceptance of AI-powered tools.

Keywords: Artificial Intelligence, Artificial Intelligence Tools, English Language Learning, ESL Students.

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Introduction

Technology renders language learning and teaching simple, engaging, and creative by bringing new tools into the educational setting. Artificial intelligence (AI) is one of the numerous innovations that have been brought into the education sector in recent years (AI; Bonk & Wiley, 2020 as cited in Celik, Dindar, Muukkonen, & Jarvela, 2022). Artificial intelligence (AI) is defined by Wartman and Combs (2018) as a technological advancement that allows robots and computers to process information and act like people. One of the major contributions of artificial intelligence to language learning and education is the acceleration of language acquisition (Ali, 2020).

English language proficiency is seen as a crucial educational objective on all fronts—academically, professionally, and personally (Pettela, 2020). Artificial intelligence (AI) technology is one of the latest techniques in English language acquisition (Rusmiyanto et al., 2023). Pettela (2020) asserts that AI-powered educational tools benefit both instructors and students by offering personalized, adaptable, all-inclusive, and stimulating learning experiences (Delgado et al., 2020). Many AI-based apps that employ natural language processing (NLP) can help users study and become more fluent in English. Some examples of these apps include Grammarly, Google Translate, Elsa, and Alexa (N & Kumar N S, 2023). As noted by Pettela (2020), using artificial intelligence (AI) tools to learn English is crucial since it strengthens students' communication skills by mimicking real-world conversation situations. AI-powered communication tools offer the chance to improve word pronunciation through audio exercises and visual content. Dishon (2017) stated that artificial intelligence performs an important role in education by offering a customized learning plan based on the requirements and learning environments of each learner (Huang, Saleh, & Liu, 2021).

In Pakistan, people aspire to study English for academic and professional objectives because it is the official language and is also utilized as a second language (Haidar & Fang, 2019 as cited in Ali, Bashir, Anjum, & Mahmood, 2020). Keeping in mind the necessity for Pakistani ESL learners to learn English, the importance of artificial intelligence technology in English language learning, and the need for research in this area in Pakistan, the purpose of current study is to explore the effectiveness of artificial intelligence in learning English as a second language in Pakistani universities. Three aspects make this study significant. First off, using AI-powered learning resources help ESL undergraduate students learn and advance their English proficiency. Second, in order to make learning simple and engaging, educators and curriculum designers can consider implementing technology-based activities in the classroom. Thirdly, the current work can pave the way for future linguists to investigate the advantages and functions of artificial intelligence in the context of learning English.

A review research on artificial intelligence and its applications in language learning and teaching was conducted by Ali (2020). The findings demonstrated that ESL students improved their listening and communication skills by using the AI-powered Siri system. Moreover, the study revealed that AI improved ESL learners' competency and encouraged efficient learning.

Dewi et al.'s study (2021) looked into how university students used artificial intelligence apps to learn English. By conducting in-depth interviews, a qualitative research approach was used in the study. The results showed that artificial intelligence-based tools or resources, such as Grammarly, Google Translate, and Duolingo, helped students improve their English speaking, writing, and listening skills.

A research conducted by Pettela (2020) looked at the methods and uses of artificial intelligence in the development of English as a second language. According to the study's findings, students may improve their reading and communication abilities by using AI-based tools that let them generate reading material, converse through conversation boxes, and extract information from it.

The purpose of N and Kumar N S's (2023) study was to find out what ESL students thought of AI-assisted English language training and what problems they encountered using these programs. The findings showed ESL students favored employing AI-powered applications for English language learning.

Furthermore, the results also showed that the lack of AI-based smartphone applications was the main issue facing ESL students.

As the literature mentioned above demonstrates that numerous Western studies document the usefulness of artificial intelligence platforms in fostering the growth of the English language. Nonetheless, there are very rare studies discussing the application of AI-powered systems for English language acquisition in Pakistani contexts. So, the present study is conducted to fill that gap by investigating the effectiveness of AI-based tools for learning English as a second language at the undergraduate level in Pakistan.

To achieve the study's aim, the following questions are formulated:

1. How AI tools help Pakistani ESL learners to improve their English language proficiency?
2. What opinions do students have on the use of AI-powered tools for English language learning?
3. What difficulties do students encounter while utilizing AI tools?

Methodology

To address the research questions in this inquiry, a mixed-method technique (methodology) was employed. Both qualitative and quantitative approaches are used in the data collecting and analysis stages of a mixed-methods inquiry (Creswell & Clark, 2011). Among mixed-method research designs, explanatory sequential design, exploratory sequential design, and convergent parallel mixed-method design are a few of them. Since the purpose of the current study was to examine the effectiveness of artificial intelligence in English language acquisition, an explanatory sequential design was used. An explanatory sequential design may be divided into two primary sections, according to Creswell and Clark (2011): the quantitative phase and the qualitative phase.

The present investigation has employed Davis's (1989) Technology Acceptance Model (TAM) as a theoretical framework to investigate the factors that led ESL undergraduate students to embrace or reject AI technology for learning a language. Davis (1989) developed the TAM model to look into the factors that affect people's adoption or rejection of information technology. Perceived Usefulness (PE) and Perceived Ease of Use (PEOU), according to Davis (1989), are the two characteristics or aspects that influence a user's purposeful action to adopt the technology.

In the current study, both qualitative and quantitative methods were used: questionnaire and semi-structured interviews. The quantitative information was gathered through the use of an online questionnaire that asked "what" questions on the effectiveness of artificial intelligence in English learning, students' opinions of the tools, and the difficulties they faced using them. A set of 33 closed-ended questions was constructed as part of a questionnaire to collect the quantitative data. With the alternatives on a 5-point Likert scale: (a) Strongly agree = 1, (b) Agree = 2, (c) Neutral = 3, (d) Disagree = 4, and (e) Strongly disagree = 5, the questionnaire was administered. The questionnaire's first three questions were asked to ascertain whether or not participants were using AI-powered language learning tools. The questionnaire was divided into three main sections: Section 1 discussed using AI tools for learning English, Section 2 examined students' opinions of using AI-powered tools for learning English, and Section 3 discussed problems encountered while using AI tools for learning English. Four faculty English language instructors from the Department of English have examined the questionnaire's validity to determine whether or not its items adequately addressed the study's objectives. To improve the study's outcomes, a few modifications were made to the questionnaire based on suggestions from the language instructors. Using SPSS version 27, Cronbach Alpha was calculated to assess the reliability of the questionnaire.

Table 1: *Reliability Statistics for Section 1*

Cronbach's Alpha	No. of Items
.782	9

Table 2: *Reliability Statistics for Section 2*

Cronbach's Alpha	No. of Items
.878	11

Table 3: *Reliability Statistics for Section 3*

Cronbach's Alpha	No. of Items
.834	10

As a result, Cronbach alpha scores for every section demonstrate (generally) the reliability of each questionnaire item and ensure the data's internal consistency. The numerical data (questionnaire responses) was analyzed through SPSS version 27.

Semi-structured interviews, a qualitative data collecting method, were used in this study to gather qualitative information about the function of AI-driven tools for English language learning. The objective of interviewing people is to obtain precise, direct personal information from knowledgeable sources (Merriam, 1998 as cited in Zohrabi, 2013). For the current study, a purposive sample method was used to choose 12 participants for the interviews. In the interviews, the questions focused on the experiences, opinions, and recommendations of the participants about artificial intelligence tools. Considering ethical implications, prior to carrying out the interviews, the participants completed the consent form. The Zoom software was used to conduct the online interviews. Each interview was meticulously captured on tape, meticulously transcribed, and then analyzed using Braun and Clark's (2006) thematic analysis technique.

The present study's sample size, for the quantitative study, which was determined by random sampling, consisted of 300–400 ESL undergraduate students from Lahore's public institutions. The sample size for the qualitative inquiry consisted of 12 undergraduate ESL students, who were chosen through purposive sampling technique.

Results and Discussion

The primary objective of the current study was to explore how artificial intelligence-driven tools contribute to the development of English as a second language competence and how ESL undergraduate students perceive the value of these tools in enhancing their English language proficiency. To gather the quantitative information, a 5-point Likert scale was employed in the development of a questionnaire consisting of 33 closed-ended items. 67 ESL undergraduate students filled out the questionnaire. The questionnaire was divided into three sections based on the research questions of the study. To analyze the quantitative data (the questionnaire answers), descriptive statistics (percentages, means, and standard deviations) were determined using SPSS.

Quantitative Data Analysis (Questionnaire Results)

Section 1: Using Artificial Intelligence (AI) Tools for English Language Learning

Table 4: Descriptive Statistics for Section 1

Questions	N ^a	Percentage (%)	Mean	Std. Deviation
1. Artificial intelligence-based tools have improved my English speaking skills.	67	46.3% agree	2.43	.857
2. The use of AI-powered tools (s) has enhanced my English writing skills.	67	50.7% agree	2.30	.888
3. The use of AI-powered tools has strengthened my English reading skills.	67	61.2% agree	2.28	.735
4. AI-based technologies have helped me enhance my English listening abilities.	67	44.8% agree	2.61	.937
5. AI-powered tools have provided me with opportunities or activities, such as conversations with chatbots or native speakers, games (earn points), dialogues, quizzes, and flashcards, to practice my English language skills.	67	56.7% agree	2.36	.883
6. By providing instant feedback and suggestions, AI language learning tools have helped me identify weaknesses in English and focus on improvement for effective learning.	67	64.2% agree	2.16	.771
7. AI-based tools have provided me with personalized and customized learning materials based on my interests, needs, and proficiency level.	67	59.7% agree	2.18	.815
8. AI-powered tools have made it easier for me to learn the language at my own pace.	67	53.7% agree	1.97	.870
9. I would like to continue using AI-powered language learning tools in the future.	67	67.2% agree	1.93	.703
Valid N (list-wise)	67			

N^a = Number of responses

The mean, standard deviation (S.D.), and highest percentage of agreement (%) for each of the question of section 1 are displayed in the above table. The table shows that the range of all mean values is 1.93 to 2.61. Low standard deviation values are also present. This demonstrated that almost all of the participants agreed with the questions' claims regarding the effectiveness of artificial intelligence-driven tools for enhancing participants' English language proficiency in speaking, writing, listening, and reading.

Section 2: Students' Opinions about Using AI-powered Tools for Learning English

Table 5: Descriptive Statistics for Section 2

Questions	N ^a	%age	Mean	Std. Deviation
1. I believe that the feature of AI-powered tools, providing learners with access to relevant learning material, helps them in learning English.	67	65.7% agree	1.96	.684
2. I find AI-driven applications user-friendly.	67	80.6% agree	1.93	.437
3. The flexibility of AI-powered language learning tools to teach English anywhere and at any time is beneficial for the learners.	67	67.2% agree	1.97	.758
4. I appreciate how AI-powered language learning tools save time.	67	55.2% agree	1.97	.758
5. I believe that the availability of AI-powered language learning apps on smartphones makes them more accessible to students.	67	56.7% agree	1.78	.692
6. I feel motivated and confident while utilizing the AI tools to improve my English language skills.	67	47.8% agree	2.28	.813
7. I find AI-driven language learning tools beneficial as they provide instant real-time feedback on my English.	67	61.2% agree	2.00	.696
8. I enjoy the process of learning English through AI-based language learning tools as they provide learners with interactive tasks and activities (e.g. chatbot conversations, solving puzzles, earning points for unlocking new levels, and flashcards).	67	61.2% agree	2.19	.783
9. I feel satisfied with the utilization of AI-developed tools for learning English.	67	62.7% agree	2.16	.771
10. I believe that AI-powered language learning tools are useful for ESL learner to learn or enhance their proficiency in speaking, writing, reading, and listening in English.	67	64.2% agree	2.00	.778
11. I would like to recommend AI-powered language learning tools to other ESL learners who want to enhance their English skills.	67	61.2	2.09	.690
Valid N (listwise)	67			

N^a = Number of responses

The percentages (highest), means, and standard deviations (S.D.) for each of the question of section 2 are displayed in the above table. The table shows that the range of all mean values is 1.78 to 2.28. Low standard deviation values are also present. The mean values shown in the above table clearly show that almost all of the students agreed with the assertions in the first five questions and with the remaining questions (the last five). This demonstrated that the majority of participants agreed and had favorable opinions regarding the use of AI-based tools for second language learning in English.

Section 3: Problems or Difficulties while Using AI-Powered Tools for English Language Learning

Table 6: *Descriptive Statistics for Section 3*

Questions	N^a	% age	Mean	Std. Deviation
1. Students are less familiar with the use of AI-based language learning tools due to a lack of instruction or information.	67	55.2% agree	2.24	.889
2. The high cost of AI-developed language learning tools makes it difficult to purchase for learning the language.	67	40.3% agree	2.25	.990
3. There is doubt about the accuracy and reliability of the feedback provided by AI-driven tools.	67	38.8% neutral	2.52	1.035
4. Using any AI-developed learning tool or application requires a high cost of data (internet).	67	47.8% agree	2.72	.982
5. Slow internet speed becomes a greater problem when we use AI-developed tools.	67	46.3% agree	2.36	1.124
6. Not all AI-powered language learning tools are available on smartphones.	67	35.8% agree	2.42	1.032
7. Interacting with AI-developed applications causes battery issues.	67	44.8% neutral	3.15	.925
8. There are privacy concerns while utilizing AI-driven language learning tools (e.g. loss of personal information, data privacy, and security).	67	40.3% agree	2.48	1.064
9. The learning material/content offered by AI-powered tools is not easily accessible due to technological limitations.	67	47.8% agree	2.51	.959
10. Using AI-based technologies increases students' reliance on them, which hinders their ability to think creatively and solve problems.	67	41.8% agree	2.09	1.041
Valid N (list wise)	67			

N^a = Number of responses

The percentages (highest), means, and standard deviations (S.D.) for each of the question of section 3 are displayed in the above table. The table shows that the range of all mean values is 2.09 to 3.15. Low standard deviation values are also present. The mean values listed in the above table show that, with the exception of questions 3 and 7, when participants remained neutral, the majority of students agreed with every assertion. This demonstrated the challenges or difficulties that the participants experienced, including concerns about privacy, a lack of guidance on how to use the tools, the expense of purchases, internet connectivity issues, and an excessive dependence on technology.

Qualitative Data Analysis (Semi-Structured Interviews)

Braun and Clarke's (2006) six-step theme analysis approach was used to better understand the experiences that ESL participants had with artificial intelligence technology. 12 ESL undergraduate students were chosen for the Zoom interviews based on their answers to questionnaires. The interview consisted of 13 questions. The duration of the interviews was 10-15 minutes. The theme analysis began shortly after the interviews were conducted. The interview was semi-structured and had five sections:

Introductory Question: The first question of the interview asked the participants if they thought artificial intelligence-based language learning tools made it easier to learn or get better at English language. If so, how do the tools assist you in learning English as a second language? The responses demonstrated that all

of the participants gave the affirmative response to the question because they thought artificial intelligence technology aided in their learning of English. As one of the participants stated, “Yes, these tools play a significant role in learning/improving the English language. They help in the development of our linguistic proficiency in speaking, listening, writing, and reading” (Participant 7, December 21, 2023).

Using Artificial Intelligence (AI) Tools for English Language Learning: When the participants asked questions on the AI tools they were utilizing and how they were able to improve their English language ability (speaking, listening, writing, and reading). Then, according to the participants, to improve their English, they made use of ELSA Speaks, ChatGPT, Grammarly, Duolingo, QuillBot, Spell Checker, Bard, and Google Translate. As the participant (12) stated, “I have used Grammarly, QuillBot, and ChatGPT to improve my English” (Excerpt, December 21, 2023). From the participants’ responses, the first theme has been developed, artificial intelligence technologies help to enhance or improve English language proficiency.

Additionally, the participants discovered that a number of tool features—such as accuracy, immediate feedback, recommendations, interactive practice activities, progress monitoring, grading, and speech recognition features—were helpful for enhancing their English language proficiency. As participant 6 remarked, “The personalized feedback and suggestions provided by AI tools were quite helpful” (Excerpt, December 21, 2023). As a result of the participants’ responses, the six-step theme analysis method developed by Braun and Clarke (2006) was used to construct the second theme, which offers immediate feedback and suggestions.

Students’ Opinions about Using AI-powered Tools for Learning English: In response to the question, to what extent do you believe artificial intelligence technologies have given you personalized content that adjusts to your learning preferences, learning style, and learning pace? Participant 2 stated, “Yes, AI tools have provided me with customized material that adapts to my learning needs, style, and pace through recommendations after analyzing my performance data and suggesting exercises based on my strengths, weaknesses, and learning history” (December 21, 2023). As a result, the third theme—tailored, customized, and adaptable learning—has been developed. In addition, questions concerning whether artificial intelligence technologies facilitate learning were posed to the participants. If so, how? Numerous participants believed that learning English was easy, effective, and fun because of the availability of 24/7 support, rapid feedback, adaptable and flexible materials, enjoyable exercises, and pleasurable procedures. Creating an engaged and effective learning environment has emerged as the fourth theme.

Difficulties While Using AI-based Language Learning Applications: When the participants were asked about any issues they were encountering using AI-driven technologies and whether there were any recommendations for fixes. One of the participants answered, “I encountered a few challenges like the occasional lack of context in certain areas, making it challenging to understand the practical application of certain language concepts” (Participant 6, Excerpt, and December 21, 2023). Additionally, the interviewers offered some suggestions for resolving the issues they encountered. One of the participants remarked, “Additionally, for AI tools, offering cultural context and different language explanations could be a great start” (Participant 6, December 21, 2023). The six-step theme analysis approach created by Braun and Clarke (2006) was used to construct the fifth theme, accuracy issues.

The interviewees recommended multiple features for AI tools that would help ESL learners in acquiring or enhancing their English language ability in response to the last interview question. Numerous ESL students recommended that AI-driven language learning systems should be free of charge, accommodate learners from a variety of cultural backgrounds, and update datasets in accordance with current linguistic trends.

To address the first research question, ***How AI tools help Pakistani ESL learners to improve their English language proficiency?*** The researcher developed and analyzed the first section of the questionnaire as well as the second section of the interview (open-ended questions). The findings revealed that the majority of participants believed that AI-powered tools were effective in improving their speaking

(46.3%), writing (50.7%), reading (61.2%), and listening (44.8%) abilities. The results demonstrated that the students' proficiency in speaking, writing, reading, and listening in English has been improved due to artificial intelligence-powered language learning applications (such as Grammarly, QuillBot, ChatGPT, Duolingo, ELSA, and Google Translate). Additionally, the participants' English language proficiency improved as a result of the effective features provided by AI tools, which included 24/7 availability, instant feedback, suggestions, highlighting errors, correction, personalized content, interactive activities, and grading. These features make AI tools efficient and productive, which motivates students to utilize AI. TAM's component of perceived ease of use, perceived usefulness, and actual use were revealed. Therefore, it can be concluded that Artificial Intelligence (AI) driven tools were effective and helpful to ESL learners in learning and improving their English, and that the learners embraced and used the technology (AI tools) because it was useful. The results are consistent with research conducted by Fitria (2021), Wei (2023), and Woo and Choi (2021) on the use of AI technology (tools) for learning the English language.

The purpose of the second research question (***What opinions do students have on the use of AI-powered tools for English language learning?***) was to find out undergraduate ESL students' opinions on the use of AI-assisted English language learning resources. To accomplish the second objective of the research, questions were posed to participants through section 2 of the questionnaire and section 3 of the interview. From the participants responses, it is clear that ESL students had positive opinions about adopting AI-driven language learning tools to improve their English due to their usefulness as well as user-friendly features including immediate feedback, customized learning material, interactive activities to practice skills, a flexible or motivated environment, 24/7 availability, saving time, and access to relevant material. The findings are in line with previous studies (Fitria, 2021; Lee & Cho, 2020; N & Kumar N S, 2023; Tahir & Tafat, 2021; Utami, 2020).

To answer the third research question (***What difficulties do students encounter while utilizing AI tools?***) The researcher analyzed, quantitatively as well qualitatively, the participants' responses to third section of the questionnaire's questions and fourth section of the interview's questions. Based on the qualitative and quantitative responses collected for the study, it can be inferred that the participants encountered difficulties when using AI-driven tools, such as lack of context, reliability issues, accuracy concerns, internet connectivity, lack of human interaction, technological limitations that make the material less accessible, barriers to the development of learners' critical and creative thinking skills, and privacy concerns. These shortcomings make learning difficult for learners, influence them to not use AI-based applications for English language learning, and evoke students' negative attitudes towards using AI-based language learning tools.

Conclusion

In conclusion, artificial intelligence-powered tools are effective and beneficial in improving ESL learners English language proficiency. The study discovered that ESL undergraduate students employed artificial intelligence-driven technologies to improve their English language skills. The students utilize Grammarly, QuillBot, ChatGPT, Duolingo, ELSA Speaks, and Google Translate as AI-powered language learning tools. ESL students' English language skills including speaking, writing, listening, and reading, were improved by these AI tools. Additionally, the study examined how positively ESL students perceived the use of AI technologies in their learning of English. The TAM model assisted in determining the elements that persuade ESL students to view AI-driven language learning tools favorably. The "perceived usefulness" and "perceived ease of use" were the two key components that influence students' acceptance, use, and favorable opinions of AI technologies for English language acquisition. Finally, the investigation found that adopting AI technologies for language acquisition presented particular difficulties for ESL learners such as lack of human interaction, slow internet, high cost of purchasing tools, reliability of the feedback, lack of context, and technological limitations. Future researchers can investigate how ESL teachers use AI tools in classrooms to foster English language skills among ESL learners. Moreover, a comparison of ESL learners in the public and private sectors can be done to study the trend, acceptability,

and effectiveness of AI-powered tools for enhancing English language proficiency. The research is beneficial for ESL learners as AI tools help them to learn the language on their own. Additionally, curriculum designers should incorporate AI-based learning materials and instruction into ESL curricula.

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Conflict of Interest

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