

**PEDAGOGICAL IMPLICATIONS OF AI IN ELL
CONTEXT: A QUASI- EXPERIMENTAL RESEARCH OF
CHATGPT ON ENGLISH WRITING SKILLS AT NUML
MULTAN CAMPUS**

By

Farah Jamil

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THESIS AND DEFENSE APPROVAL FORM

The undersigned certify that they have read the following thesis, examined the defense, are satisfied with the overall exam performance, and recommend the thesis to the Faculty of Arts & Humanities for acceptance.

Thesis Title: PEDAGOGICAL IMPLICATIONS OF AI IN ELL CONTEXT: A QUASI-EXPERIMENTAL RESEARCH OF CHATGPT ON ENGLISH WRITING SKILLS AT NUML MULTAN CAMPUS

Submitted by: Farah Jamil

Registration #: 50 MPhil/Eng/Lng/Mtn/S22

Mr. Qadir Bakhsh

Name of Research Supervisor

Signature of Research Supervisor

Dr. Muhammad Akbar Sajid

Name of Head (GS)

Signature of Head (GS)

Dr. Arshad Mehmood

Name of Dean (FAH)

Signature of Dean (FAH)

Date

CANDIDATE'S DECLARATION FORM

I Farah Jamil

Daughter of Rana Muhammad Jamil

Registration No. 50 MPhil/Eng/Lng/Mtn/S22

Discipline English (Linguistics)

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ABSTRACT

The present research aims to investigate the pedagogical implications of Artificial Intelligence (AI) in the English Language Learning (ELL) context, specifically focusing on ChatGPT's impact on learning and teaching English writing skills among BS English students at NUML, Multan Campus and the perceptions of English language learners regarding the integration of ChatGPT in English Language Learning (ELL) classrooms. The study is significant as existing literature lacks thorough empirical investigation of ChatGPT's impact on English writing skills among BS English students, as well as broader pedagogical implications of AI integration in English Language Learning (ELL) classrooms. The present study employs a quasi-experimental design to assess the impact of ChatGPT on English writing skills, using a mixed-method approach. Thirty students of BS English 2nd have been selected through purposive sampling method and assigned to experimental (N=15) and control (N=15) groups. The pre and post tests have been conducted from both groups to assess their English writing skills before and after the intervention period of six weeks. Additionally, a questionnaire based on the Technology Acceptance Model (TAM) constructs (Perceived Ease of Use, Perceived Usefulness, Attitude towards Use and Behavioral Intention) has been administered from the experimental group to gauge learners' attitudes, perceptions and engagement towards ChatGPT. The pre and post-test results have been analyzed using descriptive (mean, median, mode, standard deviation) and inferential statistics (independent sample t- test), and qualitative data is thematically analyzed by applying the integrated theoretical framework of three theories comprising of Technology Acceptance Model (TAM), Constructivism and Technology Enhanced Language Learning (TELL) to provide deeper insights into the pedagogical implications of ChatGPT in English Language Learning (ELL) classrooms. The findings substantiate the hypothesis that the use of ChatGPT significantly improves English writing proficiency compared to traditional teaching methods and provide insights into the effectiveness and challenges of incorporating ChatGPT in language learning context, offering valuable recommendations for educators and policymakers by providing evidence-based insights.

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LIST OF ABBREVIATIONS

AI	Artificial intelligence
AIED	Artificial Intelligence in Education
GPT	Generative Pre Trained Transformer
ELL	English Language Learning
NLP	Natural Language Processing
ML	Machine Learning
DL	Deep Learning
TAM	Technology Acceptance Model
PU	Perceived Usefulness
PEOU	Perceived Ease of Use
ATU	Attitude Towards Use
BI	Behavioral Intention
SPSS	Statistical Package for the Social Sciences
SLA	Second Language Acquisition
AALL	AI Assisted Language Learning
TELL	Technology Enhanced Language Learning
CALL	Computer Assisted Language learning

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CHAPTER 1

INTRODUCTION

In recent years, the integration of technology in education has witnessed great significance especially with the advancement of Artificial Intelligence (AI), which has revolutionized the learning and teaching process in the whole world. Recent advances in Artificial Intelligence (AI) and the development of natural language processing result powerful AI-driven applications such as ChatGPT; it can serve as an educational tool in schools and at home with promising potential for improving language learning, motivating learners and facilitating personalized learning experiences. The integration of AI in language teaching is a growing trend, which Kukulska-Hulme and Viberg (2017) highlight its potential to tailored learning experiences. Artificial Intelligence (AI) transforms teaching and learning practice globally. As the Oxford Handbook of Applied Linguistics notes, using artificial intelligence (AI) technologies for educational purposes, including language learning, is increasingly becoming useful. Thus, the present research seeks to explore pedagogical implications of AI in the ELL context, particularly the impact of ChatGPT on the learning and teaching of English writing skills among BS English students at NUML, Multan Campus.

ELL stands for English language learning, is the process of acquiring and learning English language skills by a non-native speaker to communicate effectively. ELL classes typically involve teacher-centered instruction, textbooks and language practice. However, applying AI language tools in ELL classrooms presents new opportunities to enhance learning outcomes. These tools provide adaptive and personalized approaches to language learning, allowing learners to practice language skills at their own pace, receive immediate, tailored feedback, language assessment, and conduct interactive conversations. ELL classrooms can be transformed through the integration of AI language tools and NLP techniques into dynamic learning environments that support active engagement, motivate learners, and develop proficiency. While the potential of using AI language tools in ELL classrooms holds promise, it is important to explore its effectiveness, influence, concerns and challenges through empirical research.

Artificial Intelligence (AI) is a system that employs machines to draw inferences, recommendations, or verdicts in a real or artificial context based on a certain set of human-defined goals and objectives (Organisation for Economic Co-operation and Development, 2019). With its growing universal significance across every facet of human life, the last few years have seen explosive growth in the field of AI in education (AIED). AI has great potential for education as it can produce predictive and diagnostic models, timeliness of interventions related to smart learning, precision education, and reducing drop-out rates. The most prevalent AI tools in education are semantic web, software tools, ontologies and personalized learning platforms (Hinojo-Lucena et al., 2019). Huang et al. (2023) demonstrate how technology enhances language acquisition and provides a groundwork for integrating more advanced AI programs in the computer-assisted language acquisition field.

Natural language processing (NLP) is the field of artificial intelligence that studies how computers communicate with human language, fuels AI language tools. It is similar to human language; NLP enables machines to understand, interpret, and generate human language in ways that are similar to human linguistic skills. AI language tools use NLP techniques to analyze text or speech, extract meaning, identify grammar and vocabulary errors, and offer personalized feedback to learners, resulting in interactive and dynamic language learning. Personalized learning systems allow learners with limited language proficiency to learn at their own pace, helping them to achieve maximum progress (Chen et al., 2021a).

AI language models like ChatGPT is the result of great advancements in Artificial intelligence. These tools, as noted by Warschauer (2011) in his book on technology and language learning, are not just technological marvels but also potent educational instruments capable of providing interactive, adaptive and personalized learning experiences. ChatGPT, an artificial intelligence-based chatbot developed by OpenAI, was introduced in November 2022 and provides cohesive and insightful human-like outcomes to user input. It belongs to the larger family of GPT (Generative Pre-trained Transformer) models. ChatGPT participates in conversational interactions, answering questions and providing coherent and contextually appropriate responses. In language learning, ChatGPT can be utilized as an educational tool to support learners' language development through interactive language practice and feedback.

Pedagogical implications refer to the potential consequences or practical applications of research findings to enhance teaching and learning practices. When a research is conducted in an educational context, exploring the pedagogical implications is essential because it allows researchers and educators to understand how the research outcomes can be translated into actionable strategies to improve teaching methods, learning outcomes and overall educational experiences.

In the present research, the impact of ChatGPT on English writing skills among BS English students, the pedagogical implications include:

- Integrating ChatGPT as a supplementary writing tool in ESL classrooms to provide personalized feedback and support for individual learners.
- Using ChatGPT as an additional writing assistant in ESL classrooms to get feedback tailored to different students' needs.
- Educating ESL teachers on how to use AI instruction like ChatGPT in their writing classrooms to accommodate diverse learners.
- Designing writing assignments that encourage students to use ChatGPT as a part of their writing process while still ensuring that the assignment encourages the development of critical thinking skills and language skills.
- Assessing the ethical and privacy implications of how AI tools are used in language learning and how AI is communicated to students transparently in the classroom.
- Finding ways to use AI-generated text to produce more language learning resources, quizzes and practice exercises for language students.

Employing a quasi-experimental approach based on a robust methodology, the present study aims to offer evidence-based contributions regarding the potential pedagogical applications of AI, specifically ChatGPT, for the improvement of writing skills in English among BS English students in a controlled experimental environment. Given the challenges ELL students experience mastering writing, the promise of AI-driven tools such as ChatGPT to provide them with personalized, context-aware and interactive learning experiences could be particularly applicable.

Although the conversational aspects of ChatGPT have been widely noted, its use in instructing ELL students in writing is still underexplored. This gap highlights

the need for present research on how AI supports writing proficiency development among ELL learners. Thus, this study attempts to fill the gap through the investigation of AI integration in English writing skills, personalized feedback provision, and how it can be beneficial to help ELL students gain more proficiency in writing through this process.

The present research aims to contribute to the existing literature by providing empirical evidence on AI's pedagogical impact and effectiveness in improving writing skills in ELL environments. The research findings of the study provide insights relevant to language education and inform best practices for implementing AI learning tools to support ELL instruction for learners with diverse linguistic backgrounds. It represents some progress in bridging the gap in understanding how the intersectional process of the convergence of technology and pedagogy can lead to transformative and impactful learning beacons, particularly in language learning and teaching.

1.1 Importance of Writing Skills in ELL

Writing, the most critical element in the overall proficiency of language, is a fundamental piece of the success of English Language Learners (ELL) in both the academic and professional arena. According to Ferris (2012), writing is one of the significant component for academic communication and a major way for ELL students to develop critical thinking, analytical, and solutions-oriented skills. Writing well in English opens up opportunities into higher education, career opportunities, and constructive engagement in a globalized society.

ELL students face considerable challenges in acquiring English writing skills, a fact well-documented in the academic literature. According to Cummins (2001), written proficiency is essential for students who want to perform and integrate well into an academic environment and English-speaking setting. In her writings on language teaching, Larsen-Freeman (2000) points to the complexity of teaching and learning English as a second language and claims English writing is particularly complicated. Traditional teaching methods fail to meet the diverse needs of learners in this domain. The advancements of AI tools provide a promising and optimistic way to overcome these challenges. Blake (2013) provides insight in the Annual Review of Applied Linguistics about computer-assisted language learning tools and how they can effectively improve proficiency, paving the way for informative technologies, such as

ChatGPT. As Warschauer and Healey (1998) noted, technology facilitates language learning, and AI has a strong potential to enhance these results.

However, for ELL students, it is a challenge to master the skill of writing in English. According to Grabe and Kaplan (2014), writing in a second language is a more complicated and involved process than speaking, reading or listening, given that it entails high levels of control over a range of linguistic, cognitive and rhetorical features. Linguistic proficiency, which encompasses grammar, syntax, and vocabulary, is one of the main writing challenges of ELL students. According to Silva (1993), ELL students face difficulties in English grammar and vocabulary, resulting in errors that obscure meaning and lessen the readers' writing taste. Moreover, English language learners (ELLs), on the other hand, may struggle with grasping and employing rhetorical modes prominent in academic writing in English but either foreign or non-existent in their first languages.

Writing fluency and coherence is another challenge to overcome. Cumming (2001) notes that ELL students struggle with organizing coherent thoughts and building arguments in English writing. This challenge speaks to a lack of engagement with diverse kinds of writing in English and few chances to write and receive feedback. Psychological factors such as anxiety and lack of confidence when writing in a second language also profoundly affect ELL students' writing performance. Cheng (2004) points out, writing anxiety is a typical phenomenon in ELL students and can often occur due to fear of making mistakes, receiving negative feedback, or not being proficient in English. This fear blocks the writing process and, therefore, degrades the quality of written work.

To address these challenges, educators and researchers have explored different instructional methods and interventions. Importantly, there are other approaches that integrate technology and AI tools, such as Google Translate, to teach writing to ELL students. Emerging research in this area suggests that AI tools, particularly ChatGPT, have the potential to provide personalized and adaptive learning experiences that may be highly beneficial in improving the English writing skills of ELL students.

1.2 Artificial Intelligence-Powered Digital Tools

Artificial Intelligence (AI) is classified into three predominant types: Artificial General Intelligence (AGI), Artificial Super Intelligence (ASI) and Artificial Narrow Intelligence (ANI). Each type has unique characteristics and capabilities. AGIs are artificial intelligence systems that can learn from experiences, adjust to new inputs, and perform human-like tasks (Bansla, 2012). On the other hand, ASI has surpassed human intelligence in virtually every field, with enhanced intelligence, decision-making capabilities, huge memory, and extremely fast information processing. ANI is trained to develop human beings or human-like skills in certain activities and does not have capabilities other than those jobs. For example, Google Translate (translation service) and virtual assistants are artificial narrow intelligence (ANI) examples.

Chatbots are artificial narrow intelligence (ANI), they mimic human conversations in text or speech using AI methods (such as NLP and ML) (Chiu et al., 2023). Chatbots are programmed to respond to a conversation with various inputs and provide a conversation-like experience, giving users the answers they need according to the provided data. ChatGPT is an artificial narrow intelligence (ANI) based chatbot, which utilizes Generative Pre-trained Transformer (GPT) architecture. This powerful technique allows ChatGPT to understand, interpret, and compose accurate and contextually relevant responses with interactive dialogue. ChatGPT has been trained extensively on a lot of text information from the internet. Such observations have trained ChatGPT to understand language's context, meaning and nuances (Bansla, 2012; Safdar et al., 2021).

1.3 Artificial Intelligence in Education (AIED)

Artificial intelligence (AI) integration into language education and learning has transformed traditional teaching strategies in an instructional setting. Luckin et al. (2016) conducted a significant research offering a thorough analysis of the implications of artificial intelligence in the field of education, more especially in terms of its capacity to maximize the personalized learning experience for every student. AI adapts learning instruction depending on individual requirements, interests, and speed of learning, therefore providing each person with a more individualized and significant educational experience (Vera, 2023).

A research by Kukulska-Hulme (2019) underlines even more the efficiency of AI-driven language learning platforms since it shows that AI tools can create adaptive learning environments for language learners where they can experience customized and effective learning approach. Furthermore, this development is ahead from the automatic speech recognition, natural language processing and basic artificial intelligence of digital assistants including ChatGPT, Siri and Alexa since it can now execute more complicated automated answers and actions (Kohnke et al., 2023).

Language learning apps include ChatGPT, Duolingo, and Babbel are among the more advanced AI tools applied in education. Most of these applications rely on artificial intelligence algorithms that change their course based on the needs and development of every student. Vesselinov and Grego (2012) underlines even further the effectiveness of AI-driven language learning systems since users of the Duolingo site showed significant increases in language competency.

Chatbots and AI tutors are advanced AI tools that significantly contributes to AI in education (AIED). These AI tools provide conversational, interactive experiences similar to interacting with a person, giving students opportunities for practice and instant feedback. Based on the suggestion of Fryer and Carpenter (2006), Chatbots have significant implications in language learning, it can facilitate student engagement and learning outcomes. AI is also changing the way writing skills are taught in language learning. ChatGPT and other AI-powered writing assistants help to fix grammar and spelling mistakes and suggest style and tone for native and non-native English speakers. Warschauer and Ware (2006) have written about the role of AI in writing instruction, demonstrating that these AI generated tools assist in writing development.

Moreover, AI is also used critically in assessment and feedback. An example of this would be automated essay scoring systems that use natural language processing to score and give feedback on student essays, something that was previously reserved for human educators only. According to research by Shermis and Hamner (2013), automated essay scoring systems show reliability and validity and help save time measuring students' writing skills. Additionally, AI's ability to process extensive data informs educators about student learning trends, allowing for well-informed educational approaches and strategies. Xie and Reider (2014) explain how AI provides

insight into the student learning process and aids educators in optimizing it daily through a study on learning analytics and educational data mining.

Therefore, the impact of using AI is huge and fruitful in the education field, especially for language learning. It provides the most advanced and original tools and methodologies, more advanced teaching strategies, and personalized and adaptive learning paths for students. As AI technologies develop further, they revolutionize educational settings, fostering effective and enhanced learning experiences.

1.4 ChatGPT and Language Learning

Language educators have gradually recognized the usefulness of smart chatbots in immersing students in authentic conversational practice in their target languages. These computer applications can closely imitate naturally occurring conversation, enabling both the provision of asynchronous tutoring and real-time linguistic input, the two type requisites for successful language acquisition (Ashfaq et al., 2020; Fryer et al., 2020). Chatbots use powerful AI tech advances to learn language from massive datasets of human language interactions. By training on accumulated data, they can adjust their responses in real-time according to past behaviors and become increasingly effective in chat (Jiang et al., 2022). They thus have considerable advantages as always-on, adaptive language-learning agents that converse with users, learn from this interaction, and support tailored practice opportunities (Fryer et al., 2019).

Language acquisition in a second language requires a lot of input and exposure to different linguistic accommodations for the device to engage with, and that is where the strength of AI-powered Chatbots lies; they can accommodate users with a lot of different linguistic exposures. They dynamically adapt to learners' proficiency levels and foster interest in linguistic and cognitive growth with varying expressions, responsive interactions, and individualized feedback (Huang et al., 2023; Kohnke, 2022a, 2022b).

In addition, they can provide an adaptive learning environment similar to real-life human interactions. They enable language practice at any time, which benefits learners who want to improve their skills beyond the traditional classroom environment (Haristiani, 2019). Providing learners with opportunities to adjust and amend their output, these Chatbots can facilitate the teaching and learning cycle (Ellis, 1999;

Mackey, 2020). They also offer immediate feedback, facilitating formative assessment necessary for language development (Kuhail et al., 2023).

Released by Open AI in November 2022, Chat-GPT is one of the advanced AI tool available. It is a generative pre-training transformer. Unlike earlier digital assistants who employed simple artificial intelligence to do tasks, ChatGPT can hold more complex discussions, giving voice to past flaws with automatic speech recognition and NLP to provide the user a more dynamic experience. Built on GPT (Generative Pre-trained Transformer) design, ChatGPT can produce responses human-like depending on what users provide. This quality has been utilized in language education to provide interactive and interesting conversational opportunities for students. It can carry both complicated and understandable talks. ChatGPT involves students in a more natural, flexible, and dynamic manner than conventional language-learning methods. ChatGPT also offers rapid language learning practice feedback. ChatGPT instantly fixes mistakes made by students in real time and offers ideas for development as well as explanations. Designed especially to enhance writing skills in several language learning applications, ChatGPT of OpenAI is a great example of AI-powered platforms (Barrot, 2023). Many research (Huang and Tan, 2023) have confirmed how well ChatGPT improves writing.

ChatGPT offers customised language instruction. It provides a tailored and focused learning experience by matching talks to the learner's degree of fluency and learning style. Lee et al. (2020) address this aspect of personalizing utilizing artificial intelligence-driven language learning by stating that emphasizing personalized learning paths made feasible by AI considerably increases learning efficacy. For language acquisition, ChatGPT marks a paradigm change. The rise of ChatGPT offers fresh chances for language instruction that fit more exploration and pragmatic application in the classroom environments.

Aldosari (2024) defines artificial intelligence as a system that combines smart algorithms to help humans complete different jobs by means of integration. in a teaching environment. Scholars in the field of applied linguistics have extensively recorded the advantages of artificial intelligence in language education, therefore benefiting not only language teaching and learning strategies but also language learners in acquiring new languages (Huang et al., 2023).

Scholars have proposed that the emergence of ChatGPT could signal the onset of artificial general intelligence, where AI might achieve human-like intelligence levels by transitioning "from algorithmic to linguistic intelligence" (Zhou et al., 2023, p. 5). In this context, despite concerns from policymakers and educators about potential ethical dilemmas, widespread academic dishonesty and the risk of dehumanization associated with ChatGPT (Rudolph, Tan, & Tan, 2023), an examination of global discussions shows a growing interest in the benefits this advanced conversational AI could offer for language learning (Shemesh, 2023). Hawanti and Zubaydulloevna (2023) identify several advantages of this emerging AI technology after conducting experimental researches on ChatGPT. ChatGPT engages students in dialogues and provides instant feedback, enabling language learners to practice new ways of creating meaning and benefiting from tailored learning that enhances creativity and productivity.

Additionally, it increases learners' exposure to the target language through simulations of real-life usage scenarios. Shemesh (2023) has crafted a comprehensive, user-friendly manual on enhancing English communication skills, vocabulary and grammar using ChatGPT, highlighting the significant potential of ChatGPT as a transformative tool in AI-driven language education.

However, to date, there is a lack of rigorous research on the extent to which ChatGPT effectively improves English writing skills and is perceived and accepted by learners in English language learning (ELL) classrooms.

1.5 Hypothesis

1.5.1 Null Hypothesis (H₀)

There is no significant difference in English writing skills improvement between BS English students who use ChatGPT and those who do not use ChatGPT during the intervention period.

1.5.2 Alternative Hypothesis (H_a)

There is a significant difference in English writing skills improvement between BS English students who use ChatGPT and those who do not use ChatGPT during the intervention period.

The researcher has employed a quasi-experimental design and statistical analysis methods to determine whether the results support the null hypothesis or favor

the alternative hypothesis. By conducting the study and analyzing the data, researcher aims to provide empirical evidence on the effectiveness of ChatGPT as an AI-based language tool for enhancing English writing skills among BS English students and explore its potential pedagogical implications in the ELL context.

1.6 Statement of the Problem

After reviewing the literature related to study, the researcher found that traditional language learning instructions fail to offer personalized support or feedback based on the learner's current level and progress. As a result, they stifle the development of English language learners in terms of language proficiency. Furthermore, there is a lack of empirical research on AI language tools' potential impact and pedagogical implications (e.g., ChatGPT) in ELL instruction. Given the lack of research evidence available to educators and policymakers on the effectiveness and usability of AI tools for integration in ELL classrooms, it remains unclear what approaches are most effective in improving English writing skills for ESL learners. Therefore, the present study seeks to explore the impact of integrating ChatGPT in improving English writing skills among BS English learners and offer evidence-based recommendations for practice in language education.

1.7 Objectives of the Research

The present research aims:

1. To examine the impact of ChatGPT on the improvement of English writing proficiency of BS English students at NUML Multan Campus
2. To explore the potential pedagogical implications of integrating AI-driven tool ChatGPT in English language learning contexts
3. To investigate the perceptions of English language learners regarding the integration of ChatGPT in ELL classrooms

1.8 Research Questions

The present research investigates the following research questions:

1. What is the impact of integrating ChatGPT in learning English writing skills of BS English students at NUML Multan Campus compared to traditional writing teaching methods?

2. What are the pedagogical implications of using ChatGPT as a language learning tool in English Language Learning classrooms?
3. How is the integration of ChatGPT in ELL classrooms perceived by the English Language learners?

1.9 Research Methodology

The methodology section of the present research outlines the plan and procedures which have been used to conduct the quasi-experimental study on the pedagogical implications of ChatGPT in English writing skills among BS English students at NUML, Multan Campus. It describes the study design, sampling, data collection methods, and data analysis techniques.

The present study employs a mixed-method approach. The present research is a quasi-experimental study that intends to evaluate ChatGPT's impacts on BS English students' English writing skills or instruction. The control group, of BS English students, has received traditional writing instructions without the integration of ChatGPT, while the experimental group has employed ChatGPT for their writing process. This design allows the comparison of the effects of the intervention tool (ChatGPT) on English writing skills between the two groups. A questionnaire is administered to determine learners' perception on using ChatGPT in ELL classrooms.

A quasi-experimental study is a type of research that has been used to evaluate the cause and effect correlations between variables. In a quasi-experimental research, researchers select and assign participants to groups based on pre-existing characteristics, without random assignment of participants to different groups. It enables researchers to compare the impacts of particular intervention on the dependent variable.

Thirty students of varying backgrounds and proficiency levels have been selected as a sample for this study. The participants have been selected from BS English (2nd semester) at the National University of Modern Languages (Multan Campus), and their language proficiency has been checked through a pre-test so that the experimental and control groups are comparable. The participants have been divided into an experimental group (N=15) and a control group (N=15). All the participants are aged between 18 and 25.

A pre-intervention test of the English writing skills has been conducted from both the experimental and control groups before the intervention. It includes essay writing, paragraph development, grammar, and vocabulary tasks and is a baseline measure of learner's initial writing ability. The experimental group has used ChatGPT, an AI-based language tool, during their writing practice and assignments. The experimental group participants are encouraged to use ChatGPT for guidance, feedback, suggestions, and language help throughout the writing process. While the control group has received traditional writing instruction from the instructor without the assistance of ChatGPT. After 6 weeks (around a month and a half) of intervention period, a post-intervention assessment is carried out to assess the English writing skills of the two groups. The post-intervention assessment is the same as the pre-intervention assessment in comparing the degree of improved writing proficiency between the groups.

The experimental group of students have also been given a questionnaire to assess their perceived confidence, willingness to learn, engagement, and satisfaction with ChatGPT as an educational tool. The questionnaire comprised of two sections: the first section collects students' demographic information, whereas the second section aims to assess students' perceptions regarding ChatGPT-Integration in ELL Classrooms. The statements presented in the second section have been adopted from the Technology Acceptance Model (TAM) developed by Davis (1989).

TAM is a well-established and extensively utilized research framework for studying user acceptance of technology (Lee, Kozar, & Larsen, 2003). Therefore, it is used as the primary framework to examine learners' views of ChatGPT. The study measures four main constructs from TAM as identified by Huang et al. (2012): perceived ease of use (PEOU), perceived usefulness (PU), attitudes towards use (ATU) and behavioral intention (BI).

The pre- and post-test results have been analyzed using statistical techniques. Descriptive statistics are analyzed alongside inferential statistics, specifically the independent sample t-test, through SPSS-25 to assess the significant differences in language proficiency gains between the both groups before and after the intervention.

The findings of Quantitative data have been analyzed qualitatively and thematically to identify recurring patterns, themes, insightful comments regarding the

use of ChatGPT and pedagogical implications of using ChatGPT in ELL classrooms. These qualitative insights complement the quantitative results and provide a deeper understanding of learners about their experiences and perceptions of ChatGPT in ELL Classrooms.

1.10 Significance of the Present Study

The significance of this study lies in its potential to explore the effectiveness of AI tools like ChatGPT in ELL Classrooms, particularly for writing skills, the research offers significant contributions to linguistic theory, especially in the area of second language acquisition (SLA). From a practical standpoint, this research revolutionizes teaching methodologies in ELL contexts. As Blake (2013) noted in his research on the effectiveness of technology-mediated language learning, AI can also give educators insight into effective teaching strategies and learning outcomes.

This study contributes to the understanding of effective integration of AI technology in ELL pedagogy by providing the empirical evidence of improving English writing skills. AI language tools are designed to meet the learners' individual capabilities and specific needs and provide with personalized and adaptive learning experiences. The present research helps to understand the potential of AI tools to deliver personalized feedback, align with learners need and progress, and increase the effectiveness of instruction.

In addition, providing evidence-based information, the findings of this study, insights into the opportunities and challenges of using ChatGPT in language learning, and recommendations for educators and policymakers. The findings of present research helps the educators' in making decisions regarding language teaching technology investment and integration into any curriculum. This aligns with the views expressed by Coniam (2004) on the role of technology in shaping education policy.

Research findings contribute to the academic and practical discourse on the body of knowledge in language education and ultimately impact practice and educational policy about using AI in the classroom. It also contributes to the growing knowledge in AI-assisted language learning (AALL) research.

1.11 Delimitations

In the present study, certain delimitations have been set to keep the focus and manage resources efficiently. Firstly, this research is based on a limited sample size of

30 BS English (2nd semester) students from the National University of Modern Languages, Multan Campus, owing to a lack of time and resources. Secondly, the intervention period of ChatGPT for the experimental group is only six weeks, which limits the observable long-term effects. Thirdly, the focus of research remains on English writing skills, so research on the use of ChatGPT in other skills of the English language including speaking, listening and reading has been excluded. Lastly, the inclusion of BS English students with different proficiency degrees is also a limitation. However, efforts have been made to control for the homogeneity in each group by having a controlled environment to maintain experimental conditions.

Despite these delimitations, the present research strives to provide valuable insights into the pedagogical implications of ChatGPT in ELL instruction and offers practical recommendations for enhancing English writing skills among BS English students.

1.12 Chapter Breakdown

The dissertation is organized into five chapters of varying lengths in accordance with the framework. Every chapter covers a significant aspect within the discipline. They are meant to stand alone, allowing for the provision of a strong and unambiguous theoretical foundation and the refutation of pointless claims regarding the discipline's viability. The following is the thesis's chapter breakdown:

Chapter 1: This chapter includes the introduction of research. It is an executive summary that provides the reader with an alluring preview of what is to come. This chapter sheds light on a variety of topics, including introduction to the subject, the study's background, introduction to the Artificial Intelligence and ChatGPT in Educational context, hypothesis, the problem statement, objectives, research questions, significance of study, a brief introduction to methodology and delimitations of research.

Chapter 2: The works already done and relevant literature on Artificial Intelligence in Education and ChatGPT in language learning have been critically reviewed in this chapter. Also, this chapter aims to create a theoretical framework to analyze the collected data.

Chapter 3: An elaboration of the research methods used for the present research is provided in this chapter. Research Design, quasi-experimental study and sampling technique have been elaborated in this chapter, along with their analytical tools and

stages of analysis. Also, it highlights the methods for gathering data and provide specifics about the data analysis. It also discusses the research ethics and limitations of the present research.

Chapter 4: This chapter has been divided into two parts, the first part deals with the quantitative analysis of collected data and then qualitatively elaboration of the quantitative findings by employing theoretical framework comprised of three theories: TAM model, constructivism and TELL. The second part deals with the quantitative and qualitative analysis of a Questionnaire to investigate the perceptions of learners regarding integration of ChatGPT in ELL classrooms.

Chapter 5: This chapter provides a conclusion to the research findings. Also, it makes some comments and recommendations for additional research in this field.

CHAPTER 2

LITERATURE REVIEW

This chapter discusses the theoretical framework, relevant literature and works that have already been done in the domain of AI and ChatGPT in educational and language learning context. The integration of Artificial Intelligence (AI) in educational settings, particularly in the domain of English Language Learning (ELL), represents a significant paradigm shift in pedagogical methodologies. The present study integrates ChatGPT, an advanced conversational AI chatbot, to improve the English writing skills of BS English students at the National University of Modern Languages (NUML.) Multan Campus. The objectives of the present research are driven by the increasing significance of AI applications in educational settings and the urgent need for an in-depth understanding of the pedagogical implications of these technologies.

2.1 Theoretical Framework

The theoretical framework offers a perspective through which the research problem is observed and grasped. The theoretical framework of the present research is based on three theories: Technology-Enhanced Language Learning (TELL), Jean Piaget's Constructivism, and Fred Davis's Technology Acceptance Model (TAM). These theories offer different prism to understand the acceptance and application of artificial intelligence tools as well as their educational effects in the framework of language acquisition.

One of the basic models for understanding user acceptance and use of technology is the Technology Acceptance Model (TAM) developed by Davis, 1989. With the advantages of its relevance and adaptability to technological advancements, Davis's theoretical framework has become a commonly utilized method in educational technology research (Davis, F. D., 1989). This study utilizes the Technology Acceptance Model (TAM) to examine learners' perceptions of ChatGPT at NUML, focusing on its perceived usefulness and ease of use, which are critical factors influencing its adoption and integration into language teaching practices.

Piaget's constructivism posits that learners are active constructors of knowledge, shaping their understanding of the world through personal experiences and reflective processes. Thus, this theory helps us to better grasp how ChatGPT supports an active, learner-oriented approach in ELL, in which language learners co-construct

language learning and engage in real-world discussions. The constructivist hypothesis has been investigated by many scholars within the framework of technology improved language acquisition (Piaget, J., 2013).

Technology Enhanced Language Learning (TELL) is the application of technology to augment and ease language acquisition. TELL is particularly relevant to our perspective on tool integration—such as ChatGPT—into language learning strategies to improve writing competencies. The impact of technology on language learning has been thoroughly examined in TELL research (Heift, T. & Schulze, M., 2007).

These ideas have been combined into a thorough framework that guarantees the investigation of the several dimensions of artificial intelligence application in language acquisition and acts as a guide for this specific research. This combined approach helps to thoroughly investigate in ELL ChatGPT's technological, educational, and cognitive aspects.

This theoretical framework is essential as it offers a structured approach to address the research questions by examining the integration of ChatGPT and similar LLMs into current pedagogical practices, the factors influencing their acceptance among educators and learners, and their implications for learning.

2.1.1 Technology Acceptance Model (TAM)

One of the most well-known paradigms in pedagogical technology, the Technology Acceptance Model (TAM) helps to evaluate users' opinions on the acceptance and competent usage of certain technology. Fred Davis presented it in 1989; Richard Bagozzi and Fred Davis then developed it in 1992. TAM seeks knowledge and comprehension of the elements influencing consumers to adopt or use the specific technology. Developed to grasp and forecast human behavior about a given technology, TAM, an extended form of the Theory of Reasoned Action (TRA), is a psychological theory.

The present study examines the acceptance and use of an artificial intelligence tool-based language tool called ChatGPT by BS English students at the National University of Modern Languages, Multan campus, using TAM. By means of TAM, the researcher has acquired understanding of the elements fostering either encouragement or inhibition of students from utilizing ChatGPT as a tool for language

acquisition and to what extent they welcome its integration into their language-learning strategies.

TAM is based on the idea that four core constructs drive the intention to use technology.

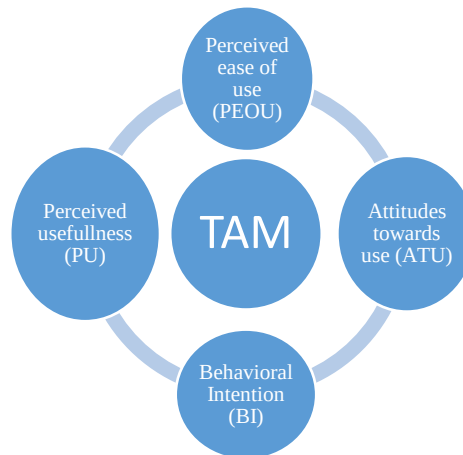


Figure 1. Core Constructs of TAM Model

According to Davis (1989), Perceived Usefulness (PU) refers to the extent to which users believe that using particular technology will enhance their performance and creativity. Specifically, in a language learning context, students consider ChatGPT useful when they think it can give them valuable feedback, help them improve their writing and assist with language learning. Perceived ease of use (PEOU) reflects how users perceive particular technology easy to use. (Davis, 1989). In the context of present research, if ChatGPT is functional in ways that are user-friendly and easy to interact with during the writing stage, students are more likely to use it in language learning activities.

Attitudes towards Use (ATU) are users' overall affective responses to technology use. This emotional experience is based on interpretation and can be negative or positive depending on the user's experiences and perceptions (Davis, 1989). A user's belief in technology (its perceived ease of use and usefulness) and their behavioral intention to use it are key links in this attitude.

According to Davis (1989), this attitude is influenced directly by two primary factors. If a technology is perceived as beneficial in enhancing job performance, it positively shapes the user's attitude towards its usage. Users are generally more favorable towards technologies that they believe will bring them significant advantages.

If a technology is user-friendly and easy to interact with, it is more likely to foster a positive attitude. Frustration caused by complex or hard-to-operate technologies can influence the user to commit to these systems. One of the biggest predictors of whether someone will go ahead and use a technology is their attitude to using it. A good attitude will probably lead to a greater intention to use, while a bad attitude will suggest that they will not be willing to use the technology, whether perceived as useful or easy to use.

In short, "Attitude Towards Use" combines cognitive appraisals and one more bridging point to usage behavior that develops emotional and psychological readiness for using technology. Studying it is useful for improving and aligning the strategy behind technology design and implementation with emotional response and user expectations.

Behavioral Intention (BI) refers to the extent to which a person plans to use or not to use a certain technology in the future. Such intent is the best predictor for real-world use of any technology, therefore forming a focus of studies on technology adoption and implementation. In this case, the users, if favorable towards technology, are likely to develop an intention to use it. On the other hand, negative tendency might negatively correlate with technology adoption. The intention to use technology will be strong if a user believes that it enhances their job performance or daily life.

ChatGPT, a conversational AI agent, represents a new educational tool for language learning. In the present research, the researcher aims to explore whether students perceive ChatGPT as useful and easy to use in improving English writing skills or not, by using TAM. Users' prior experience, existing digital literacy, perceived ease of use, and perceived usefulness of technology are critical components (Davis, 1989; Venkatesh & Bala, 2008) helping to shape perceptions of the effectiveness of ELL programs at NUML, Multan Campus.

The TAM model has also been utilized to study the acceptance of various technologies in the education sector. Therefore, PU and PEOU are important for how users perceive new information technologies. However, they also influence decision-making over whether or not users use new technology in their learning or teaching (Venkatesh et al., 2003). Considering research related to language learning apps and online platforms can shed some light on applying the TAM framework to AI tools in

ELL; it usually indicates that the perceived usefulness of the technology in language improvement (PU) and its usability (PEOU) can significantly predict adoption of the technology (Park, 2009).

In TAM, critics highlight that it does not consider the external impact on the individual as a social influence, individual differences, the community, or the specific situation of technology usage. These factors are particularly relevant in education, where social dynamics and individual learner needs have high salience (Bagozzi, 2007). To address these criticisms, modifications of TAM in later research have added more components. When the original model was extended, the roots in technology acceptance could be deeper, making it applicable to diverse contexts, such as AI in education (e.g., Venkatesh & Davis, 2000; Venkatesh et al., 2012).

TAM provides a basic foundation for examining the acceptance of AI tools such as ChatGPT in the ELL. The reason for choosing this theoretical framework is that this model offers a refined structure to confirm the factors mentioned about how perceived usefulness and ease of use are relevant to the integration of ChatGPT for language learning purposes. In this study, TAM comprehensively explores how learners perceive ChatGPT and its potential impact on enhancing English writing skills in ELL classrooms.

2.1.2 Constructivism

Constructivism, a theory developed in the early to mid-20th century by Jean Piaget, is one of the most commonly used theories in educational psychology. Constructivism is a school of thought strongly inspired by Piaget's several seminal books on cognitive development, notably "The Construction of Reality in the Child" (1913) and "The Psychology of Intelligence" (1947).

According to constructivism, students actively participate in the learning process by means of communication and experiences thereby building their knowledge of the world. According to this view, students learn most when they relate newly acquired knowledge or skills to pre-existing knowledge or past experiences, therefore rendering learning relevant. Technologies like ChatGPT enable this dynamic in the 21st century by offering interactive platforms to support a real-time approach to immersion, so facilitating language acquisition and hence rendering the idea of Constructivism relevant to the language learning environment.

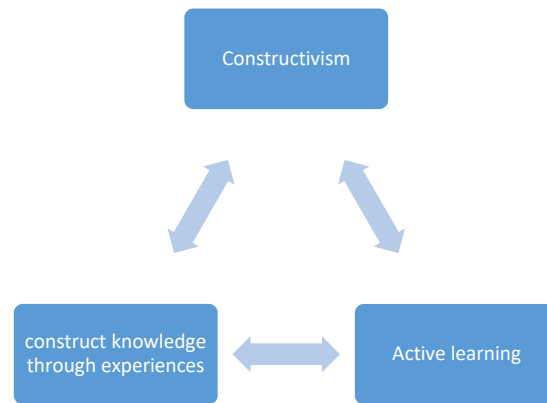


Figure 2. Core Constructs of Constructivism

According to Piaget (2013), learning is not just gaining facts but creating knowledge through direct experience with the world. This method starkly contrasts traditional instructional learning, where knowledge is typically delivered from teacher to student much more passively. In contrast, constructivist facilitators design practices that promote exploration, problem-solving, and collaboration so learners can explore and build knowledge independently. As per Constructivist theory, learners flourish well in environments where they interact, experiment and question. This active engagement enhances comprehension and retention (Dewey, 1986).

Constructivist approach for ESL (English as a Second Language) learners advocates for immersion in real-life tasks in the target language, which is more effective than traditional methods based on memorization (Krashen, 1982). ChatGPT, an AI-driven tool, aptly provides a unique opportunity for learners to practice their language skills with live conversation, which provides instant feedback and customizes their learning pace, making sure to implement the effective strategy of Constructivism. Using AI tools like ChatGPT, learners have a personalized educational experience that caters to their unique needs and interests, highlighting the Constructivist philosophy of individual learner-centeredness in the learning process.

Digital pedagogical tools have changed the face of traditional learning, leading to more interactive and student-centered learning environment rooted in constructivist approach (Papert, 1980). Various research studies have highlighted the positive impact of using a technology-enhanced, constructivist approach to learning. These indicate that when learners are engaged in meaningful, interactive tasks with technology, their motivation, engagement and language skills are significantly enhanced (Cummins, 2000 & Warschauer, 1996).

In the present study, ChatGPT an AI-based language model, is integrated in English Language Learning Classrooms where learner interact with ChatGPT during their writing practice. These interactions allow learners to actively build their understanding of English writing skills, using ChatGPT as a resource to get feedback, experiment with vocabulary and develop their writing skills. ChatGPT access learner's previous language learning experiences, knowledge and abilities and allows them to incorporate their new knowledge—the feedback they could receive with the help of an AI—into their pre-existing linguistic understanding of writing English to enhance their writing proficiency. ChatGPT provides individualized feedback that allow learners to tailor their writing support and making the learning experience even more relevant.

From a Constructivist view, the integration of AI tools into language learning platforms, such as ChatGPT, present practical application of Constructivist principles by creating engaging and personalized as well as real-world context-rich environments for learners. With its deep roots in constructivism and its theoretical basis, this approach potentially guides future research into effective integration of AI tools in language acquisition and learning.

2.1.3 Technology Enhanced Language Learning (TELL)

TELL stands for Technology-Enhanced Language Learning that investigates the use of technology, such as digital tools and computer-based applications, to facilitate language learning and teaching methodologies. TELL, as a term, includes language learning software, mobile applications, language learning platforms, language corpora, and the advanced AI-driven language tools like ChatGPT.

TELL (Technology Enhanced Language Learning) has greatly impacted language education. That evolution has been driven largely by applying modern digital tools, including more sophisticated forms of AI such as ChatGPT, that have expanded the potential and reach of TELL approaches in innovative and interactive ways. TELL belongs to the broader field of Computer-Assisted Language Learning (CALL), which started to emerge with the introduction of computers in education in the late 20th century (Levy, 1997). Scholars like Stephen Bax and Mike Levy have greatly contributed to the existing literature on technology in language education. Technological advancements made TELL a more user-friendly, interactive, and mobile application.

TELL is the notion that technology should enhance the language learning experience through variety, interactivity and personalization. This use of digital tools is more than simply a resource; it is an active participant within the overall learning plan (Chapelle, 2003). Tech-Enhanced Learning (TELL) supports integration of technological tools into pedagogical practices. The goal is not to simply use technology for technology's sake; rather, it should be about using technology to supplement classroom practices and to enhance educational practices (Hubbard, 2008).

The present study explores how artificial intelligence in ChatGPT impacts on English language learning experiences and strengthens the respective learning solutions provided in language learning conferences. It aligns with the broader objective of integrating technology to enhance learning outcomes through technology enhanced language learning (TELL) initiatives. ChatGPT's multiple benefits in language learning environments such as immediate feedback, interactive, personalized and autonomous aspects of language learning aligns with TELL principles, and serves as a practical example of how AI promotes authentic communicative practice (Warschauer, 1996).

The conversational potential of ChatGPT, learner's engagement and interaction which are some of the most important elements in language learning and acquisition (Blake, 2013). ChatGPT's AI-driven system adapts from individual interaction data and provides customized content and responses aligned with different proficiency levels (Kukulska-Hulme, 2005). A meta-analysis was conducted on Computer Assisted Language Learning, which confirmed that technology-enhanced tools have a significant effect on language learning (Lin et al., 2018).

Research using conversational agents in language learning has increased engagement, motivation and skill building. These findings illustrate how AI tools such as ChatGPT fall within the TELL framework (Fryer & Carpenter, 2006). Recent studies on AI in teaching languages indicate that AI tools deliver flexible, personal learning experiences at scale. However, challenges including ensuring pedagogical appropriateness and data privacy remain (Xu et al., 2019). ChatGPT, within the context of the TELL framework, is a significant step as it opens avenues towards a more interactive, personalized, and adaptive language learning experience.

2.1.4 Integrated Theoretical Framework

The integration of Technology Acceptance Model (TAM) along with Constructivism and Technology Enhanced Language Learning (TELL), findings suggest a holistic approach to understanding the adoption and effectiveness of AI tools like ChatGPT in the English Language Learning (ELL) context. When one considers user acceptance of language learning technologies and mobile apps, beyond that, the role of technology for learning, in general, is added, and we find ourselves with a wider lens enabled by the union of these three theories.

TAM deals with the acceptance and usage of technology, whereas constructivism and TELL provide a pedagogical framework for using this technology. It is vital with technologies such as ChatGPT, as the Technology Acceptance Model (TAM) guides us as to whether educators and learners will accept it through insights into user perceptions such as Perceived Ease of Use (PEOU), Perceived Usefulness (PU), Attitude (ATU) and Behavioural Intention (BI). Either way, constructivism and TELL are approaches to how these technologies would be pedagogically beneficial by using them for active and personalised interaction that leads to effective learning. TELL aims to enrich language education by integrating technology, and these diverse approaches follow constructivist principles that see learning as active and experiential. As a tool, ChatGPT embodies these principles by enabling interactive, learner-centred experiences. In this regard, from the learners' perspective, TAM helps in studying and ensuring that the acceptance of such technologies is received well and used efficiently by the stakeholders concerned, especially in terms of being pedagogically sound.

As it relates to the present research, these theories guide design and analysis. TAM provides insights for understanding user acceptance and guiding the incorporation and use of ChatGPT in the ELL classroom. Insights about ChatGPT Attitude of Learners and Educators through Questionnaire based on TAM's constructs (PU, PEOU, ATU & BI) Ensure that the experiment design is constructivist and offers learning activities for developing pragmatic knowledge and ChatGPT language competence. In interactive sessions, learners hold conversations with ChatGPT and utilise it as a resource to apply language concepts in real time, thereby actively creating their understanding. The instructional strategies implemented are based on the constructivist approach. ChatGPT-based activities are meant to elicit active involvement and promote knowledge-building through interaction. These are activities

where learners practice writing, have conversations, or study language using ChatGPT. To understand the importance of TELL concepts for the current curriculum operations, TELL principles shape the selection of technological tools and how these tools have been used in the language curriculum. ChatGPT is governed by TELL's focus on constantly improving the language learning process and making this tool not an accessory but a tool that enhances the language learning experience. ChatGPT and Language Curriculum: In light of TELL principles, incorporating ChatGPT in the language curriculum should be meaningful, purposeful and linked with expected learning outcomes. We should stop seeing ChatGPT solely as a (new) piece of technology but rather as an enabler for practice in news skills acquisition, writing, comprehension, conversational fluency, and other language competencies.

This combination of theories is beneficial in accomplishing the research objectives. For example, Examining the Influence of ChatGPT in ELL Students' Writing Skills Through a Constructivist Lens focuses on whether ChatGPT improves writing skills in ELL students. At the same time, the Technology Acceptance Model serves as an underlying framework for the factors that affect its adoption. TELL provides the general background of this technological integration into language learning. This multi-dimensional view received from the combination of TAM, Constructivism, and TELL provides insights into ChatGPT's possible implementation and effectiveness in enhancing ELL. This unified theoretical framework goes beyond just the significance of user acceptance and pedagogical soundness but demonstrates how technology is strategically activated to facilitate language learning.

This theoretical integration provides the theoretical scaffold for the current study, shaping both the experimental design and the interpretation of results. It ensures a thorough grasp of the technological and pedagogical elements of using AI tools in language education research. The model is intended to be holistic, looking at adoption, pedagogical adaptation, and effective use of AI tools such as ChatGPT in ELL.

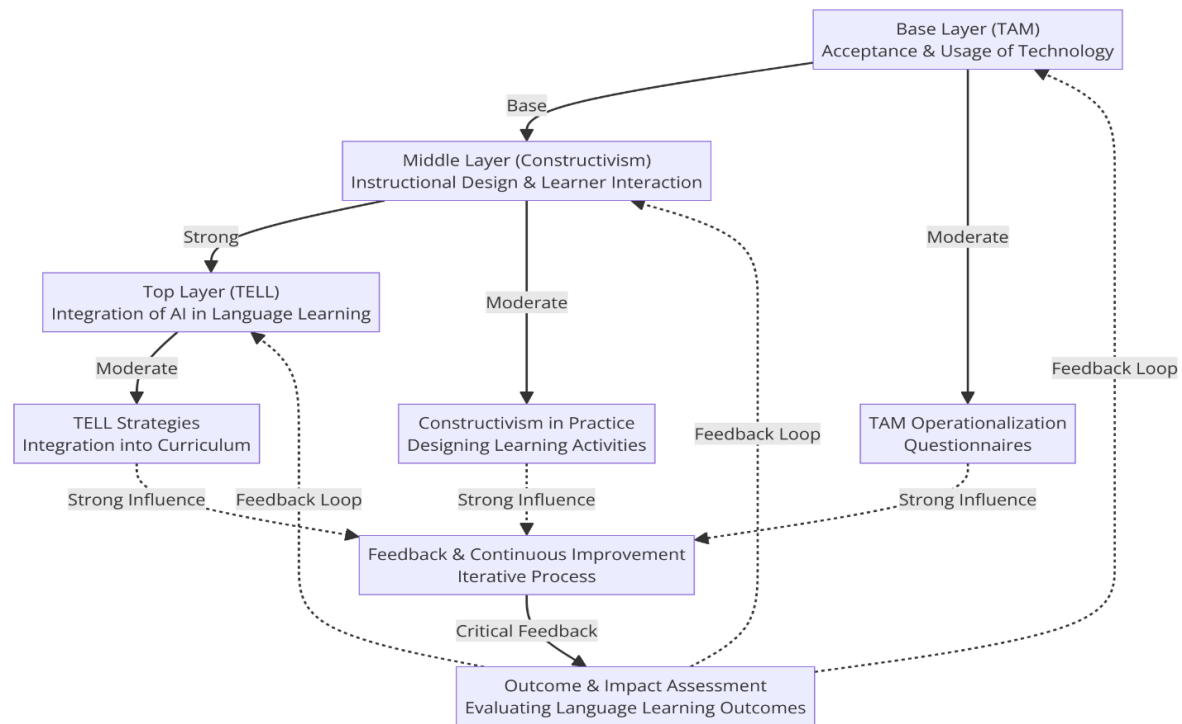


Figure 3. Theoretical Integrated Framework

At the foundational level, TAM concerns itself with the acceptance and usage of technology. The constructivist principles act as the foundation for the instructional design and how the learner interacts with the tool. This layer deals with how learners actively build knowledge representatives with their experiences with ChatGPT. Under TELL principles, the model is capped with a more instructional focus on using ChatGPT, which is embedded within the larger language learning process. It identifies top usages of technology that support pedagogical agenda and language learning objectives.

This research's operational framework is based on various educational and technological strategies that encourage the implementation and acceptance of ChatGPT into ELL. Using the TAM constructs, the attitudes of both learners and educators regarding ChatGPT will be assessed through a questionnaire, which will guide the implementation process to maximise acceptance and usage of ChatGPT. A focus on constructivism in practice: (1) create learning activities whereby ChatGPT supports experiential, problem-based and situated language learning through interactive dialogues, writing prompts and language games. Technology-Enhanced Language Learning (TELL) strategies—using best practices into which ChatGPT is integrated into the language classroom, aiding certain tasks towards the learners' language goals

and validating practice, feedback, and assessment aligned to the TELL pedagogies. Such data will be the basis for ongoing iterations, where initial alternative TELL frameworks with ChatGPT will be fed back and refined in this transformative TAM model with focused realities on ELL to yield TELL in a constructivist framework. This feedback cycle translates the acceptance of users (TAM) into modifications of the pedagogy (Constructivism) and the technology being used (TELL). Figure 2 depicts the outcome and impact assessment of ChatGPT from TELL principles; based on the TAM perspective, it assesses user satisfaction with ChatGPT, while from the Constructivist perspective, it measures the level of user engagement in active learning while practising with ChatGPT. The integrated model is a comprehensive framework for implementing AI tools in ELL, offering a structure that can balance technological acceptance, pedagogical soundness, and potential for effective language learning, which can prove valuable in maximising the educational worth of AI tools like ChatGPT, ensuring that they can be deployed effectively in line with language learning objectives and learner needs.

The concept model will help integrate TAM, Constructivism, TELL, and AI tools in the specific context of ELL. It also highlights the emphasis on a holistic perspective, where consultations around technology acceptance are as crucial as pedagogical efficacy and the tangible improvement in language learning outcomes.

2.2 Works Already Done

2.2.1 AI and Pedagogical Implication

Ali (2020) illustrates how artificial intelligence may improve pedagogical techniques and educational outcomes, therefore offering insights on the part it plays in language learning and instruction. Relevant studies and results from associated academic databases are integrated in this review using a qualitative research approach grounded on content analysis. The findings show that artificial intelligence offers a new dimension to tailored and interactive language learning in addition to being a tool supporting conventional language instruction methods. The researchers underlined the need of using artificial intelligence for foreign language acquisition and advised greater research on how it may be applied to advance other language competencies including writing and reading. It presents a larger view of what artificial intelligence can accomplish as well as possible educational application. The results show the great

relevance of artificial intelligence in education, particularly for teachers and academics aiming on improving language instruction strategies.

Zhang (2022) described how new technologies influence teachers' professional development and pedagogical practices in EFL classes. Qualitative data collection was used in this study, and literature review was the main method used to synthesize existing research in this field. This article identifies several obstacles to integrate technology within educational environments, such as insufficient formal training and teacher resistance owing to a lack of familiarity with new technologies. It also states that infrastructure constraints can impede effective technology use in education. It identifies areas for further research, such as the need for studies that explore the integration of materials for specific technological tools in language learning and teaching. It urges for greater empirical insights into the successful modes of AI-powered tools across education.

Ilkka (2018) critically reviewed the analysis of AI in educational contexts, providing insights for those who develop policies and technologies within the field and those seeking to research the connection between AI and education. It shows the phenomenon of AI development and its growth, from simple machine learning models to complex neural networks and their penetration in all spheres, including education. The researcher elaborates how AI could transform classroom learning, teacher roles and student outcomes by helping with personalized learning, automating mundane tasks and complementing educational tools. This paper adopts a predominantly analytical and conceptual approach for its research methodology, reviewing guidance in the literature and theoretical perspectives on the influence of artificial intelligence on education. The research findings suggest that AI has tremendous potential to affect education in various ways such as Personalization of Learning, Efficiency in Administration, Interactive Learning, and Engaging Learning Experiences. The paper discusses future directions for research and practice, policy and ethical considerations, and educators' preparation, training, and professional development.

Jiang (2022) explains the initial integration and relevance of artificial intelligence (AI) in EFL instruction. The probable benefits of these technologies in promoting language acquisition, enabling tailored learning experiences, and raising the efficiency of educational environments are underlined in this review. The approach of this study is based on a systematic review and consolidation of the present empirical

and theoretical material related especially to the uses of artificial intelligence in the EFL environment. The findings of the literature review show a clear influence of artificial intelligence on EFL teaching and learning in several uses.

Klimova et al. (2023) systematically reviewed the existing research on using artificial intelligence technology to teach English as an applied language in university settings. Researchers in this paper address how foreign language education (FLE) may use machine learning (ML), deep learning (DL), and other forms of artificial intelligence (AI). The study applied systematic review and meta-analysis under PRISMA principles. Built from experimental research spanning Jan, 2018, to Dec, 2022, it aims to highlight cutting-edge technologies and their proof of usage inside university levels of English language instruction. The assessment claims that although some FL teachers have learned these technologies theoretically, none have used them. It emphasizes the need of additional empirical research, pedagogical instruction and direction for instructors to include technologies into their curricula.

Polakova and Klimova (2022) conducted a mixed-method research emphasizing the role of vocabulary in language learning and the need for both incidental and intentional methods to acquire vocabulary. This study investigates the impact of the mobile vocabulary learning app in a blended learning context. This study uses a quasi-experimental design to compare vocabulary acquisition among students using the mobile app to traditional methods—quantitative test results from tests that are analyzed statistically to measure learning outcomes. Qualitative data is collected from minute papers, questionnaires and online focus groups to explore students' perceptions of the mobile app's usefulness in learning. The results highlights the significance of mobile vocabulary learning app in acquiring vocabulary. Students indicated that they felt an increase in motivation and enjoyment when learning with the app and demonstrated improved vocabulary knowledge, ease of use, and motivation.

Huang et al. (2023) discusses the Integration of Artificial Intelligence in English Language learning and teaching. This study adopts bibliometric analysis as its research methodology. The researchers conducted a literature review of works published between 2000 and 2019 to explore AI integration in language education. They used structured topic modelling, the latent topics were identified from these publications, and performance analysis using citation and h-index metrics to measure whether the research was impactful and disseminated. The results of the bibliometric analysis

revealed that there has been a considerable increase in the number of studies related to AI-enhanced language education, indicating a highly active area of research and growing academic interest.

Qasem et al. (2023) conducted experimental research to find how chatbot use influences English for Specific Purposes (ESP) learning in online classrooms. The paper emphasizes the development of digital technologies and how they affect ESP, therefore enhancing language acquisition by means of tailored curricula and real-world environments. Participants included Business Department ESP students from the University of Bisha. This study investigated the efficacy of the Dialog flow chatbot in enhancing ESP vocabulary acquisition using a pre- and post-test methodology with informal interviews. The main conclusions revealed that the use of Chatbots greatly affected the improvement in ESP vocabulary acquisition.

Dizon (2020) carried a quasi-experimental study looking at how smart personal assistants (IPAs) might help to improve second language (L2) listening and speaking skills. This work uses a quasi-experimental design. Pre-tests and post-tests showing clear progress in L2 speaking and listening over the training helped to evaluate this intervention. The poll results show that the participants had good impressions of using Alexa for language acquisition related aspects like motivation, enthusiasm, and speech ability. On the other side, the research also underlined the limits of such technologies, including the sporadic difficulty to understand L2 speech and the necessity of more empirically robust investigations to assess their efficacy.

The students of the experimental group using the Dialog flow chatbot outperformed more vocabulary learning than those in the control group. This development indicates how Chatbots could help to enhance the possibility for efficient ESP vocabulary acquisition. The interviews also confirmed these findings; students had good impressions of how involved and interesting learning with the chatbot was. This paper clarifies the transforming possibilities of chatbots in language instruction, especially in ESP, and provides the foundation for additional embedding of artificial intelligence technology in education.

Xin (2021) experimented with a multimedia artificial intelligence technology applied to the effectiveness of English teaching practice. The study has shown how it is essential to harness multimedia tools in effective English teaching to facilitate more

innovative and engaging learning atmospheres that can result in better delivery of the lesson by teachers and student learning achievement. The research adopts an experimental design that involves the implementation of a multimedia English practice teaching platform. This technology support in the education process can also cater to a specific need in the educational cycle and make interaction more meaningful between students and teachers.

According to the results of Dou Xin's study, the application of multimedia AI technology in English teaching considerably improves the benefits of education. After using this multimedia platform, educational efficiency increased by up to 30%, and students' acceptance of this model rose to 35%. The experimental data reflect that students are comparatively more engaged with learning English when they are prepared with conventional study material in a standard format than those taught using the multimedia platform.

Chung and Bong (2022) tested intelligibility tests by utilizing human subjects and Artificial Intelligence (AI) mobile applications as their listeners and examined the generalizability of the Lingua Franca Core (LFC) based on the intelligibility of Korean-accented English. The present study aimed to examine the feasibility of AI apps in L2 pronunciation practices by comparing the KoE intelligibility tests completed by human listeners or AI apps. The data consists of transcripts of Korean-accented English (KoE) data from 30 native English speakers and data from various AI applications analyzing words containing LFC and non-LFC phonological features. KoE is used to evaluate the intelligibility of LFC and non-LFC features by comparing the accuracy of word identification by human listeners with that of AI applications. Two experiments were performed, "Human listener intelligibility testing" and "AI app intelligibility testing". The scripts of 100 target words from each data set (from NSs and AI apps) were analysed qualitatively and quantitatively. Native English speakers, on average, outperform AI applications in KoE intelligibility tests. Again, humans and AI struggled with non-LFC features, suggesting a uniform distraction for listeners. The research informs of the variability between LFC and non-LFC feature sets. It even suggests that AI applications can capture speech realization at a human listener level, though with some differences.

2.2.2 ChatGPT's application in ELL contexts

Baskara and Mukarto (2023) explored the implications and limitations of utilizing ChatGPT in language learning in higher education. ChatGPT is competent in creating coherent text, sentences, and articles about most topics but was highly limited in generating in-depth and complex content. The study also mentioned the potential for integrating ChatGPT in language courses, providing personalized instructions and authentic language content.

Vera (2023) conducted a research to examine the effectiveness of ChatGPT on L2 learning among undergraduate students at a private university in Chile. A randomized control trial design was employed in the study, whereby 35 participants were randomly assigned to an experimental group using ChatGPT-based instruction and a control group traditionally receiving classroom instruction. Data were collected through pre-test and post-test assessments for language proficiency alongside a questionnaire to explore participants' perceptions of the instruction. The results suggest that ChatGPT can be a co-equipping and supportive classroom assistant to students in traditional contexts via a collaborative experience that offers scaffolding for language progress at the individual student level.

Han et al. (2023) presented the rapid integration of LLMs (e.g. ChatGPT) in educational grounds, most notably within EFL environments. This shows the promise of these tools in offering non-judgmental feedback/support and, in turn, creating a more inclusive learning environment. The study has conducted a mixed-method approach. It involves analyzing interaction records between 213 college students and ChatGPT spanning an entire semester, structured via the RECIPE platform. In EFL courses, students used ChatGPT to help revise their essays. The dataset contained logs of conversations, students' states of mind and attitudes, and histories of essay edits, providing a panoramic view of student interactions with the systems. Using the data, researchers built and evaluated baseline models for intent detection and satisfaction estimation. Statistical analysis of F1 scores was performed to evaluate how well these models captured and performed this task for a prediction of the satisfaction and intent of the student. The qualitative side of the study looked more closely at how students thought of ChatGPT, including their comfort level in using the AI for learning and whether they tended to anthropomorphize the AI.

The findings document diverse patterns of student engagement with ChatGPT, emphasizing its perceived role as a non-judgmental, supportive peer rather than a traditional authority figure. The analysis also found that students generally found the AI interactions helpful for learning language usage and revising essays, which suggests a positive reception of AI-assisted learning. This paper opens up several avenues of further research to explore more extensive and nuanced models for detecting intent in this human-technology interaction or estimating satisfaction after the interaction that could contribute to a better understanding of the student-AI interaction. The research also recommends investigating new types of hybrid human-AI collaboration in pedagogy to maximize learning outcomes.

Liu and Ma (2024) analyze EFL learners' exposure to ChatGPT outside-the-classroom, pointing out the significance of comprehending technology acceptance in informal digital learning contexts. The study utilized a quantitative correlational research approach, assessing Chinese EFL learners' attitudes, intentions, and behaviors towards ChatGPT with a modified TAM questionnaire.

The researchers used structural equation modelling (SEM) to analyze the collected data. The results show positive attitudes regarding the usefulness of ChatGPT and increased behavioral intention to use ChatGPT. This paper finds that ChatGPT has considerable potential as a language-learning mechanism outside the classroom. The findings support the need for educational strategies that leverage AI to enhance language learning in informal settings, aligning closely with the present study on exploring the pedagogical implications of AI at NUML Multan Campus.

Song and Song (2023) investigated the impact of AI on the writing skills and motivation of Chinese EFL students. The research addresses a gap in contemporary educational strategies by leveraging advanced technology to improve learning outcomes in non-native English speakers. The study has employed a mixed-method approach to provide a comprehensive analysis. Quantitatively, it utilized before and after intervention tests to measure writing skills improvements, involving fifty EFL students split into control and experimental groups. Qualitatively, it involved semi-structured interviews to gain deeper insights into students' motivational changes and their experiences with AI-assisted learning. The study is grounded in Vygotsky's social constructivist theory, emphasizing the role of interaction in learning. It expands this framework to AI as a facilitator of learning, which may even complement the role of

traditional peers in the learning interaction. This paper discusses a broader notion of feedback to show how these AI tools do not merely supply feedback but rather engage learners with these tools to stimulate real learning through social interaction and collaborative work.

With AI-assisted instruction, these students showed significant gains in multiple facets of writing and motivation. These students performed better in sentence organization, coherence, grammar and vocabulary. It was further illustrated in the qualitative findings, where students recognized the benefits of AI, providing personalized, immediate feedback and facilitating an environment of learning support. Qualitative data from students indicated a positive view of the AI tools, identifying real-time feedback responses leading to increased motivation and engagement, and the interactive nature of AI as highly beneficial. Nevertheless, there were worries about a potential overdependence on AI to write for them and the need to preserve academic integrity. Careful implementation is critical to avoid some forms of dependency and promote the development of independent critical and cognitive thinking capabilities among the learners.

Hawanti & Zubaydulloevna (2023) investigated the Potential of AI Perspective on Anxiety Reduction in English Writing Classroom Using ChatGPT. Incorporation of technologies like AI is becoming ubiquitous in educational settings, and understanding the role they play in learning dynamics, particularly in reducing some anxiety linked to language learning, is important as we move forward. This study used a quasi-experimental research design with 73 college students from the Abdul-Wahid Institute of Islamic Studies, Indonesia. There were control and experimental groups whereby the experimental groups used ChatGPT to assist them in writing. Pre- and post-tests were conducted to assess the impact of ChatGPT on anxiety levels among researchers, which constituted the analysis of the data collected. The effect of the use of ChatGPT on students' anxiety levels was evaluated using statistical methods, namely one-way ANCOVA. The significant differences in returns between the experimental and control groups were calculated on pre-test and post-test scale scores. Results showed that the experimental group reported significantly less anxiety than the control group. This decrease is likely due to the instant feedback that ChatGPT provides and its one-on-one interaction with students, luring them to participate more confidently and efficiently in the writing process. It suggests incorporating advanced AI features to

offer a wider variety of learning experiences, reducing stress for students in different ways.

Javier and Moorhouse (2023) conducted quasi-experimental research to explore the integration of ChatGPT, to understand the output of generative AI-enabled Chatbots in secondary school English language learning in the Philippines. It acknowledges the promise of ChatGPT as a conversational partner, a feedback provider, and an ornate writing assistant. Data were gathered via pre- and post-intervention surveys, observations, and examination of student interaction with ChatGPT. Researchers performed data analysis to assess productivity in using ChatGPT and critical use in students. Qualitative analysis was used to examine the students' feedback, while quantitative assessments were used to analyze other outcomes in terms of performance and attitudes.

The results indicated that although students had difficulty engaging with ChatGPT meaningfully, well-structured lessons on crafting adequate prompts and engagement with the system resulted in more relevant and useful interactions with ChatGPT. Over time, students learned how to optimize writing with ChatGPT while also seeing the potential and limitations of the tool; awareness of the importance of thinking critically about technology grew. That said, the efficacy of these tools ultimately lies in the responsibility of educators to implement them in conjunction with traditional methods to enhance, not undermine, academic growth. The study concludes with suggestions for research into the long-term effects of AI tools on language learning, especially addressing their potential for enhancing critical digital literacy capacities. It suggests the need for larger studies in different education contexts to confirm and generalize the early findings towards crafting comprehensive teaching strategies for adopting AI in education. The review links the paper's findings to the context of broader ELL research in the present study.

Al Ghazali et al. (2024) explored the possibility of ChatGPT as a substitute teacher for ninth-grade chemistry students in the United Arab Emirates. According to Bloom's taxonomy, the study aimed to evaluate ChatGPT's student engagement and performance in different cognitive domains. The study adopted a quasi-experimental research design that consisted of an experimental group that used a ChatGPT-based instruction pack and a corresponding control group with 39 eleventh-grade students. To examine the effectiveness of ChatGPT, student performance was measured during a

post-class evaluation formatted around Bloom's taxonomy, measuring knowledge recall, application, and reasoning skills. The results section compares performance outcomes for the experimental and control groups. Differences in performance across cognitive domains were tested by using statistical methods.

Results showed ChatGPT was effective in helping students recall content and, to some extent, in assisting with reasoning, but less effective for encouraging students to engage and further ensure their understanding of the content, compared to traditional teaching methods. The control group also outperformed the others in applying knowledge and completing assessments, indicating the value of human interaction when learning complex topics such as chemistry. Findings shed some light on integrating AI tools in education (but further studies are still recommended) and highlight long-term repercussions and the need to explore features of such AI to become more complex and cater to humanistic pedagogic techniques. Indicates an increasing need for hybrid teaching models that best leverage AI tools alongside human teaching to maximize education. These research results also provide empirical evidence and insights on the methodological implications of AI implementation, which are highly relevant for future studies on the pedagogical implications of AI in ELL contexts.

Mohammad Ali (2023) Investigated the potential personalized learning impact of the AI chatbot, ChatGPT, in ESL classrooms. The researcher explored English teachers' perceptions on how the integration of ChatGPT allows for enhanced tailored linguistic tasks to promote improved student engagement and learning outcomes. In terms of methodology, a mixed-method approach was utilized to gain an in-depth understanding of ChatGPT's impact. In a 4 week intervention, ChatGPT was used to guide personalized learning tasks. Data were collected using pre- and post-intervention questionnaires, teacher interviews, and analysis of student performance metrics. Collected data were analyzed statistically to determine the effects on students' grammatical knowledge and qualitatively by using thematic analysis from teacher interviews.

Results showed a marked improvement in student grammar skills, as reflected in decreased error rates on post-intervention tests. From interviews with teachers, we observed positive perceptions of AI integration to generate personalized learning experiences; however, challenges in integrating AI tools into education systems were

also evident. The study adds to the literature on the potential of AI in education generally and in ESL in particular.

Lo (2023) studied the various effects of ChatGPT, an AI-based chatbot, on education after its launch. The article identifies advantageous and challenging implications of ChatGPT in educational contexts, offering a general understanding of its utility and limitations for various academic disciplines. Given the rapidity of this technology development, Lo has undertaken a rapid review methodology to conduct a timely synthesis of studies published within three months of its release of ChatGPT. Across the review, academic papers on ChatGPT usage in education were qualitatively analyzed, and the content was coded using open, axial, and selective coding to develop broad themes and insights. Lo's results showed that ChatGPT performed well in certain subjects like economics and programming but poorly in others such as law, medicine, and mathematics. The study urges further, long-term research into the continued effects of students' use of AI in the classroom. That involves exploring existing and more advanced AI models, understanding their use in academia, and addressing challenges around misinformation and academic integrity. The review also emphasizes the need for updated institutional policies and growing IT literacy among educators and learners.

Grassini (2023) explored the transformative potential and challenges of artificial intelligence (AI) in education, especially generative pre-trained transformers such as ChatGPT. It explores how AI can enhance personalized learning and the real concerns over its impact on academic integrity and pedagogy. This paper focuses on a narrative review of current research and opinions regarding AI in education. It is complemented by a non-systematic literature search using keywords including combinations of AI and education and a snowball method to capture relevant and up-to-date publications. The analysis revolves around a binary between the potential benefits of AI, including efficiencies in time and personalized learning, and the potential drawbacks, like decreased analytical capacity and a greater possibility of academic dishonesty. It discusses the tension between both sides, suggesting a compromise about the place of AI in the future classroom.

In summary, although there should be an emphasis on the feasibility and use of AI (e.g. ChatGPT) in favor of educational processes and engagement with the learner, it must also be linked with the significant risks of implementing such technologies. It

involves the risk of fostering dishonesty amongst learners and promoting dependency that could undermine the effectiveness of the educational experience. While the study highlights the significant promise of AI technology to enhance educational tools, its integration into curricula must be approached with caution to ensure it does not damage educational structure and integrity in the long run.

2.2.3 Research Gap

The existing literature related to the study may not sufficiently address the following aspects:

1. The impact of ChatGPT in learning and teaching English writing skills among BS English students compared to traditional writing instruction.
2. The broader pedagogical implications and practical recommendations for educators and policymakers to integrate AI-driven tools effectively in ELL classrooms.

Therefore, the present study attempts to fill these gaps in the literature by conducting a quasi-experimental study to determine the impact of ChatGPT on English writing skills among BS English students at NUML Multan. It aims to fill gaps in the literature regarding AI-assisted language learning and offer practical suggestions for educators and policymakers to effectively integrate AI technologies in the growth of English language learners' language development.

CHAPTER 3

RESEARCH METHODOLOGY

This chapter focuses on the research design employed in the present research. Research in the field of ESL and the effectiveness of educational technologies (particularly the use of artificial intelligence in the educational setting) in improving ESL learning outcomes has become a significant area of investigation. Introducing AI tools in ELL classrooms is a potentially powerful educational intervention in the context of language learning. The present study intends to explore the pedagogical implications of utilizing ChatGPT to enhance the English writing skills of BS English students of NUML, Multan campus. The present study adopts a quasi-experimental design with a mixed-method approach to evaluate quantitative and qualitative data to assess the impact of AI-assisted learning.

3.1 Research Design

A quasi-experimental design along with a mixed-method approach is employed in the present research. This research design has been selected due to its relevance to the research objectives, which aim to assess ChatGPT's impact on BS English students' writing skills.

A mixed method merges the numeric trends of quantitative research with the rich contextual detail of qualitative research in a single study, enabling a holistic understanding and analysis of a study. Quantitative data provide the correlations among variables, while qualitative data provide the deeper meaning and explanation (Creswell, 2017). As a result, this might be even more beneficial in educational research because it opens up opportunities for how and why certain teaching methods influence learning outcomes, highlighting a deeper understanding of the effectiveness of AI tool interventions such as ChatGPT in English language learning environments.

The quantitative aspect of this research includes using pre-test and post-test instruments to measure the degree to which ChatGPT impacts on students' English writing abilities. Statistically, data is collected through writing proficiency tests, which have been analyzed using descriptive and inferential statistics. The qualitative approach, however, has focused on what the students perceived and how they experienced using ChatGPT in a questionnaire. Data have been collected and analyzed to determine themes and patterns related to them in their perception and attitudes

towards the ChatGPT, its usability, and its effectiveness in helping them to improve their English writing skills.

This study utilized both quantitative and qualitative data. Data from each category was separately analyzed using suitable analytic methods. Quantitative data analysis has involved statistical software such as SPSS for conducting descriptive and inferential statistics, while qualitative data analysis has involved identifying themes from the users' responses. The results from both quantitative and qualitative analyses have been compared, contrasted, and combined to draw comprehensive conclusions about the effectiveness of ChatGPT in ELL education. Using mixed method approach allows the study to leverage the strengths of both quantitative and qualitative research. It mitigates the weaknesses of each method used alone, providing more reliable and valid results (Teddlie & Tashakkori, 2009). For instance, while quantitative data shows that ChatGPT improves writing skills statistically, qualitative data explains how students use the AI tool and why it is (or is not) effective from their perspectives.

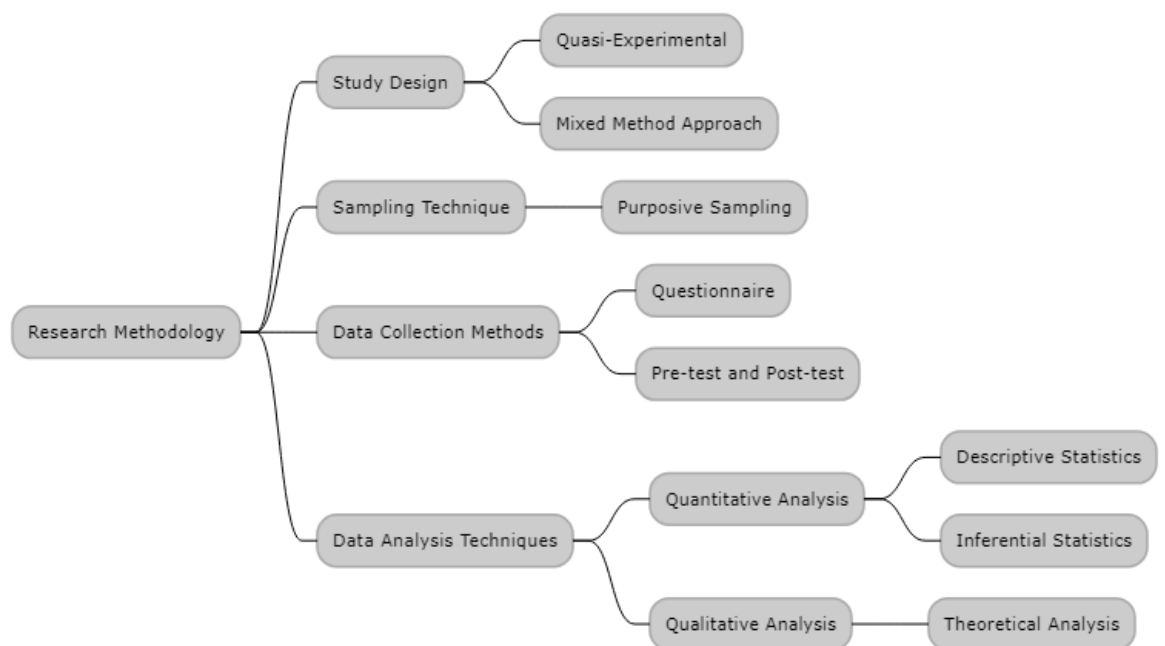


Figure 4. Research Design

3.2 Quasi-Experimental Study

A Quasi-experimental design has been employed in the present research. Quasi-experimental study is a research methodology that allows researchers to evaluate interventions without the need for random assignment of participants to treatment and

control groups. Unlike true experimental designs, quasi-experiments do not involve randomization when assigning controls, making them especially useful in situations where random assignment may be infeasible or unethical (Cook & Wong, 2008).

In the present research, quasi-experimental design involves two groups of participants: an experimental group whose English writing instruction is integrated with ChatGPT and a control group whose English writing instruction is without AI tools. The researcher compares the educational outcomes of the two groups when the intervention period ends, and it provides insights about the effectiveness of ChatGPT in improving English writing skills.

The rationale for selecting this research design stems from its suitability in educational research, where random assignments cannot be used. Participants cannot be randomly assigned to different educational interventions due to logistical reasons or ethical concerns (Trochim, Donnelly, & Arora, 2017). Quasi-experimental designs are a possible practical alternative. In particular, quasi-experimental designs are suitable for examining the impact of advanced classroom technologies and methods, such as AI-based education, because researchers often work in pre-established classrooms or with specific educational policies that make random assignment impossible (Mertler, 2019).

Additionally, although quasi-experimental studies are often perceived as less rigorous than randomized trials owing to the potential for selection bias, thoughtful planning and control protocols can alleviate these concerns. Common practices, such as matching participants on key characteristics or statistical controls, approximate the conditions of an experimental design and improve causal inferences (Cook & Wong, 2008).

The main implication of this study is that, so far, the quasi-experimental design has been applied in selecting the participants based on the same educational setting, which means that participants of both experimental and control groups have witnessed the same events except for the application of the intervention. This context minimizes the extraneous variability that may result from differing educational settings and enhances the validity of comparing outcomes for both groups.

3.3 Sampling

Purposive sampling has been employed in the present study to select participants for both control and experimental groups. Purposive sampling, also known

as judgmental sampling, specific sampling, or subjective sampling—is a type of sampling that is part of the non-probability sampling techniques that researchers use to choose the samples most representative of the population in a research study. It involves making purposeful decisions about who will be included in the sample based on the study's objectives and the questions it needs to answer. In contrast to probability sampling, where each member of the population has an equal chance of being chosen, purposive sampling is concerned with the quality and relevance of the participants who can provide valuable information regarding the research question.

The inclusion criteria include students enrolled in BS English 2nd semester, representing the subjects who are proactive about enhancing their abilities in writing. The study also considers students exposed to AI tools like ChatGPT and those unfamiliar with such technology, thus allowing for comparison of different levels of familiarity and its effects on learning outcomes. Additionally, it encompasses students at different levels of English proficiency in order to understand how ChatGPT supports learners at different stages of mastering English writing skills.

The participants in the present study consisted of a selected group of thirty students from various backgrounds and levels of proficiency. Students have been chosen from (2nd semester) BS English at the National University of Modern Languages, Multan Campus, through a pre-test, which has been administered to assess the language proficiency of participants in order to establish the equivalence of experimental and control groups. The students have been assigned to an experimental group (N=15) and the control group (N=15). Participants are aged between 18 to 25 years.

Purposive sampling has been used in the present study primarily because it is efficient and relevant. It enables the researcher to concentrate on the characteristics of a population of interest, which is useful for highlighting the effects of educational interventions. Purposive sampling is useful when resources are limited, and the study has to cover subgroups that are particularly interesting to the researcher (Patton, 2002).

Using purposive sampling, this study strategically selects participants who provide the most relevant and insightful data regarding the usage and impact of ChatGPT in improving English writing skills among BS English Students. This approach aligns with the research objectives to capture in-depth and contextual

understanding of how technological tools like ChatGPT influence language learning processes and outcomes.

3.4. Rationale for using Quasi-Experimental Design and Purposive Sampling

The present study adopts a quasi-experimental design, a widely recognized and suitable approach for educational research, particularly when random assignment of participants to groups is impractical. Unlike a true experimental design, which requires random assignment, quasi-experimental studies allow researchers to investigate cause-and-effect relationships in naturalistic settings where participants are assigned based on pre-existing conditions. In the context of this research, random allocation of students to control and experimental groups is not feasible due to institutional constraints, such as the fixed composition of university classes. Therefore, the quasi-experimental design is deemed appropriate to preserve the ecological validity of the study while still allowing for a comparison of the effectiveness of two distinct instructional approaches.

The decision to implement a quasi-experimental design is further justified by the need to examine real-world pedagogical applications of AI, specifically ChatGPT, in a classroom setting. Since the study aims to evaluate how students naturally interact with AI tools within their typical academic environment, it is crucial to maintain the integrity of the existing class structures. Artificially altering these structures through random assignment could have introduced confounding variables or disrupted the normal learning dynamics, thereby compromising the authenticity of the findings.

Additionally, quasi-experimental designs are widely accepted in educational research as a valid alternative to true experiments when randomization is either impossible or unethical. In this case, students are already enrolled in particular class sections, and disrupting their learning progress for the sake of random allocation would have been impractical. By comparing the performance of the control group (which received traditional instruction) and the experimental group (which integrated ChatGPT into their writing activities), the quasi-experimental design enables a rigorous examination of causal relationships, while maintaining a real-world learning context.

Non-probability (purposive) sampling has been employed due to the specific target population of the study—BS English students enrolled at the National University of Modern Languages (Multan Campus). This approach is selected specifically to

match homogenous sample of students that had similar educational backgrounds and are engaged in same course of writing. Purposive sampling empowers the researcher to pick participants based on their appropriateness with the research objectives, ensuring that the research is executed within an actual classroom environment and other students with similar levels of language proficiency. This approach ensures that the results would be highly relevant to similar educational environments, strengthening the study's external validity.

However, non-probability sampling is common when the sample population is limited to a study within specific programs or institutions in Education. Controlling for possible confounding variables like students' previous exposure to writing instruction, the participants were taken from BS English (2nd semester) in this case. The deliberately non-probability sampling approach decreases generalizability to other student populations. However, the controlled setting and focus on a specific educational context means that results are both meaningful and relevant in the wider discussion of AI in educational contexts.

In addition, non-probability sampling enables the study to include students across all ranges of language mastery levels, generating a diverse yet targeted sample size that has the potential to be an illuminating data set. Moreover, this sampling strategy is critical in documenting the diversity in student experiences with ChatGPT, thus allowing the researcher to examine how different types of learners progress and how proficiency levels contributed to their engagement with the use of AI technology. The sample specificity grounds the practical implication of the study, showing how AI tools such as ChatGPT can be integrated into ELL programs in similar higher education contexts.

3.5 Experimental Group

In this study, ChatGPT, an advanced linguistic model, has facilitated the writing instruction for the experimental group. The researcher allows the participants to interact with AI support consistently throughout the six-week intervention. During the intervention, participants have used the AI tool (ChatGPT) for academic exercises and personal topics. In reaction to their written prompts, ChatGPT provides immediate feedback on grammar, vocabulary, proper sentence construction, and overall text organization. It also points out errors, recommend improvements, and provide personalized feedback on writing styles.

ChatGPT acts in an interactive mode, prompting students to ask questions or request more information or examples for clarity. The goal is to create an interactive and tailored experience for the user's specific needs. ChatGPT also recommends stylistic substitutions, phrases and diction improvements to enrich expressiveness and grammatical proficiency. ChatGPT has progress-tracking tools and offers a digital portfolio in which students can secure and review all the activities they complete. Such tasks have prompted students to evaluate their strengths and weaknesses, incorporate ChatGPT's criticism in later drafts, and employ platform features to measure their progress. The AI-based writing instruction sections have been held twice weekly for 6 weeks, and each session is about 60 minutes.

Considerable measures have been taken to prevent plagiarism issues. Detailed instructions on harnessing ChatGPT as a writing tool have been discussed with students, emphasizing originality and lack of reliance on AI writing. Participants learned to adeptly integrate AI recommendations into their original writing through interactive sessions, discussions, and hands-on examples. In the present research, instructor emphasizes the ethical applications of AI, guiding students on how to incorporate AI insights while ensuring that their distinctive voices and original ideas remain intact. In addition, continuing interactive discussions during the study period reinforced these ethical guidelines and addressed any questions raised by participants.

3.6 Control Group

In contrast, the control group has received traditional English writing instructions of the same curriculum as the experimental group but without the assistance of ChatGPT. The control group has been similarly engaged in various writing practices and exercises to those of the experimental group over the six-week intervention period. These sessions have focused on writing skills like grammar, vocabulary, structure, coherence, and sentence construction. The instructor has given feedback on each student's writing, including what to focus on to improve as a writer in the future. Instructor led these sessions and provide support and guidance during the intervention period.

Control group members have consistently made attendance for writing classes, completed assignments and incorporated revisions based on feedback provided by the researcher throughout the intervention. They are invited to reflect on their progress and modify their work based on the guidance provided. In the language lab, both groups

have carried out their respective sessions in a fully equipped language lab that provided a homogeneous and controlled environment for the study. This strategy ensures that the experimental group has the required AI technological tools.

3.7 Intervention Plan

The present study has systematically integrated ChatGPT into the English writing curriculum to harness the advanced language-oriented capabilities of AI for improving students' writing proficiency. The study participants include the experimental group (15 BS English students), who have been given explicit training and planned opportunities to embrace ChatGPT as part of their routine writing practices, and the control group has been taught using standard methods without AI support, for six weeks. ChatGPT has been integrated into the course in a thoughtful way that supports the goals of the course itself and is designed to support the development of English writing skills, including essay writing, paragraph writing, grammar, and vocabulary.

The intervention plan aims to directly support the English writing course's main targets and improve the student's ability to write an essay correctly and construct a paragraph well, including vocabulary and grammar. ChatGPT is introduced as a tool that assists students in real-time, offering immediate feedback on grammar, syntax, and structure, thus reinforcing the traditional writing instruction provided by the teacher. Each writing task assigned to students in the experimental group is designed to exploit ChatGPT's capabilities. The control group relied solely on instructor feedback and peer review, adhering to conventional teaching methods.

3.7.1 Lesson Plan and Weekly Structure

Each week, specific lesson plans have been designed for both control and experimental group in order to carry out the quasi-experimental research. Lesson plans of experimental group are designed to integrate ChatGPT for various writing activities and feedback, while the lesson plans of control group includes traditional methods, peer or teacher feedback without ChatGPT.

The experimental group has been assigned a range of writing tasks, including essays, paragraph writing, and creative assignments, that required them to engage with ChatGPT during different stages of the writing process. For instance, during pre-writing, students are encouraged to use ChatGPT for brainstorming ideas, generating

topic sentences, and organizing their thoughts. During the drafting phase, ChatGPT serves as a source for vocabulary suggestions, sentence construction, and refining paragraph transitions. In the revising phase, students are instructed to use ChatGPT to evaluate their grammar, syntax, and overall flow, obtaining constructive feedback before final submission. This step-by-step integration ensured that ChatGPT plays a role at every crucial stage of the writing process, allowing students to use it as a real-time editor and collaborator.

Each lesson plan for both groups (control & experimental) has been designed on the same given pattern.

Class Duration: 60 minutes

Class Segments:

1. Introduction (10 minutes): Instructor introduces the topic and objectives for the day.

2. Main Activity (30 minutes): Students engage in the core activity for the day (writing, brainstorming, drafting, etc.), with different methods for experimental and control groups.

3. Feedback and Discussion (10 minutes): Feedback and foster discussion on the writing tasks.

4. Closing (10 minutes): Instructor summarizes key points, address questions, and assign follow-up tasks or homework.

The lesson plan for day 1 of both groups is included in Appendix H.

Weekly Structure

EXPERIMENTAL GROUP

Week 1: Introduction to ChatGPT and Basic Writing Practice

Day 1: Instructor provides a brief introduction of ChatGPT, its capabilities, limitations and ethical concerns to the students. Instructor demonstrates how it generates text, answers questions and provides feedback.

Day 2: Instructor assigns simple writing prompts for students to interact with ChatGPT, focusing on vocabulary development and grammatical structures.

Day 3: Students use ChatGPT's suggestions and feedback as part of the writing improvement process during their writing practices.

Week 2: Vocabulary and Grammar Practice

Day 1: Instructor introduces vocabulary and grammar-focused tasks. Students work with ChatGPT to check vocabulary usage in sentences and short paragraphs.

Day 2: Students use ChatGPT to question grammar rules and their usage in writing. Students practice exercises on specific grammatical structures, with real-time feedback from ChatGPT.

Day 3: Students refine grammar and vocabulary usage in longer sentences and short paragraphs with ChatGPT's assistance in writing tasks assigned by instructor.

Week 3: Constructing Coherent Paragraphs

Day 1: Instructor teaches students how to construct coherent and well-organized paragraphs with the assistance of ChatGPT by focusing on topic sentences and supporting details.

Day 2: Instructor assigns writing prompts that require students to create cohesive paragraphs with clear topic sentences and supporting details, while receiving feedback and assistance from ChatGPT.

Day 3: Students revise and refine paragraphs using feedback from ChatGPT on coherence and flow assigned by instructor.

Week 4: Essay Writing and Development

Day 1: Instructor introduces essay structure (introduction, body and conclusion) and its types to students, also guide students how to use ChatGPT to learn the writing process of these types of essays.

Day 2: Students practice descriptive writing with guidance from ChatGPT (prompt-based writing).

Day 3: Students use ChatGPT to brainstorm ideas and plan the structure of an argumentative essay.

Week 5: Essay Writing and Development

Day 1: Students use ChatGPT to understand expository writing and analyze structure and coherence by practicing writing tasks.

Day 2: Students practice narrative Writing with the assistance of chatGPT by focusing on story structure, character development, and feedback.

Day 3: Students learn comparative Writing by comparing two texts or ideas, using ChatGPT for structural suggestions and feedback.

Week 6: Final Projects and Reflection

Day 1: Students work on final writing project, using ChatGPT to review drafts.

Day 2: Students revise their project after getting feedback from ChatGPT on it.

Day 3: Instructor reflects on the 6-week learning experience using ChatGPT and its impact on the improvement of English writing skills.

CONTROL GROUP**Week 1: Introduction to Writing Basics**

Day 1: Instructor introduces the fundamentals of writing process: sentence structure, punctuation, and basic grammar rules to the students.

Day 2: Instructor provides examples of well-constructed sentences, analyzes and discusses their components.

Day 3: Writing exercises are assigned to students focusing on clear and concise sentence construction.

Week 2: Vocabulary and Grammar Practice

Day 1: Students learn advanced vocabulary words from their course outline and their usage in sentences and short paragraphs with the help of instructor.

Day 2: Instructor teaches grammar rules related to sentence structure, tenses and punctuation in writing.

Day 3: Instructor conducts a writing activity in which students integrate new vocabulary and proper sentence structure into a cohesive writing piece.

Week 3: Paragraph Development

Day 1: Instructor teaches the basic structure of a well-developed paragraph (topic sentence, supporting details, and conclusion) by focusing on coherence and clarity.

Day 2: Students learn how to develop strong supporting details to back up their topic sentence and analyze sample paragraphs to identify the key elements.

Day 3: Instructor assigns writing tasks requiring coherent paragraphs on various topics.

Week 4: Essay Writing and Development

Day 1: Instructor provides a brief introduction on essay writing and its types: components of an essay (introduction, body paragraphs, and conclusion).

Day 2: Students learn traditional brainstorming techniques and forming persuasive arguments, using discussion or individual outlines to practice argumentative writing.

Day 3: Students explore the structure of narrative essays and brainstorm personal or fictional story ideas.

Week 5: Essay Writing and Development

Day 1: Students learn to write expository essays and brainstorm topics for explaining or informing.

Day 2: Students practice descriptive writing, working in groups or individually, followed by peer review.

Day 3: Instructor teaches how to write comparative essays and brainstorm topics for comparing and contrasting two subjects.

Week 6: Final Writing Project and Reflection

Day 1: Students complete a final writing project and focus on drafting and refining ideas.

Day 2: Students revise their final project based on their self-assessment and peer feedback by focusing on clarity, structure, and argumentation.

Day 3: Instructor reflects on the 6-week writing journey, identifying areas of improvement and setting future writing goals.

3.7.2 Role of Instructor

Instructor has played a significant role in managing and conducting classes for both control and experimental groups. Instead of throwing students in to figure out the tool independently, the instructor has provided guided demonstrations on using ChatGPT as a writing assistance. Instructor demonstrates a training session for students to learn ChatGPT's interface, capabilities, and limitations. This session has focused on the tool's ability to enhance writing quality with real-time feedback and provide students with guidance on how to get the most out of using it. Students have been taught to ask specific questions, seek clarifications and request feedback on grammar and structure. Throughout the six-week intervention period, the instructor has provided ongoing support and monitored the students' use of ChatGPT. In this intervention, the teacher's role has shifted from that of a traditional pedagogue to a guide through the integration of AI-generated feedback within the students' writing. Additionally, this interactive approach encourages deeper engagement with the writing process and the AI tool, encouraging student autonomy and self-efficacy as they refine their work.

During intervention period, the instructor solves technical issues that students face while using ChatGPT, ensures that students have been using the tool positively, and gives more instructions about integrating feedback from ChatGPT in their revision. The researcher has worked to ensure that this technology has been used well and not just superficially and counterproductively.

In the control group, the instructor plays an essential role in providing traditional instruction involving English writing skills, focusing on essay writing, grammar, and vocabulary without intervention tool. Instructor guides students in writing essays, explaining the structure, developing arguments and providing feedback to make essays more organized and clear. In grammar, explicit teaching of rules, corrective feedback, and practice exercises help students become accurate. Vocabulary instruction involves teaching new words, teaching how to use them in the right context, and practicing to reinforce understanding. The instructor maintains consistency in teaching methods, regularly assesses the learner's progress, and enables self-directed skill building, offering the experimental group a foundation for comparison.

3.8 Data Collection

In this study, data have been collected in a structured manner in three separate stages (pre-intervention, intervention, and post-intervention). This research has been carried out in phases, and each phase has been devised to collect certain kinds of data that help to create deep insights into the impact of ChatGPT on BS English students' writing skills.

3.8.1 Pre-Intervention Assessment

Its objective is to serve as a baseline of participants' writing ability to evaluate the impact of the intervention. The pre-intervention English Writing Test comprises essay writing, grammar, and vocabulary tasks. Importantly, the instruments that have been selected are validated and reliable, as illustrated by Bachman and Adrian (2022), and they are commonly used in measuring English writing proficiency. All participants have been assessed in a controlled environment to ensure uniformity of data quality.

3.8.2 Intervention

During this phase, ChatGPT serves as an intervention educational tool in the experimental group to assist with writing assignments. ChatGPT is an interactive tool that provides suggestions, corrections and feedback on writing. Its function is to emulate a real-time learning aid, supporting the writing process and learning experience. Such usage of AI has proven to be successful in education as O'Brien and Scharber (2018) advocate for AI in classroom settings. The intervention period is of six weeks, so students of experimental group have sufficient interaction with ChatGPT.

3.8.3 Post-Intervention Assessment

After the intervention period, to measure the intervention's efficacy on students' English writing skills, a post-test has been administered following the same administration procedure as the pre-test has taken in the prior phase. It allows a straightforward comparison of performance of both groups before and after the intervention. Under the same controlled conditions of the initial testing, both groups have been assessed through the post-intervention test.

3.8.4 Tools and Instruments Used

3.8.4.1 Pre-test and Post-test

The organization and the distribution of the pre-test and post-test of English Writing Skills have been arranged similarly but in different content. These tests are

meticulously crafted to test particular aspects of writing, including structure, cohesion, grammar, and vocabulary. The tests are designed based on standard ELL assessment criteria for validity and reliability.

The pre and post-tests for the control and experimental groups have been designed into five sections (Content Development, Structure and Cohesion, Vocabulary and Grammar) with a total score of 20 points.

The breakdown of each section is given below:

Section I: Grammar and Vocabulary

This section tests basic grammar and vocabulary knowledge through fill-in-the-blank and multiple-choice questions. Each correct answer is awarded 1 point.

Section II: Sentence Structure

Students are required to reorder words to form correct sentences and identify sentence types. This section assesses understanding of sentence construction and grammar.

Section III: Essay Writing

An essay on "The Impact of Technology on Modern Society" is to be written within 150-200 words. The essay is evaluated on coherence, grammar and vocabulary with a maximum of 10 points.

Section IV: Editing

Participants must identify and correct grammatical errors in a provided passage. Each correct correction earns 1 point.

Section V: Vocabulary Usage

This section involves matching words with their correct meanings to test vocabulary knowledge.

Each section is designed to challenge different aspects of writing skills, from basic grammar and vocabulary to more complex tasks like essay writing and text editing. The distribution of points across the sections emphasizes the importance of higher-order writing skills, particularly in essay writing, which can earn up to half of the total points.

3.8.4.2 Questionnaire

In addition to the language proficiency tests, the experimental group students have been given a questionnaire to assess their perception, motivation, engagement, and satisfaction levels regarding ChatGPT as a teaching and learning tool in ELL classrooms.

The questionnaire is designed into two sections: first section collects students' demographic data, whereas second section examines students' perceptions about the integration of ChatGPT in ELL classrooms. The questions in section 2 are adapted from the Technology Acceptance Model (TAM) (Davis, 1989). TAM has been considered one of the most popular and powerful research frameworks in user acceptance of technology (Lee, Kozar, & Larsen, 2003). So, it has been used as the main framework for assessing learners' attitudes toward ChatGPT. As stated by Huang et al., TAM has four core constructs upon which the study revolves, PEOU, PU, ATU and BI.

According to Davis (1989), PEOU is defined as the user's belief that using a specific technology will be free of effort, while PU is the belief that a technology will improve one's performance. ATU, based on Fishbein and Ajzen (1977), pertains to the overall favorability of a tool as perceived by the user. Lastly, BI, also from Fishbein and Ajzen (1977), involves an individual's assessment of the likelihood of performing a particular behavior. A strong BI indicates that a user is likely to accept and use technology in the classroom (Yi, Jackson, Park, & Probst, 2006). The last two questions on the questionnaire are open-ended, concerned with the participants' use of ChatGPT to assess how ChatGPT is beneficial assistance in learning English Writing Skills. The questionnaire data has been analyzed using descriptive statistics and later on has been elaborated qualitatively by applying different theories.

In the questionnaire, the following instruments have been used to assess key constructs related to ChatGPT as an educational tool.

1. Demographic Information Section:

Basic questions about age, gender, and previous experience with AI-based learning tools.

2. Perceived Ease of Use (PEOU):

A Likert scale (1 to 5, where 1 = strongly disagree and 5 = strongly agree) to measure students' belief in how easy ChatGPT is to use

3. Perceived Usefulness (PU):

Likert scale questions to assess students' perceptions of how helpful ChatGPT is in improving performance.

4. Attitudes Towards Use (ATU):

Likert scale questions to gauge students' overall favorability towards ChatGPT.

5. Behavioral Intention (BI):

Likert scale questions to assess students' likelihood of continuing to use ChatGPT.

6. Open-Ended Questions:

Two final open-ended questions to gather qualitative feedback on ChatGPT's role in improving English writing skills.

These instruments ensure comprehensive data collection, enabling both quantitative and qualitative analysis.

3.8.4.3 Intervention tool

In the present study, ChatGPT serves as an intervention tool and is also being investigated as a subject. It is more than a digital assistant; it is a central part of testing whether AI boosts language learning outcomes or not. Warschauer (2004) confirms that AI tools impact learning by providing personalized feedback and facilitating more engaging learning experiences.

3.8.4.4 Validity and Reliability of Pre & Post Assessments

The present study has employed pre-test/post-test assessments and questionnaires with careful considerations to determine the impact of ChatGPT on learners' writing performance levels in English. They are designed to assess major elements of writing ability such as essays writing, paragraphs, grammar, and word choice. The tests are based on the writing syllabus learnt outcome.

Its content validity is guaranteed because test items are designed to evaluate students' capacity to undertake writing tasks reflective of actual academic writing. The assessments are structured on established frameworks by which the English level of writing can be assessed, and the tests are standardized across both groups to reduce bias. To maximize reliability, all students have been assessed on equal terms

concerning the same prompts, instructions, and time limits. The scoring has been standardized so that the rubrics are applied consistently from participant to participant to keep the results as comparable and standardized as possible.

The questions posed in the pre-test and post-test are constructed to align with the syllabus and the specific learning goals of the English writing course. This correlation guarantees that the tests assess students' mastery of abilities connected to the curriculum which students are learning and the teaching methods. Both the pre-and post-tests included similar tasks, such as writing essays, providing paragraph development, and completing various grammar exercises. These tasks have been selected on the basis of skills emphasized in the curriculum, allowing the tests to measure student growth in key areas of ELL accurately.

In addition, the test items are chosen from a wide range of writing skills, from basic grammar and syntax to higher-order skills like coherence and argumentation, to enhance the content validity of the assessments further. Moreover, vocabulary and critical thinking tasks ensured that the assessments did not just reflect the grammatical correctness but also students' capacity to articulate and structure ideas adequately in writing.

Subject-matter experts, including faculty members experienced in both English writing instruction and educational assessment, have reviewed the design and content of the assessments to guarantee they align course objectives and are suitable for the target population, paying particular attention to level and academic context. This expert validation has assured that the tests would get accurate and meaningful results.

The pre-test and post-test have been administered under standardized conditions, with clear and consistent instruction given to control and experimental groups. By confirming homogeneous administration procedures, the study has minimized potential variations in students' understanding of the test tasks or external distractions that could have interfered with their performance. It was important to make sure that any changes seen between the pre-and post-tests could be attributed to the intervention (i.e., the use of ChatGPT) rather than to variations in the administration of the tests.

3.9 Analysis

In the present study, the researcher employs quantitative and qualitative approaches to analyze ChatGPT's impact on BS English students' writing skills. The Integration of these two methods allows for a deeply analysis of how these AI-assisted learning strategies are incorporated in ELL context, leading to the learning methods' various outcomes and descriptions.

3.9.1 Quantitative Analysis

3.9.1.1 Descriptive Statistics

The collected data from the pre-test and post-test have been analyzed quantitatively through statistical tool such as SPSS-25. Initial analysis of the data involves descriptive statistics to provide basic summaries about the sample and the measures. This includes calculating means, standard deviations, median and mode for the scores from the pre- and post-intervention assessments. Descriptive statistics helps in understanding the general distribution and central tendencies of the data, which is essential for setting the stage for more complex analyses (Field, 2024).

3.9.1.2 Inferential Statistics

To investigate the impact of ChatGPT on improving English Writing Skills, an independent samples t-test has been conducted between post-test of both control group and experimental group. This test assesses whether there are significant differences between the two groups' post-test scores, providing evidence of the effectiveness of ChatGPT compared to traditional teaching methods without the AI tool.

3.9.2 Qualitative Analysis

3.9.2.1 Thematic Analysis

After analyzing the collected data quantitatively, the results have been qualitatively and thematically analyzed to identify emerging patterns, themes, and key comments on using ChatGPT and the pedagogical implications of integrating ChatGPT in ELL classrooms. A qualitative analysis of the responses from the open-ended questions in the questionnaire have been analyzed by applying the integrated theoretical framework. These qualitative themes build on the quantitative findings and help illuminate students' experiences and understanding.

Integrations of qualitative and quantitative methods have been described in studies such as Creswell and Clark (2017), which outline strategies to integrate

quantitative results within statistical analyses with qualitative themes derived from them to provide a broader understanding of research questions. The quantitative findings are again supplemented by qualitative analysis that delineates shared themes around higher levels of engagement and satisfaction with learning processes in students.

Both these methods and their synthesis not only triangulate the findings via different data types but also enhance insight into what enables ChatGPT's functionality in ESL situations and how. As a result, it allows for a more nuanced interpretation of results and more insight into the observational study conclusions based on this systematic analysis approach.

3.10 Ethical Considerations

Ethical considerations are important while conducting any kind of research, particularly when it involves human participants, as is the case with the nature of present study which aims to assess the impact of educational interventions, such as ChatGPT in ELL context. The relevant ethical principles applicable to this study include ethical approval, informed consent, and data confidentiality.

The participants have been provided with detailed information regarding the aims, procedures, possible risks, and possible benefits of the research, and their voluntary involvement is confirmed with their signed informed consent. The identity of participants and data concerning them have been strictly anonymized and kept confidential. The collected data has been stored securely and only accessible to the research team.

In the present research, the ethical principles safeguarding the subjects' privacy and rights have been strictly followed (informed consent, the right to withdraw from the study without penalty, and maintaining confidentiality). Prior to data collection, institutional review and approval have been obtained.

3.11 Limitations of the Present Research

One of the primary limitation of this study is the reliability of technology infrastructure. ChatGPT requires a stable internet connection and sufficient computing devices for instructor and students. Due to a lack of consistent access among the participants, some interruptions in the learning process have been contributed to the disruption in consistency and reliability of intervention outcomes. This challenge, also

noted in educational technology literature, highlights the issue of tech equity (Selwyn, 2016). Moreover, the quality of interactions with ChatGPT varies widely among learners based on their initial writing proficiency and skills in efficiently relating their queries. It has shaped unequal opportunities, with students with higher initial proficiencies or better technology skills benefiting from the application to a greater degree than others, reflecting the findings of Reich and Ito (2017). Furthermore, while the responses given by ChatGPT are prompt and helpful, feedback often lacks depth, which is trying on higher-order writing skills like argumentative structure and critical analysis, requiring additional instructor support. Such restriction hinders the scalability of utilizing ChatGPT as a sole instructional tool, agreeing with Guilherme (2019), who notes that human intervention will always be needed in the presence of AI.

Furthermore, as Zhao (2017) notes, there lies the risk of students relying too heavily on ChatGPT for corrections and feedback, undermining their independent learning and critical thinking. The over-reliance on AI can affect self-regulated learning development; students may overly rely on the AI responses, failing to assess the results of their work critically. Moreover, the fact that, at times, AI can only process more simplistic language that makes AI a very limited tool, as language is a highly context-based skill, and it requires an understanding of extended conversations and social contexts to be learned correctly. The quality of the AI Content is Variable. Although AI tools provide personalization, they cannot individualize the experience to meet each learner's unique learning needs, styles and progress. It is also essential to provide equity in access to AI tools for learners, regardless of their socio-economic status, to prevent further widening of existing inequalities in education.

These limitations serve as a reminder of the intricacies of integrating AI technologies such as ChatGPT into educational practices and the need to consider the technological, pedagogical, and demographic factors involved in achieving meaningful and equitable learning outcomes.

CHAPTER 4

ANALYSIS

The present study aims to evaluate the impact of employing ChatGPT on improving the English writing proficiency of BS English students by comparing a control group with an experimental group through pre-test and post-test assessments. This chapter is divided into two sections; the first section discusses the quantitative and qualitative analysis of the data collected through pre-test and post-test of both groups, while the second section discusses the quantitative and qualitative analysis of the questionnaire responses which are collected from the participants of experimental group to gauge their perceptions about the integration of ChatGPT in ELL classrooms.

4.1 Quantitative Analysis of Data

Quantitative analysis refers to the systematic examination and interpretation of numerical data in order to derive meaningful insights and draw conclusions. In the present study, the data collected through pre & post tests have been analyzed quantitatively by the SPSS analysis comprised of both descriptive statistics (Mean, Median, Mode, std. Deviation and range) and inferential statistics (independent sample t-test). The data collected through questionnaire has been analyzed by Google Forms response analysis. Google Forms automatically generates visual summaries, including bar charts, pie charts, and histograms, for each question. This provides a quick overview of the data distribution.

4.1.1 Descriptive Statistics Analysis

Descriptive statistics analysis is the process of summarizing and organizing the characteristics of a data set. This type of analysis gives simple summaries of the sample and the measures, which provide the foundation for more complex statistical analyses.

Measures of the central tendency of the data include the mean, median, and mode. The variability in the dataset is represented with measures of dispersion like range and standard deviation. Another important concept is the frequency distribution, which shows how many times each value or category occurs in the data.

4.1.1.1 Descriptive statistics of control group

The pre-test scores of the control group reveal a moderate level of initial writing proficiency among the students. With a mean score of 8.47, the central tendency

indicates that most students have an average command of English writing. The median score of 9.00 supports this observation, showing that half of the students scored below and half scored above this value. The mode, which is 8, signifies that this score is the most frequently occurring among the students. The standard deviation of 1.846 indicates some variability in the scores, while the range of 6 reflects the span of student's writing abilities within the group.

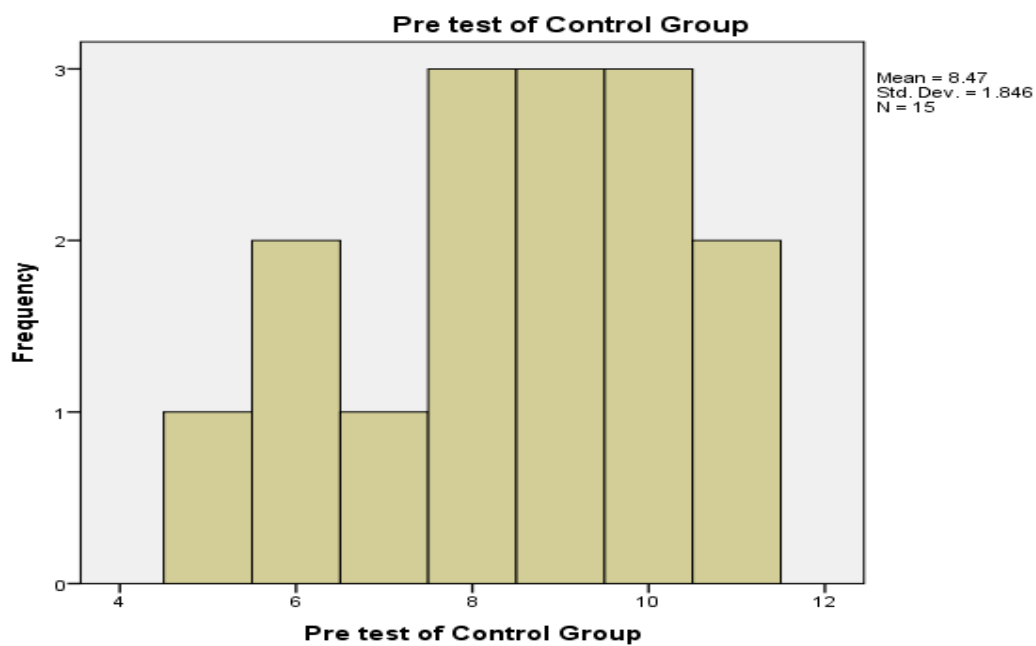
	Pre test of Control Group	Post test of Control Group
Valid	15	15
Missing	0	0
Mean	8.47	11.93
Median	9.00	12.00
Mode	8 ^a	13 ^a
Std. Deviation	1.846	2.052
Range	6	7

Table 1. Descriptive Statistics of Control Group

After the intervention, the post-test scores of the control group show a notable improvement. The mean score has increased to 11.93, suggesting that traditional writing instruction has a positive impact on the student's writing skills. The median score of 12.00 and the mode of 13 indicate that the distribution of scores shifted towards higher values. The standard deviation has increased slightly to 2.052, suggesting increased variability in the students' performance. The range also increases to 7, reflecting a broader spread of scores in the post-test.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	5	1	6.7	6.7	6.7
	6	2	13.3	13.3	20.0
	7	1	6.7	6.7	26.7
	8	3	20.0	20.0	46.7
	9	3	20.0	20.0	66.7
	10	3	20.0	20.0	86.7
	11	2	13.3	13.3	100.0
	Total	15	100.0	100.0	

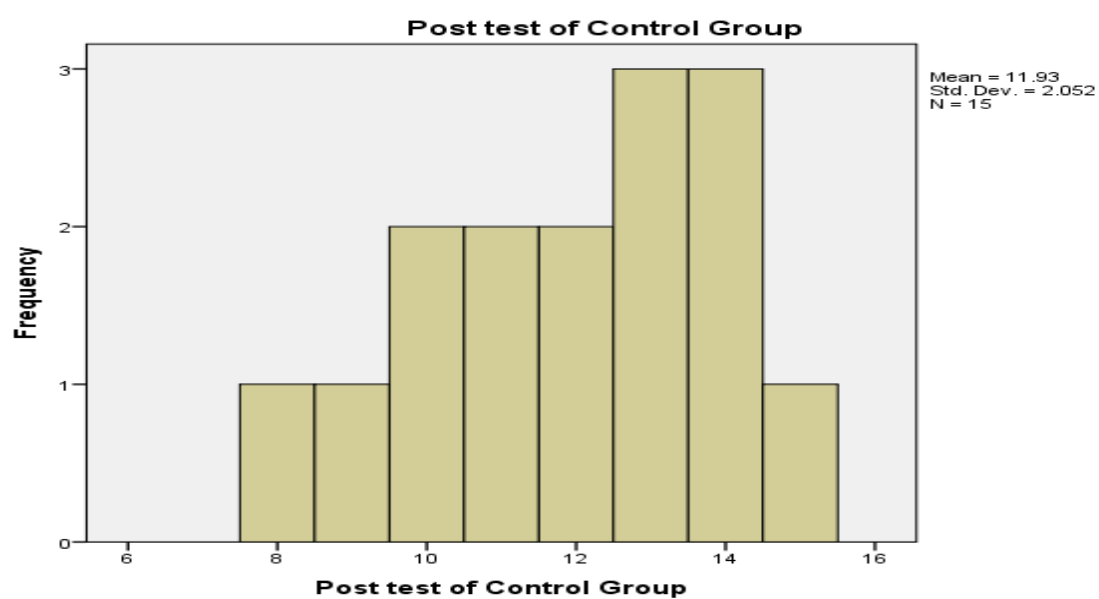
Table 2. Frequency Table of Pre-Test of Control Group



Graph 1. Frequency of Pre-Test of Control Group

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	8	1	6.7	6.7	6.7
	9	1	6.7	6.7	13.3
	10	2	13.3	13.3	26.7
	11	2	13.3	13.3	40.0
	12	2	13.3	13.3	53.3
	13	3	20.0	20.0	73.3
	14	3	20.0	20.0	93.3
	15	1	6.7	6.7	100.0
Total		15	100.0	100.0	

Table 3. Frequency Table of Post-Test of Control Group



Graph 2. Frequency of Post-Test of Control Group

The pre-test frequency distribution of the control group shows that most students have scored between 8 and 10, with 20% of students scoring each of these values. This concentration indicates moderate initial proficiency. In the post-test, scores ranged from 8 to 15, with a notable shift towards higher scores. The highest frequencies are observed for scores 13 and 14, each representing 20% of the students, suggesting significant improvement.

There is an overall improvement indicated by the increased value of mean, median, and mode from the pre-test to the post-test of control group. Control Group has showed significant improvement from the pre-test (mean = 8.47) to the post-test (mean = 11.93).

4.1.1.2 Descriptive statistics of Experimental group

The pre-test scores of the experimental group, with a mean of 10.00, indicate a slightly higher initial proficiency compared to the control group. The median score of 10.00 supports this observation. The mode of 9 is the most frequently occurring score, highlighting a common proficiency level among the students. The standard deviation of 1.852 indicates moderate variability in the scores, while the range of 6 reflects the diversity in the students' writing abilities.

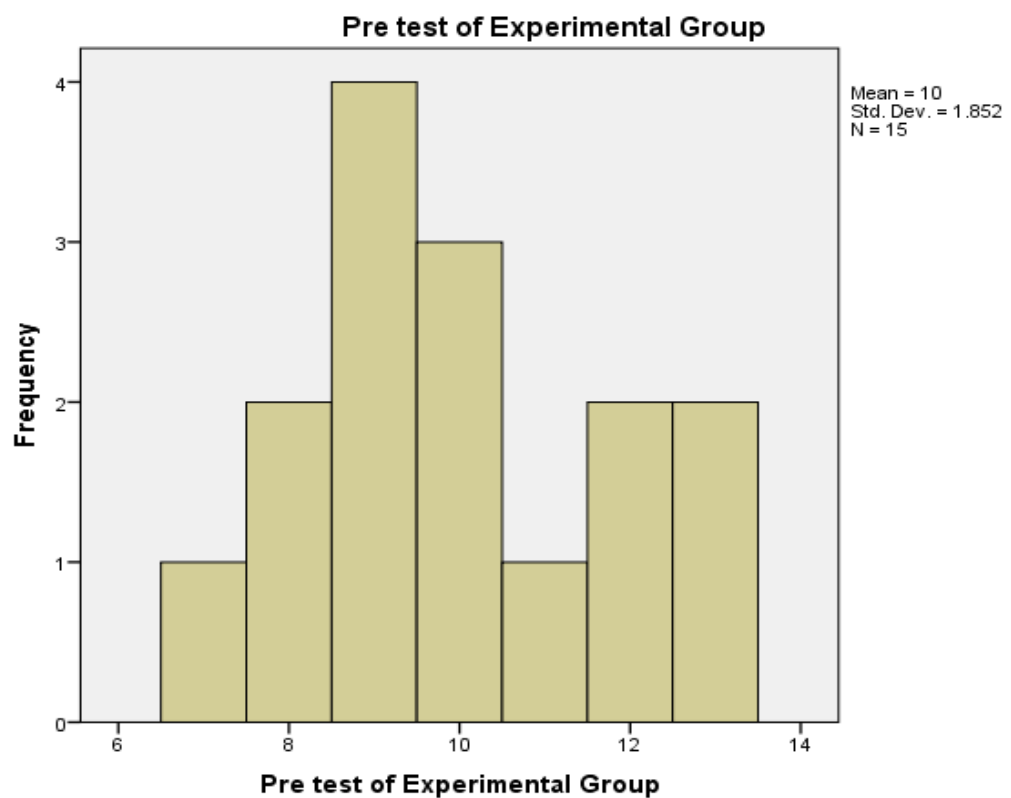
		Pre test of Experimental Group	Post test of Experimental Group
N	Valid	15	15
	Missing	0	0
Mean		10.00	16.60
Median		10.00	17.00
Mode		9	16 ^a
Std. Deviation		1.852	1.352
Range		6	5

Table 4. Descriptive Statistics of Experimental Group

The post-test scores of the experimental group demonstrate a significant improvement, with a mean score of 16.60. This substantial increase indicates the effectiveness of ChatGPT in enhancing students' writing skills. The median score of 17.00 and the mode of 16 show that the majority of students have achieved high scores. The standard deviation decreased to 1.352, indicating less variability and more consistent improvement among the students. The range of 5 suggests a tighter clustering of scores at the higher end, reflecting overall higher performance.

Pre-test of Experimental Group					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	7	1	6.7	6.7	6.7
	8	2	13.3	13.3	20.0
	9	4	26.7	26.7	46.7
	10	3	20.0	20.0	66.7
	11	1	6.7	6.7	73.3
	12	2	13.3	13.3	86.7
	13	2	13.3	13.3	100.0
	Total	15	100.0	100.0	

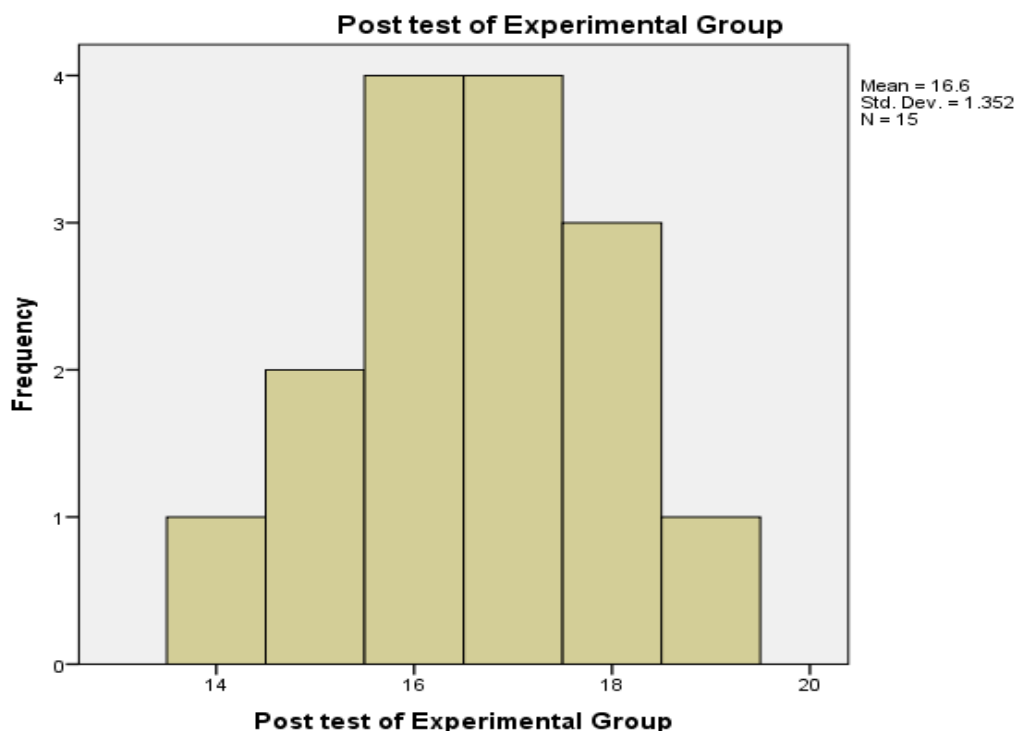
Table 5. Frequency Table of Pre-Test of Experimental Group



Graph 3. Frequency of Pre-Test of Experimental Group

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	14	1	6.7	6.7	6.7
	15	2	13.3	13.3	20.0
	16	4	26.7	26.7	46.7
	17	4	26.7	26.7	73.3
	18	3	20.0	20.0	93.3
	19	1	6.7	6.7	100.0
	Total	15	100.0	100.0	

Table 6. Frequency Table of Post-Test of Experimental Group



Graph 4. Frequency of Post-Test of Experimental Group

The pre-test frequency distribution of the experimental group shows a concentration of scores between 9 and 10, indicating moderate initial proficiency. In the post-test, scores range from 14 to 19, with a significant number of students scoring 16 and 17. This distribution indicates marked improvement and supports the effectiveness of ChatGPT in enhancing writing skills.

All measures of central tendency exhibit an increase, suggesting a significant progress. There is a significant improvement in performance from the pre-test (mean = 10.00) to the post-test (mean = 16.60).

The improvement in the mean scores and a change in the order of distribution of scores, as observed in the frequency tables, indicate that both groups have achieved significant improvements. The post-test results of the experimental group are notably significant.

4.1.2 Inferential Statistics Analysis

Inferential statistics analysis focuses on making predictions or inferences about a larger population based on a sample of data from that population. Unlike descriptive statistics, which merely describe the characteristics of the data set at hand, inferential statistics go a step further to test hypotheses, determine relationships, make

generalizations and draw conclusions beyond the immediate data. After descriptive statistics analysis, the collected has been analyzed through inferential statistics analysis.

4.1.2.1 Independent Samples T-test

This statistical method has been employed to compare the mean values of the post-test results between the control and experimental groups, assuming both equal and unequal variances. The results, which are statistically significant ($p < 0.0001$), indicate that the experimental group has performed much better than the control group in the post-test. The mean difference between the two groups is -4.667.

Group Statistics					
	Groups	N	Mean	Std. Deviation	Std. Error Mean
Post_test	Control	15	11.93	2.052	.530
	Experimental	15	16.60	1.352	.349

Table 7. Statistics of Control & Experimental Group

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Post_test	Equal variances assumed	2.978	.095	-7.355	28	.000	-4.667	.634	-5.966	-3.367
	Equal variances not assumed			-7.355	24.232	.000	-4.667	.634	-5.975	-3.358

Table 8. Independent Sample T-Test

The independent sample t-test compares the post-test scores of the control and experimental groups to determine the effect of ChatGPT on English writing skills. The control group has an average mean score of 11.93, while the experimental group, which used ChatGPT, has a higher mean value of 16.60. This indicates that students using ChatGPT performed better on the post-test. The control group has a higher standard deviation (2.052) compared to the experimental group (1.352), suggesting that scores in the control group are more spread out. In contrast, the experimental group shows less variability in post-test scores. The standard error is smaller in the experimental group (0.349) than in the control group (0.530), reflecting greater accuracy in estimating the average performance for the experimental group.

Levene's Test for Equality of Variances checks whether the variance in scores is the same across both groups. The F-value of 2.978 and a p-value (Sig.) of 0.095

indicates that the variances are not significantly different (as the p-value is higher than 0.05). Thus, the assumption of equal variances holds.

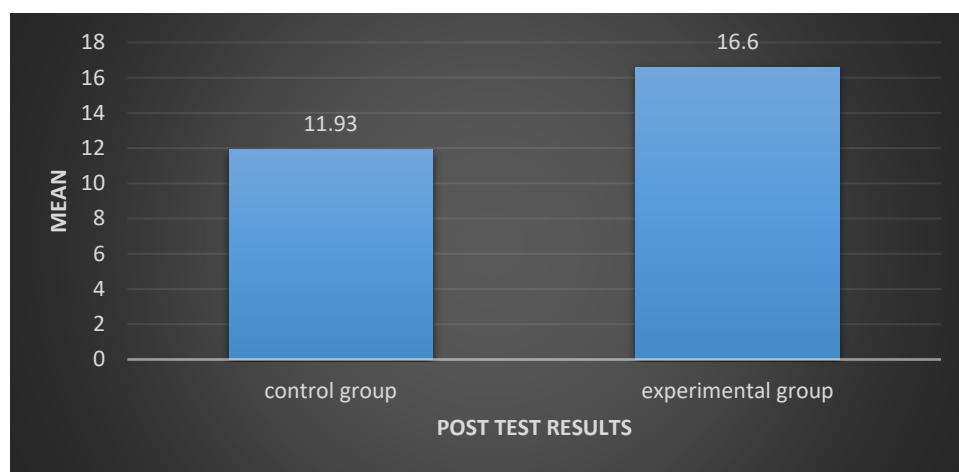
The t-test for equality of means shows a highly significant t-value of -7.355 ($p < 0.001$) with a significant mean difference of -4.667, confirming the substantial positive impact of ChatGPT on students English writing skills. The degrees of freedom are 28, determined by the total number of participants in both groups minus 2. With a p-value of 0.000, which is lower than the 0.05 threshold, rejects the null hypothesis. This confirms that the post-test scores of the control and experimental groups differ significantly. The mean difference is -4.667, indicating that the experimental group scored, on average, 4.667 points higher than the control group.

The confidence interval ranges from -5.966 to -3.367, means that results are 95% confident that the true difference in post-test scores between the two groups lies within this range. Since the interval does not cross zero, it confirms that the experimental group performed better. The results of the independent sample t-test indicate a significant difference in post-test scores between the two groups. The experimental group, which used ChatGPT, has scored significantly higher, demonstrating the positive impact of ChatGPT on English writing skills. The p-value of 0.000 strongly supports the conclusion that this difference is not due to chance.

The control group, with a standard deviation of 2.052, has a wider range of scores, higher than that of the experimental group, 1.352. The greater variance in the control group indicates a wider spread of student performance for that group, presumably due to the more varied means of learning or learning environments. In contrast, the experimental group had more consistent results, taking advantage of ChatGPT's structured and uniform feedback, which narrowed the spread of their scores.

The control group probably engaged in more conventional practice and writing lessons. Some students might have had different access to resources, feedback or study habits, resulting in a wider distribution of post-test scores. In other words, the experimental group using ChatGPT probably had access to regular, systematic and automated feedback in a more organized learning environment. This action was uniform across all students and allowed different scores to remain within the same range based on feedback of the same type and quality.

Without the structured guidance of an AI, the control group is more influenced by individual factors such as motivation, prior writing experience and personal learning styles. Some students have shown significant improvement with more resources or better learning strategies while others struggled, leading to wider variation in performance and inflating the standard deviation.



Graph 5. Comparison of Means of Post- Test Results

The experimental group exhibits substantial improvement after the intervention in the post-test and considerably outperforms the control group in the post-test analysis. The extent of the shift and the statistical significance indicates that ChatGPT has a positive impact on the experimental group. The significant statistical power, as evidenced by substantial p-value fosters trust in these conclusions. The study concluded that ChatGPT as a learning tool significantly enhanced the English writing skills of the experimental group. The results show the effectiveness of ChatGPT as compared to traditional methods of teaching with statistically significant evidence. The post-test performance of the experimental group shows significant progress compared to the control group, and it can be concluded that ChatGPT plays an important role in improving students' English writing ability.

The quantitative data analysis suggested that experimental group participants significantly improved their English writing skills, including effective sentence structure, coherence, grammatical accuracy, and increased vocabulary. Such improvements are aligned with results reported by Liu et al. (2021) and Yan (2023), who conducted a research to highlight the role of AI tools in enhancing EFL learners' writing abilities.

Advanced AI-embedded language learning tools offer students genuine possibilities to enrich their grammar composition, vocabulary, sentence structure and coherence while practicing writing exercises with the assistance of AI tools. These tools contribute to a more creative and engaging way to study writing rather than pursuing passive and traditional methodologies (Zhao, 2017). ChatGPT not only creates writing prompts and fills grammatically correct sentences, but it also provides relevant vocabulary, consequently assisting students in generating better-quality texts. This assistance has potentially amplified student engagement in writing tasks within the AI-powered classroom. Such improved interactions have been fundamental in propelling their scholarly writing capacities. Such insights align with the discovery by Utami and Winarni (2023) that AI-based language learning platforms greatly increased EFL students' engagement in writing activities that subsequently improved their writing capabilities. These quantitative results are supported by the qualitative data from this study, which indicated that students have positive attitudes towards the impacts of the use of AI tools in their writing practices.

In accordance with the observations of Hwang et al. (2023), the present study posits the advantages of integrating AI-powered language learning tool in ELL classrooms such as the personalized language learning opportunities. By using this AI tool, students' progress at their own pace and receive instant feedback to improve their written outputs. This personalized approach enhances learners' motivation to write. It provides targeted feedback on their writing, with recommendations on how they can improve how they approach writing problems specifically and how they can do so efficiently. In other words, the AI tool assist in personalizing the writing tasks and thus enable learners to internalize the skills. Through these interactive sessions, they transform from relying on external input to completing writing tasks independently and expertly. This change indicates that students who use the AI-enabled language learning tool can quickly achieve self-regulation for writing better than those who do not utilize AI tools in writing.

4.2 Qualitative Analysis of Data

In order to predict and explain the behaviors of technology adoption, Davis developed a model named as the Technology Acceptance Model (TAM) in 1989. This model has been validated multiple times and employed across different technological implementations in educational settings (Davis, 1989; Venkatesh & Davis, 2000).

Davis (1989) defined perceived usefulness as the degree to which students believe using ChatGPT would improve their English writing skills. Lee et al. (2003) suggest that perceived usefulness is a major determinant of learners' acceptance and continued technology usage, supporting the observed positive influence on the experimental group's post-test scores.

The large difference in post-test scores between the experimental and control groups indicates that students probably found ChatGPT helpful for improving their English writing skills. ChatGPT provides instant feedback on writing and has reinforced its usefulness and effectiveness as a tool. The significant increase (10.00 to 16.60 mean internal post-test scores) in post-test scores of students from the experimental group indicates that students found ChatGPT beneficial for improving their English writing skills.

Venkatesh and Davis (2000) state that ease of use is the degree to which the prospective user expects the target technology to be free of effort. Higher ease of use allows users to integrate ChatGPT in their study routines without technological barriers. This characteristic is known to impact technology adoption (Venkatesh & Bala, 2008), and it seems to be confirmed by the students' word-of-mouth performance, which consistently improved, indicating that they perceived ChatGPT as easy to use and accessible. This is important because lower standard deviations in post-test scores indicate in how easy the system was to use. This allowed students to make consistent improvements as a group. The lesser variability (as seen from a lower standard deviation of post-test score in the experimental group compared to pre-tests) shows that students adapted to the technology more easily.

The "Attitude Towards Use" construct predicts user acceptance and continued use. The rationale behind this construct is that an individual with a favorable attitude towards technology, i.e. a positive feeling towards it, is more likely to use it and vice versa (Davis, 1989). Also, attitude does not uniformly affect all situations, there can be varying degrees of correlation, depending on the technology in use and the availability of the technology. In educational contexts, for example, a positive attitude toward technology-based self-directed learning is influenced and mediated by technology acceptance, technological self-efficacy and learning motivation.

The mean scores of the control group increased from 8.47 to 11.93 ($p < 0.001$) and the experimental group from 10.00 to 16.60 ($p < 0.001$) from pre-test to post-test, indicating that the students' perceptions of their learning experience with ChatGPT and its usefulness in their own English writing skills likely improved. TAM posits that perceived usefulness is an important antecedent to attitudes toward technology (Davis, 1989). The experimental group significant improvement further highlights the effectiveness of ChatGPT and its perceived usefulness

As writing skills of experimental group were noticeably improved, as shown in the increased mean scores, students' attitudes toward implementing ChatGPT were likely positively affected. This is consistent with the TAM idea that positive experiences with technology improve the user's overall attitude toward that technology (Davis, 1989). Since the SPSS results also indicated significant improvement in the experimental group compared to the control group, it can be said that such positive effects increase the intention to use ChatGPT for learning purposes. As per TAM, a positive attitude towards technology is used as an antecedent of behavioral intention to use technology (Venkatesh & Davis, 2000).

In the Technology Acceptance Model (TAM), "Behavioral Intention" is considered one of the key constructs that refer to the perceived likelihood of a person to use a technology (Davis, 1989). As for the behavioral intention, the experimental group that applied the ChatGPT to learn English writing showed a significant improvement. Consequently, those changes likely become behavioral intentions to use the tool for educational purposes (Davis, 1989) associated with the positive answers about using ChatGPT, interpreted from the scores on the test and the satisfaction with the technology. A positive attitude towards the use of technology increases the intention to use it (Venkatesh & Bala, 2008). TAM's findings reaffirm its relevance in the education sector and imply that the integration of ChatGPT in ELL classrooms is beneficial and user-friendly by students, and plays a significant role in the improvement of English writing skills.

The constructivist approach of Piaget (1947) and Vygotsky (1978) indicates that learning is an active contextual process of obtaining and building knowledge based on prior knowledge rather than merely acquiring it. Essential features such as active learning, experiences, and environmental engagement are explicit to learning and

knowledge construction. Jonassen (1999) adapted this driving theory to integrate digital tools that have been extensively used in educational settings.

Vygotsky's (1978) concept of social interaction is crucial for the formation of cognition while ensuring the active participation and engagement, a concept that ties in with Papert's (1980) "constructionism" — effectively learning through making — thus supporting a traditional view of learning through ChatGPT's active engagement functionality. Students write and instantly get feedback, which requires active participation just like ChatGPT encourages students to be actively engaged. It is not just about passively consuming information but actively applying it in context, allowing students to actively engage with their world and construct new understandings based on real-time feedback. This interaction ensures that the tool gives instant feedback and crafts its response based on the input, which goes with the constructivist understanding of learning about knowledge-building based on prior knowledge experiences.

It appears that the lower correlation in the post-test scores of the experimental group versus the control group may indicate that participants of the experimental group had differing experiences — which would make sense given that not all learners would gain an equal amount from interacting and engaging with ChatGPT. This variation is attributed to a hallmark of constructivist learning, where the student builds knowledge individually (Piaget, 1947). It has enabled personalized learning paths and responses, which allows students to explore and understand concepts at their own pace.

The tailored learning experience of AI tool highlights how Jonassen's (1999) perspectives on constructivist learning environments can still be seen where digital tools act as cognitive capacities that enable critical thinking and learner-centred experiences. Therefore, ChatGPT, being adaptive, provides personalized experiences according to student input, which, under the influence of constructivist principles, gives more power to the learner's background and experiences in shaping learning processes. Furthermore, ChatGPT provides students with a tailored conversation student by student and error by error, as that is still likely to make the learning experience more authentic and valuable.

TELL is the approach that effectively integrates the technology in language education, to create more communicative, pragmatic, and tailored learning experiences (Chapelle, 2003). This approach promotes hybrid teaching strategies which enhance

traditional instruction and creates rich, immersive environments for practicing, developing, and honing language skills. Important aspects are multimedia, interactive exercises, and the ability to apply real-life situations to a controlled setting. Research indicates this approach contributes to much greater language acquisition and practice (Godwin-Jones, 2019). Significant improvements in post test scores of experimental group are due to ChatGPT's engaging, context-rich environment that enables students to practice writing in scenarios that reflect real life communications

ChatGPT engage students in written dialogues by providing tailored experience with different scenarios, so they explore language in different contexts, creating that bridge between theoretical knowledge and practical application. ChatGPT is a facilitator of varied engagement with language that has the potential to move students through a spectrum of writing tasks, from simple, procedural ones to more intricate, complex products.

In the present study, results highlight the importance of technology for instant feedback to learn new languages in the context of effective learning and retention, enabling a more immediate and interactive learning experience (Warschauer & Healey, 1998). Immediate and tailored feedback, and revision are integral to language learning and one of the biggest advantages of TELL. ChatGPT's instant feedback mechanism is a powerful means of language acquisition and writing development. The significant development of writing skills and the proven statistical results indicate that ChatGPT is effectively integrated into the language learning process. The research results supports the findings of Heift & Schulze (2007), who highlights the importance of integrating AI technologies in language learning contexts.

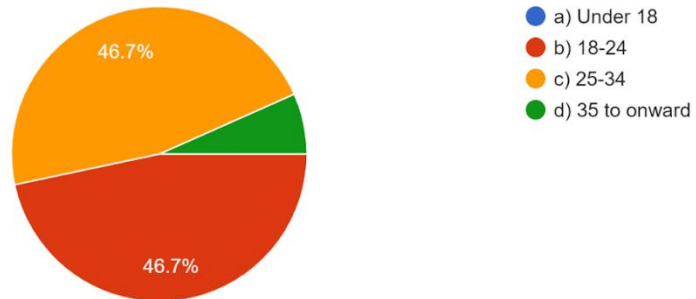
4.3 Questionnaire Analysis

A questionnaire has been conducted from the experimental group to assess their perceptions and experiences about the integration of ChatGPT in ELL classrooms after the intervention period. Questionnaire responses have been collected and analyzed by Google Forms response analysis. Google Forms automatically generates visual summaries, including bar charts, pie charts, and histograms, for each question. This provides a quick overview of the data distribution.

4.3.1 Demographic information

1. Age

15 responses



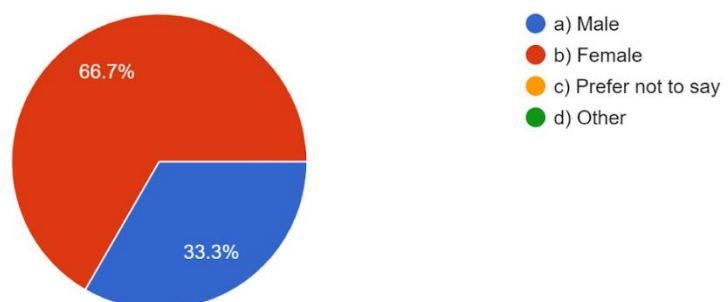
Graph 6. Age of Participants

The pie chart indicates an equal distribution between two age groups, 18-24 and 25-34, each constituting 46.7% of the responses. The 35 to onward age group represents a smaller portion at 6.7%, and no respondents are under 18.

This demographic is typically more receptive to new technologies and more open to using AI-based learning tools, which influences the PEOU and PU constructs of TAM model (Venkatesh & Davis, 2000).

2. Gender

15 responses

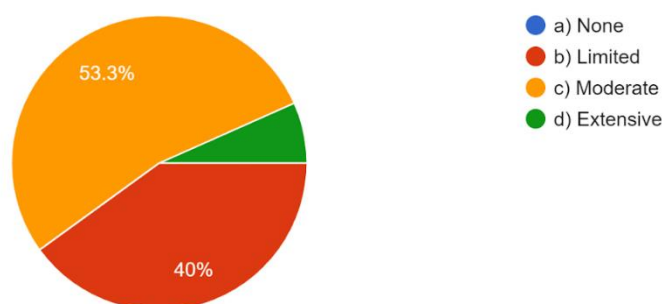


Graph 7. Gender of Participants

The gender distribution among the respondents shows a majority of females (66.7%) and a minority of males (33.3%), with no responses in the 'Other' or 'Prefer not to say' categories.

3. Previous experience with AI-based learning tools

15 responses

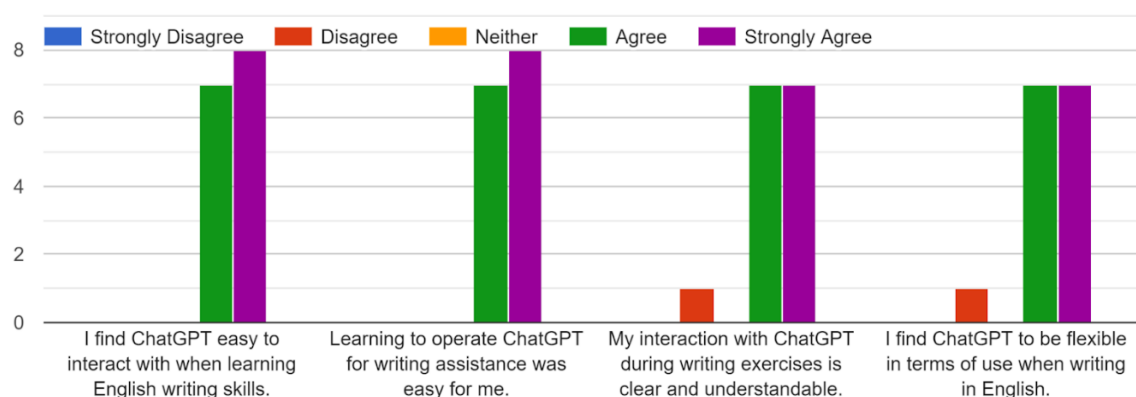


Graph 8. Previous Experience of Participants with AI based Learning Tools

A significant proportion of respondents have moderate experience (53.3%) with AI-based learning tools, while 40% have limited experience, and only a small percentage have extensive experience (6.7%).

The TAM suggests that prior experience impacts both the PEOU and PU constructs (Venkatesh et al., 2003). Respondents with limited or no prior experience may require more time to find the technology useful or easy to use, which influence their attitude towards using ChatGPT and their behavioral intentions regarding its continued use.

Perceived Ease of Use (PEOU)

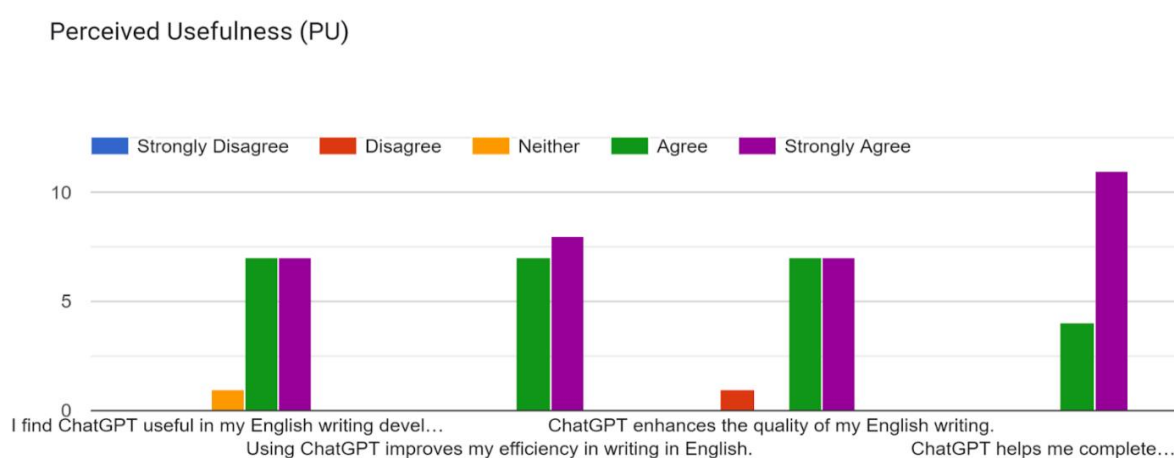


Graph 9. Perceived Ease of Use (PEOU)

The bar chart shows responses to statements about ChatGPT's ease of use. Most respondents agree or strongly agree that ChatGPT is easy to interact with when learning

English writing skills. This suggests that the tool is considered user-friendly, which is a positive indicator for PEOU within the TAM framework (Davis, 1989). Opinions are mixed regarding the ease of learning to operate ChatGPT for writing assistance, with a moderate number neither agreeing nor disagreeing. This might indicate a learning curve or variability in user experience with the platform.

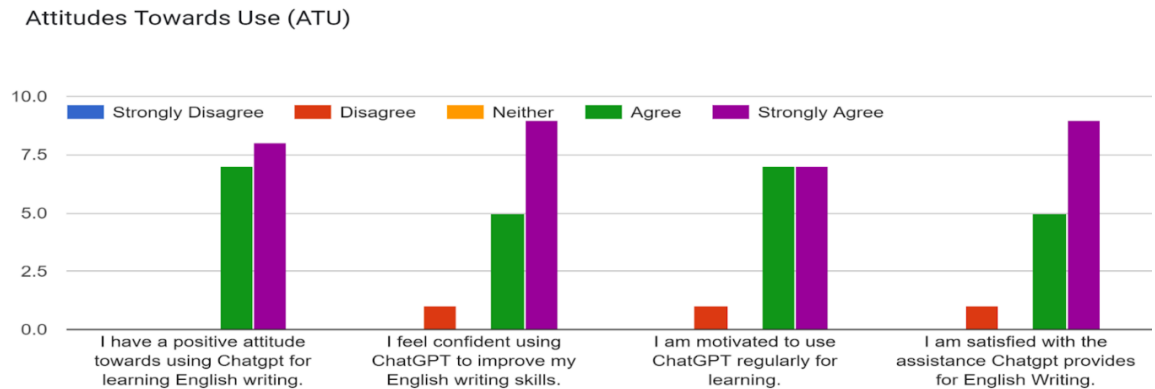
Responses indicate that most respondents find their interaction with ChatGPT during writing exercises clear and understandable. The majority of users agree that ChatGPT is flexible to use when writing in English, which enhances the technology's adaptability to different learning styles and needs.



Graph 10. Perceived Usefulness

The second bar chart evaluates respondents' views on the usefulness of ChatGPT in learning English writing. Most respondents find ChatGPT useful in their English writing development, which speaks to the perceived usefulness of the tool in enhancing learning outcomes. Opinions are more varied regarding the enhancement of writing quality, with a significant number of respondents neither agreeing nor disagreeing. This could suggest the need for more targeted features or examples within ChatGPT that focus on quality improvement.

Many agree that using ChatGPT improves efficiency in writing in English, indicating that the tool is considered beneficial for streamlining the writing process. Respondents tend to agree that ChatGPT helps complete writing tasks, reinforcing the perceived usefulness of the tool in providing assistance.

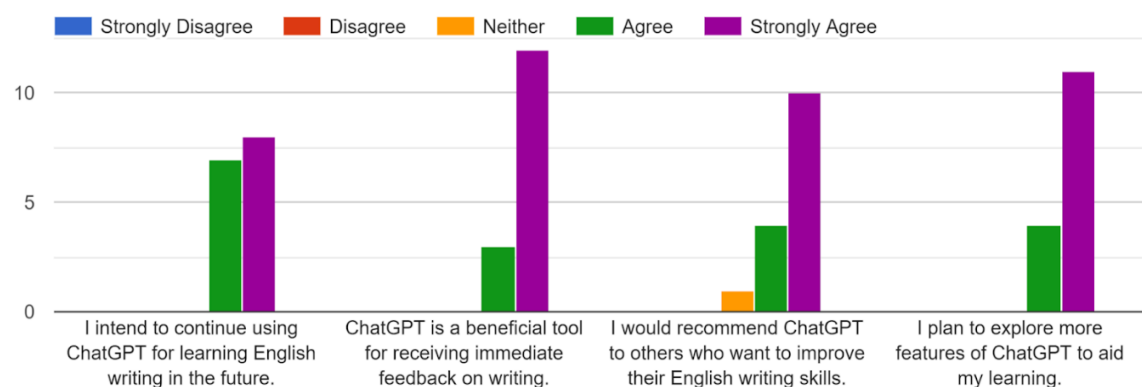


Graph 11. Attitudes Toward Use (ATU)

The majority of respondents agree or strongly agree that they have a positive attitude towards using ChatGPT for learning English writing. This is a crucial factor in the TAM as it directly influences users' acceptance and usage of technology (Ajzen, 1991). Most respondents also agree or strongly agree that they feel confident using ChatGPT to improve their English writing skills, suggesting that the tool's perceived capabilities positively affect their self-efficacy.

A significant number of respondents are motivated to use ChatGPT regularly for learning. This motivation is essential for long-term engagement with the tool. The respondents largely agree that they are satisfied with the assistance provided by ChatGPT for English writing, which is indicative of a successful user experience.

Behavioral Intention (BI)



Graph 12. Behavioral Intention (BI)

The intention to continue using ChatGPT for learning English writing in the future is strong among respondents, which is a predictor of actual system use in the TAM (Davis et al., 1989). Respondents recognize ChatGPT as beneficial for receiving immediate feedback on writing, which is a specific utility that can reinforce continuous use.

Many are willing to recommend ChatGPT to others for improving their English writing skills, highlighting perceived satisfaction and perceived usefulness. A substantial number of respondents express the intention to explore more features of ChatGPT, suggesting that they see potential in the tool beyond their current usage.

4.4 Qualitative Analysis of Questionnaire

The demographic information in the questionnaire is included to refine the implementation strategy of ChatGPT in the learning environment. For instance, strategies to enhance perceived ease of use need to be tailored to accommodate the large portion of users with no previous experience with AI tools. For constructivist learning, activities structure to progressively build familiarity and competence with the tool, leading to more personalized and meaningful learning experiences (Jonassen, 1994). Understanding the demographics allows educators to design language learning activities that cater to a younger audience, likely to be more digitally literate but inexperienced with AI. The integration of ChatGPT includes scaffolding to assist in the gradual development of writing skills, aligning technology use with pedagogical goals (Chapelle, 2003).

The high agreement with PEOU, PU, ATU and BI constructs indicate a positive reception of ChatGPT as an educational tool. This supports the hypothesis that a tool's ease of use and usefulness are fundamental predictors of its acceptance (Davis, 1989). The clear and understandable interaction with ChatGPT suggests it is an effective mediator in a constructivist learning environment. It facilitates the active construction of knowledge by providing immediate, personalized feedback on writing tasks (Jonassen, 1994).

The results reinforce the belief that ChatGPT is valuable to TELL frameworks. This is consistent with the relevance of TELL, as it offers an authentic approach to computing, enabling learners to use creative and communicative technologies to pursue concrete linguistic, episodic, and procedural goals (Heift & Schulze, 2007). The

favorable perception of ChatGPT's ease of use and usefulness indicated by the responses to the questionnaire is naturally attributed to its acceptance and significant integration. Moreover, the results are consistent with the constructivist and TELL principles, indicating that ChatGPT is an effective tool for teaching English writing skills.

The positive attitudes and significant behavioral intentions (the willingness to recommend and the intention to explore more features) support the idea that ChatGPT is perceived as a useful tool for TELL methodologies and proved the TAM postulate that positive attitude toward using technology strongly predicts the behavioral intention to use the technology (Fishbein & Ajzen, 1977). Learning how to implement the tool confidently and the motivation to use it regularly follows a constructivist perspective on learning. Learners are more likely to deeply engage with the technology and build knowledge meaningfully if they are confident (Vygotsky, 1978).

The qualitative data from open-ended questionnaire items indicates how ChatGPT assist BS English students' writing skills. It helps learners to correct grammar and syntax mistakes in the writing process, allowing students to write with more precision and confidence by giving them corrective feedback that is detailed and explains the error. Students also felt more able to expand their vocabulary as ChatGPT provides synonyms, antonyms, and even detailed definitions of words, which help them diversify their writing and improve their lexical repertoire. This instant and in-depth response is essential for language learners, helping them develop a more elaborate and sophisticated writing style.

Another significant advantage is ChatGPT's ability to help in ideation and brainstorming, especially for those with writer's block or looking for inspiration. The AI can provide ideas, generate prompts, and write a draft, making it a useful resource for creative writing or essay preparation. ChatGPT's ability to adapt to various writing styles and tones enables students to experiment with and try out different writing styles, by enhancing their versatility and effectiveness in communication.

Based on the results, students found ChatGPT beneficial (perceived usefulness) in learning English, grammar correction, word expansion, and writing practice students by providing real-time feedback and dialogic learning. Indeed, such perceptions align with the Technology Acceptance Model's (TAM) focus on perceived usefulness being

a critical determinant of the acceptance of new technologies (Davis et al., 1989). TAM theorizes that users are more likely to have a positive attitude toward a technology if they believe it helps them perform better (Davis, 1989).

Response to ChatGPT's user-friendly interface, immediate feedback, ease of engagement, and assistance with proofreading and brainstorming aligns with the TAM's concept of perceived ease of use, which impacts technology acceptance (Venkatesh & Bala, 2008). ChatGPT's utilization as a constructivist tool for learning English writing allows interactive and personalized learning experiences.

Such interaction supports the constructivist view that knowledge is constructed through interaction and negotiation in a meaningful context (Jonassen, 1999). As users engage with ChatGPT, they create knowledge, as this experience introduces them to new vocabulary and corrects their grammar errors. They do not receive information passively but are part of a two-way conversation leading to personalized learning. This flexibility accommodates individual learner needs, an aspect of constructivist learning (Papert, 1980). ChatGPT helps learners scaffold their learning through complex grammar and vocabulary usage, adapting to their level of competency, as discussed in constructivist theories of learning (Vygotsky, 1978).

The TELL framework is developed to leverage digital tools in educational context, which helps to improve language learning in a more significant way and establish a more enhanced learning environment using technology (Chapelle, 2003). The responses from the questionnaire indicate that ChatGPT offers a multimodal form of language learning by integrating text with interactive conversations and instant feedback to solidify the brain's material (Mayer, 2001). ChatGPT's personalized feedback and support are integral to TELL, as they complement the pedagogical goal of meeting the unique needs of each learner. These insights indicate that ChatGPT is a valuable resource for language learners as long as it is used thoughtfully within an educational context that fosters its strengths, mitigates its weaknesses, and addresses its limitations.

The questionnaire responses indicate some limitations and concerns. Among the biggest concerns is the apparent over-reliance on AI tools like ChatGPT, which could negatively impact on students' critical thinking and independent research abilities. It also allows students to rely on artificial intelligence for ideas and content production,

potentially hindering their ability to think critically and denying them the opportunity to enter into challenging and meaningful learning processes. These comments underline the need to balance regularly using AI tools and traditional ways of learning so that students can still hone their writing and critical thinking skills.

In sum, the responses to the questionnaire show that ChatGPT is a multifaceted educational tool that assists and complements English writing skills in various ways. Its advantages range from mechanical aspects of writing, such as grammar, syntax and vocabulary building to more creative and subjective elements, like style, tone, and idea generation. ChatGPT complements a holistic learning approach by incorporating more traditional methods and a human feedback system. However, the advantages presented by this tool are undoubtedly beneficial and can take language learning outcomes to the next level. The features of ChatGPT that users find helpful underscore the principles of Technology-Enhanced Language Learning, particularly the emphasis on personalized feedback and real-time interaction, which are critical for skill development in language learning (Heift & Schulze, 2007). The diverse features highlighted by users indicate that ChatGPT serves not only as a practical tool for immediate language tasks but also as an engaging platform for deeper language acquisition and practice, fitting within the theoretical constructs of TAM, Constructivism, and TELL.

CHAPTER 5

CONCLUSION

The present research aims to investigate the pedagogical implications of AI in the ELL context, specifically focusing on ChatGPT's impact on learning and teaching English writing skills among BS English students at NUML, Multan Campus and the perceptions of English language learners regarding the integration of ChatGPT in ELL classrooms. The study is significant as existing literature lacks thorough empirical investigation into ChatGPT's impact on English writing skills among BS English students compared to traditional methods, as well as broader pedagogical implications for AI integration in ELL classrooms. The present study employs a quasi-experimental design to assess the impact of ChatGPT on English writing skills, using a mixed-method approach. Thirty students of BS English 2nd have been selected through purposive sampling method and assigned to experimental (N=15) and control (N=15) groups. The pre and post tests have been conducted from both groups to assess their English writing skills before and after the intervention period of six weeks.

In addition, a questionnaire derived from the constructs of the Technology Acceptance Model (TAM) has been conducted from the experimental group to analyze learners' attitudes, perceptions, and engagement towards ChatGPT. Statistical analysis of the pre and post-test results have been analyzed using descriptive (mean, median, mode, standard deviation) and inferential statistics (independent sample t-test), and the qualitative data is thematically analyzed by leveraging the integrated theoretical framework of three theories comprising of Technology Acceptance Model (TAM), Constructivism and Technology Enhanced Language Learning (TELL) to provide greater insights on the pedagogical implications of ChatGPT in ELL classrooms.

The present research systematically examined the effectiveness of AI-based tools, particularly ChatGPT, on improving the English writing performance of BS English students enrolled at MUML, Multan Campus. The results confirm the hypothesis that the integration of ChatGPT in teaching English writing skills outperforms conventional teaching methods. It shows that students who leveraged ChatGPT significantly improved their English writing skills than students from the control group. ChatGPT gives students immediate, personalized feedback, allowing them to correct errors quickly and improving student retention.

The present study highlights important pedagogical implication for introducing AI tools like ChatGPT into language teaching and learning contexts. AI can be embedded into the curriculum to complement traditional teaching methods and to improve student's performance by providing a transformative, adaptive and interactive learning process. AI shifts the focus of educators away from the traditional to more individualized and integrated learning experience. Educational policymakers are encouraged to embrace AI's positive potential in education and support emerging technologies like it through funding, training, and resource allocation. Though this study has given us many insights, future work could study the effects of AI integration in education over time, its effectiveness in various educational levels and settings, and comparative research with other AI tools. Furthermore, exploring the retention of skills learned through AI would prove beneficial.

5.1 Research Findings

5.1.1 Impact of Integrating ChatGPT In ELL Context

AI integration in education has received significant attention, especially in language learning. The present study conducted at NUML, Multan Campus, aims to investigate the pedagogical impacts of employing AI (ChatGPT) on the English writing skills of undergraduate students.

The initial mean scores of pre-test for the control and experimental groups were 8.47 and 10.00, respectively, indicating that the participants in the two groups had almost equivalent capabilities in English writing. After the intervention, a significant difference in performance has occurred. The mean scores increased to 11.93 for the control group and significantly increased to 16.60 for the experimental group. An independent samples t-test analysis shows that the experimental group outperformed the comparison group on post-test scores with a mean difference of -4.667 and $p = .000$. The findings of statistical analysis provide substantial evidence that ChatGPT has a significant impact on improving English writing skills as compared to traditional approach.

The present study concludes that ChatGPT's user-friendly interface and interactive feedback mechanisms likely led to a positive user experience, encouraging students to interact more with the tool. The substantial improvement in the writing skills of the experimental group complements the Technology Acceptance Model (TAM) proposition that ease of use and usefulness are key predictors of the adoption of

ChatGPT and its significant impact on performance. ChatGPT offers an interactive platform that can effectively support constructivist teaching, enabling students to participate in a more active learning experience. Conversely, instead of passive absorption through observation, the experimental group engaged in active interaction, which could have led to a better quality of learning and retention of different forms of writing.

TELL framework focuses on the integration of AI and digital tools to enhance the learning experience in language education. ChatGPT, an AI advanced language model, allows students to engage with the language in a simulated environment, where they receive immediate feedback on their writing and speaking. It extends the learning experience beyond the classroom for additional practice and interaction and appeals to the constructivist perspective of learning. The significant enhancement of student writing proficiency in the experimental group indicates that AI tools like ChatGPT and TELL provide teachers and learners a much more rewarding language education experience.

Conclusively, the integration of Chat-GPT in the educational practices at NUML Multan Campus, examined through a lens of TAM, Constructivism, and TELL, represents both a successful adoption and effective utilization of ChatGPT in the education process. Integrating technology with pedagogical theory substantiates the study's findings and presents a framework that could be extrapolated in larger educational implementations of AI and similar learning across various disciplines.

5.1.2 Pedagogical Implications of ChatGPT in ELL Context

The findings of the present study highlights that integration of ChatGPT into language learning curricula supports a blended learning approach and provides the significant pedagogical implications of ChatGPT in educational context. ChatGPT, with its ability to provide immediate feedback, create a variety of material, and hold simple interactive and contexts based dialogues, is an incredible enhancement to tailored learning ways of thinking. Not only does it improve students' writing skills, but it also creates a more actively engaged and responsive environment for learning.

ChatGPT's capability to offer instant feedback on grammar, vocabulary, and writing style is crucial in shaping a responsive learning experience. According to Warschauer (2010), integrating technology into a language learning curriculum can

significantly aid in developing the skills needed to master a foreign language. Godwin-Jones (2019) highlights that utilizing interactive technologies like ChatGPT could boost students' engagement and motivation as language learners. Moreover, the potential of AI to mimic natural language dialogues and deliver contextually relevant language exercises creates a more interactive and stimulating learning environment, motivating students to write more often and with greater enthusiasm. Xie et al. (2019) highlight the potentially powerful impact of AI tools in enhancing learner's progress by providing personalized feedback in educational practices.

ChatGPT expose students to multiple writing styles, tones, and vocabulary that can only help in developing their own writing styles. By engaging with artificial intelligence, students learn how to modify their writing for various purposes and audiences. Hyland (2019) argues that "exposure to a wide range of linguistic inputs" is vital for "developing a flexible and adaptable style" (p. 434), both for individual writing and in building one's own "essential repertoire" of writing styles for life in academia and industry.

ChatGPT in essay-writing exercises consistently engage student through a responsive and interactive experience. It keeps students engaged and encourages them to write, which is the best way to become a better writer. Williams et al. (2018) notes that constant interaction with intelligent systems for any length of time lead to higher motivation and learning outcomes.

One of ChatGPT's most incredible advantages in teaching English writing is its ability to provide instant and individualized feedback, which is pivotal for learning and correcting language promptly. Timely corrective feedback is important in language learning as it allows the learners to instantly understand and correct their mistakes and is supposed to lead to better retention of accurate language use (Bitchener & Storch, 2016).

Iterative feedback enable students to incorporate drafts of their writing more continuously, so there is an improvement in both drafting and editing skills. It is similar to how people write in the real world: many drafts, many changes, which in turn supports students developing the critical skills of revision and editing. This finding supports the formative assessment theory (William, 2018), which postulates that feedback through repeated evaluative processes enhances learning and outcomes. This

ability of AI to generate iterative feedback on students' work allows for a more dynamic revision process, which is important for good writing. Flower and Hayes (1981), in their cognitive process theory of writing, emphasize the importance of the revision phase, during which writers assess and reorganize their text to improve clarity, coherence, and overall effectiveness.

The AI's remarkable ability to adjust the complexity of its responses depending on the proficiency level of the user makes it an inclusive tool that caters to a diverse range of learning needs. Cummins (2000) advocates technologies in linguistically diverse classrooms to scaffold learning and promote equity in educational outcomes.

It is important to state that ChatGPT implementation does not lessen the role of the teacher but instead adds another tool to the arsenal of differentiated instruction. It can help teachers to adapt their pedagogical methods and concentrate more on students' progress and needs. Levy (1997) describes the implementation of a computer-assisted language learning software in classrooms to support teachers with instructional ability. Educators reported a significant decrease in their workload related to grading and providing feedback on initial drafts. It allows them to reorient their attention from lower-level writing issues such as grammar and syntax to higher-order issues like argument, coherence and style. This observation confirms the findings of Zheng et al. (2016), who noted that AI tools could effectively take over many of the more routine elements of instruction, enhancing the efficiency and impact of teaching.

Based on these findings, this study emphasizes that ChatGPT should be carefully planned and supported; as its capability to provide instant feedback, varied linguistic engagement, and assistive feedback in the iterative writing process, offers an invaluable asset to modern language education. While a range of challenges are presented, educators must navigate and mitigate potential limitations and challenges while maximizing the positive pedagogical impacts of ChatGPT discussed in this study. These implications not only contribute the body of work on educational technology but also inform future applications of AI tools in language learning environments.

5.1.3 Learner's Perceptions of ChatGPT in ELL Context

The integration of ChatGPT in ELL classrooms has been positively perceived by the learners because of its interactive capabilities, which can greatly enhance the learning experience by increasing student engagement and interactivity, as evidenced

by the findings of questionnaire. Students noted progress in their writing ability, credited to ChatGPT's personalized and instant feedback. Such feedback enables the student to identify their mistakes and correct them by providing instant iterative feedback. This element of ChatGPT closely mirrors social constructivist theory, where individuals generate their understanding through experiences and interactions.

In addition, ChatGPT integration into the curriculum has increased students' motivation and self-confidence. ChatGPT's instant and iterative feedback builds confidence among learners and encourage them to engage more frequently in writing exercises which leads to skill development. The motivational component of ChatGPT's integration in educational contexts emphasizes its role in fostering self-directed learning and persistence in students.

Based on the quantitative data obtained from the pre and post-tests in the context of the experimental study, there is strong support for the qualitative feedback gathered from the questionnaire, indicate that the ELL students at NUML Multan Campus positively perceive ChatGPT as an educational tool and that they regard it as an effective, transformative tool with strong potential for further educational advancement. The findings also highlight the perceived usefulness of ChatGPT in ELL classrooms, and positive behavioral intention to use ChatGPT in future.

The findings of the present study highlights the broader implications of AI to revolutionize traditional teaching practices and the role of AI technologies such as ChatGPT in offering a transformative, personalized and efficient learning approach to improve educational outcomes and experiences for students in an increasingly digital world.

5.2 Challenges in Implementing ChatGPT in ELL Classrooms

Implementing ChatGPT in ELL classrooms comes with many technological challenges and limitations, most notably the requirement of solid digital infrastructure. This is nowhere more apparent than in the education sector, where many schools, particularly in rural areas , do not have the proper hardware or stable internet connection to implement AI tools. Moreover, to fully harness ChatGPT's capabilities, educators and students need to have a sufficient level of digital literacy, and integrating it with existing educational technologies can be a resource-intensive and complex process.

Pedagogically, integrating ChatGPT to specific curriculum goals is challenging. ChatGPT should be adaptable for different educational goals in different learning contexts. Over-reliance on ChatGPT can undermine traditional interactive strategies that are crucial to learning a language. Moreover, implementing AI tools such as ChatGPT requires extensive teacher professional development to modify pedagogical strategies and lesson design, which is a challenging and continuous process.

Ethical and social aspects also affect the use of ChatGPT in education. Along with protecting student data's privacy and security, it is also important to consider equity and access issues that can deepen educational disparities. AI technologies can also inherit biases from their training data, resulting in unequal educational outcomes for students from diverse linguistic backgrounds. Moreover, AI needs to be used ethically to augment the human aspect of teaching rather than completely replace it, and students also run the danger of being over-reliant on AI for learning.

New methods and evaluation frameworks must be developed to assess the effectiveness of ChatGPT in ELL classrooms, as traditional metrics may not adequately determine the impact of AI on language acquisition. Finally, AI tools require constant updating and maintenance, which means ongoing costs and continuous professional development for educators. Tackling these challenges requires a collaborative effort from all parties to leverage the advantages of AI responsibly and equitably within education.

5.3 Recommendations

In the context of education, the responses proposed by the government and educational institutions certainly are not the best way of addressing the challenges faced by ChatGPT and other similar AI-powered technologies in educational practices. However, as AI-driven educational technology becomes more widespread, there is an increasing recognition of the need to prioritize its ethical and responsible use, prompting the development of strategies to address potential challenges.

Therefore, educators and learners must develop individualized digital skills and tailored AI competencies that are crucial for ethically and pedagogically employing these tools in educational practices. It involves the ability to communicate with ChatGPT and design learning strategies that harness its potential. Additionally, while educators have developed greater digital skills through online teaching during COVID-

19, further skills are required to successfully employ ChatGPT in the English language learners (ELL). However, educators need to become experts in ChatGPT to leverage it while keeping its limitations in mind. Educators need a solid foundation of knowledge of technology to be able to use AI effectively in personalized language teaching. The foundational concepts that educators need to understand based on the research are the applications and limitations of AI-powered tools such as language processing algorithms, natural language generation models and adaptive learning systems. This knowledge is essential for educators to select and implement the proper AI tools to create individualized language learning contexts.

Individualized interactions with ChatGPT are crucial to greatly enhance learning, as integration of ChatGPT can lead you to make decisions, solve problems and reflect at a deeper level. To fully harness the benefits of ChatGPT, user interface and user experience need to be greatly improved so that AI tools are perceived more user-friendly and fosters positive attitudes among learners. By integrating multimedia features and linking it to other digital resources, ChatGPT's application will be enhanced, creating a more integrated technology enhanced language learning (TELL) environment. This integrated method works for several facets of language learning. An effective balance with the use of ChatGPT in teaching strategies is important to prevent an over-reliant use of AI by integrating AI tools alongside traditional learning practices. ChatGPT and similar AI tools in education should be continuously monitored and analyzed, refining its implementation to maximize benefits and minimize potential drawbacks.

Traditionally, educational institutions generally equipped students with simple tech skills. However, with the advancement of AI tools like ChatGPT, it is imperative to embed more advanced digital literacy among learners. As students learn to communicate with ChatGPT, they also have to learn how to engage with the complexities and limitations of what they are interacting with, negotiate the ethical considerations that surrounds it, and consider how they will act as responsible digital denizens when they choose it as an educational tool.

Finally, educational organizations at all levels have to draft usage guidelines, modify teaching and assessment methods, and formulate how to adequately prepare students for the advanced AI future when AI-based digital tools are ubiquitous

throughout daily life. That is how the educational sectors are shaped to align with the digital age, ensuring teachers and students have the tools to navigate it successfully.

5.3.1 Technological and Pedagogical Competencies to Use ChatGPT

To effectively integrate ChatGPT in educational context, educators need to balance technological competency with pedagogical knowledge so that they can integrate ChatGPT for educational purposes. Technological proficiency includes a thorough understanding of ChatGPT's capabilities, determining effective prompts, troubleshooting and ensuring currency to maximize the utility of this technology within the educational setting. It includes basic computer skills, Internet navigation, typing, and skills that help to communicate efficiently with the AI.

From a pedagogical standpoint, teachers need to use ChatGPT strategically to achieve certain learning goals like advanced language skills or understanding difficult, complex topics, which means promoting active and differentiated learning. This also includes using ChatGPT to encourage critical thinking and questioning, embed it into existing instructional technologies, and promotes advance and interactive learning environments.

5.3.2 Ethical Considerations to Use ChatGPT

Ethical considerations must be addressed while integrating ChatGPT or any other AI tool in educational context. Teachers and students must be aware of the limitations and potential biases inherent in the AI generated responses, concerns about student data privacy and tolerance of fairness and accountability in AI contributions to a decision. There are many ethical concerns regarding the use of AI, from the need for consent on the use of data to the ability of machines to create fake news. These considerations allow us not to become overly reliant on technology as it may hinder the growth of critical thinking and problem-solving skills of learners. All students must have the same access to these tools, no matter their socio-economic status or educational background. Developing ethical guidelines to protect student data privacy and ensure transparency in AI interactions is also critical.

To effectively integrate ChatGPT in educational context, it is important to carefully balance technological skills, pedagogical strategies, and ethical awareness in educational practices. Educators must educate the ethical considerations of AI usage, practical applications of ChatGPT, warn against the inherent biases of algorithmic

processes, and encourage students to think critically about the usage of ChatGPT, along with the technological and pedagogical aspects of ChatGPT to get effective learning outcomes. These considerations help educators adopt ChatGPT to enhance learning outcomes and prepare learners for the digital world.

5.4 Future Research Directions

Future studies could benefit from investigating a wider range of participants with varying ages, education levels, and linguistic strength on AI tools such as ChatGPT and their effects on various outcomes for different demographic groups studying. A more diversified participant pool would further allow for assessing the generalizability of the AI tool's effectiveness across varying educational settings and cultural contexts. Also, exploring hybrid teaching models that integrate AI with traditional instructional approaches can make learning more efficient and effective, decrease teacher workload, and foster student engagement. Studies must determine the mix of AI and human instruction that leads to the most learning and motivation among students.

In addition, studies could be performed to analyze the ethical consequences and equity issues related to the integration of AI in educational applications. Another important direction could be to evaluate the preparedness of educators and institutions to integrate AI tools into curricula. It emphasizes the importance of analyzing the training needs of educators, the infrastructural needs of educational institutions, and the mindset changes required to implement AI technologies successfully. Such research can help inform targeted professional development and infrastructure investments.

Through these approaches, researchers and educators could more effectively leverage the power of AI to revolutionize teaching and learning, making education more accessible, engaging, and impactful. These future directions address the research gaps highlighted in the present study and lead to further expansion of the application of AI in education (AIED).

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APPENDIX A

PERMISSION LETTER FROM THE UNIVERSITY

Head of the Department,
Department of English,
National University of Modern Languages, Multan Campus.

Subject: Request for Approval of conducting MPhil Thesis Research in the Campus

Dear Sir,

I hope this letter finds you in good health and high spirits. I am writing to formally request your permission to conduct a quasi-experimental research within the Department of English as part of my MPhil research thesis. The primary objective of this research is to assess the impact of the integration of ChatGPT as an educational tool in enhancing English writing skills among BS English 2nd semester Students.

The title of my research proposal is "PEDAGOGICAL IMPLICATIONS OF AI IN ELL CONTEXT: A QUASI-EXPERIMENTAL RESEARCH OF CHATGBT IN ENGLISH WRITING SKILLS AMONG UNDERGRADUATE ESL LEARNERS".

The study will involve a quasi-experimental research, the experimental group will utilize ChatGPT as a writing aid and a control group will be taught by traditional teaching methods. The intervention period for present research will span over 6 weeks.

The findings from this research could potentially lead to valuable insights into the effectiveness of AI-based tools in language learning, contributing to both our department's curriculum development and the broader field of English language education. Ethical guidelines will be strictly adhered to throughout the research, including informed consent from participating students and data privacy measures.

I kindly request your approval and support for this research endeavor. I am committed to ensuring that the research is conducted professionally and with minimal disruption to the academic activities of the department.

Thank you for considering my request, and I look forward to your positive response.

Sincerely,

Farah Jamil

Mphil English Linguistics

Roll# MP-ELING-S22-002

Reg# 50 MPhil/Eng/Lng/Mtn/S22

M. Akbar Sajid
Dr. Muhammad Akbar Sajid
Assistant Professor
National University of Modern Languages
Multan Campus

APPENDIX B

PARTICIPANTS CONSENT FORMS

Informed Consent Form for Research Participants

Title of Research: Pedagogical Implications of AI in ELL Context: A Quasi-Experimental Research of ChatGPT on English Writing Skills at NUML Multan Campus

Researcher : Farah Jamil

Email address: faharao1998@gmail.com

Institution: National University of Modern Languages (NUML), Multan Campus

Contact Information: faharao1998@gmail.com

You are invited to participate in a research study conducted by Farah Jamil at the National University of Modern Languages (NUML), Multan Campus. The purpose of this study is to investigate the pedagogical implications of Artificial Intelligence, specifically ChatGPT, on English writing skills in the English Language Learning (ELL) context.

Purpose of the Study

The aim of this study is to explore how the integration of AI tools like ChatGPT can affect the development of English writing skills among students. Your participation will contribute valuable insights into the potential educational benefits and challenges of using AI in language learning.

If you agree to participate in this study, you will be asked to:

- Complete a pre-test assessing your current English writing skills.
- Engage with AI tools like ChatGPT as part of your writing assignments over a specified period.
- Participate in post-tests to evaluate any changes in your writing skills.
- Provide feedback through questionnaires and/or interviews regarding your experience with the AI tool.
- The study will be conducted over 6 weeks of intervention

Potential Risks and Discomforts

There are minimal risks associated with this study. You may experience some discomfort related to the use of new technology or the additional time required to participate in the study. However, these risks are considered minor and are not expected to exceed the normal stress of everyday life.

Potential Benefits

By participating in this study, you may:

- Improve your English writing skills.
- Gain familiarity with innovative AI tools that can support your learning.

- Contribute to research that may enhance language teaching practices and benefit future students.

Confidentiality

All information obtained in this study will be kept confidential. Your identity will be protected in any publications or presentations resulting from this research. Data will be stored securely and only accessible to the researchers. Your responses will be anonymized to ensure your privacy.

Voluntary Participation

Participation in this study is entirely voluntary. You may withdraw from the study at any time without penalty or loss of benefits to which you are otherwise entitled. If you decide to withdraw, any data collected from you up to that point will be destroyed and not used in the analysis.

Consent to Participate

If you have any questions about this study or your participation, please contact.

By signing below, you acknowledge that you have read and understood the information provided above, and you agree to participate in this study. You will receive a copy of this consent form for your records.

Participant's Signature:

M. Javed	Shahbaz
Jakir	M. Javed
Sahib	Bilal
Akshat	Imam
Asad	Rukhsana
Shahid Ali	A. Aziz
Jahid	Ayub
M. Javed	Imam
Pamir	Jamil
Amir	Fahim
A. Rahman	Shahbaz
Zahid Ali	Salma
Faiz	Emman
M. Javed	Nasreen
Ayesh	Roxia

APPENDIX C

TURNITIN REPORT

Turnitin Originality Report

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ID: 2397472778

Word Count: 28653

Submitted: 1

farah jamil By Farah Jamil

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APPENDIX D

PRE-TEST

Pre-Test for English Writing Skills

Scoring:

Each correct answer in Sections I, II, and V= 1 point.

Essay in Section III will be assessed based on coherence, grammar, and vocabulary (up to 10 points).

Editing in Section IV=1 point per correction.

Total marks= 20

Section I: Grammar and Vocabulary

- **Fill in the blanks:**

1. The detective's keen _____ led to the solution of the mystery.
2. The political speech was filled with _____ rhetoric.

- **Choose the correct word:**

1. The team _____ won the championship was ecstatic.
 - a) who
 - b) whom
 - c) whose
1. She was _____ tired that she fell asleep immediately.
 - a) so
 - b) too
 - c) very

Section II: Sentence Structure

1. Reorder the words to form a correct sentence:

Literary theories / various / students / in / explore / their studies.

2. Identify the sentence type:

"As the sun set, the silhouettes of the trees became increasingly defined."

Section III: Essay Writing

1. Write a short essay (150-200 words) on the topic: "The Impact of Technology on Modern Society."

Section IV: Editing

1. Identify and correct the errors in the given passage:

"The author, along with several critics, were interviewed about their perspective on the novel."

Section V: Vocabulary Usage

1. Match the words with their correct meanings:

Ambiguous _____	a) Present everywhere
Esoteric _____	b) cryptic
Ubiquitous _____	c) Understood by few

APPENDIX E

POST-TEST

Post-Test for English Writing Skills

Scoring:

Each correct answer in Sections I, II, and V = 1 point.

Essay in Section III will be assessed based on coherence, grammar, and vocabulary (up to 10 points).

Editing in Section IV = 1 point per correction.

Total marks = 20

Section I: Grammar and Vocabulary

Fill in the blanks:

1. The poet's nuanced _____ elevated the poem to a masterpiece.
2. The academic paper was criticized for its _____ arguments.

Choose the correct word:

1. The author _____ intricate literary techniques, leaving readers in awe.
 - a) who
 - b) whom
 - c) whose
2. The lecture was _____ profound that students discussed it for days.
 - a) so
 - b) too
 - c) very

Section II: Sentence Structure

1. Reorder the words to form a correct sentence:

Linguistics / students / theories / advanced / their / in / study.

2. Identify the sentence type:

"In the realm of linguistic studies, scholars continuously explore new paradigms."

Section III: Essay Writing

1. Write a short essay (150-200 words) on the topic: "The Role of artificial intelligence in Education."

Section IV: Editing**1. Identify and correct the errors in the given passage:**

"The linguistic phenomena, in addition to cultural influences, impacts communication significantly."

Section V: Vocabulary Usage**1. Match the words with their correct meanings:**

- Cacophony _____ a) Producing abundant works or results
- Ephemeral _____ b) Harsh mixture of sounds
- Prolific _____ c) Brief and fleeting

APPENDIX F

RESULTS OF PRE & POST TESTS

Total number of participants= 30

Control group= 15

Experimental group= 15

CONTROL GROUP

	Pre test	Post test
1.	9	13
2.	10	14
3.	8	11
4.	11	14
5.	7	10
6.	11	14
7.	9	13
8.	8	12
9.	6	10
10.	10	15
11.	7	13
12.	6	9
13.	8	11
14.	10	12
15.	5	8

EXPERIMENTAL GROUP

	Pre test	Post test
1.	8	18
2.	10	17
3.	13	16
4.	9	17
5.	10	16
6.	9	14
7.	7	16
8.	12	18
9.	9	17
10.	13	19
11.	8	16
12.	9	15
13.	10	18
14.	12	17
15.	11	15

APPENDIX G

QUESTIONNAIRE RESPONSES

27/05/2024, 01:45

Questionnaire on Learners' Perceptions of ChatGPT in English Language Learning Classrooms

Questionnaire on Learners' Perceptions of ChatGPT in English Language Learning Classrooms

This questionnaire is developed by Farah Jamil, a Mphil student of English Linguistics at NUML(Multan Campus) in order to asses learner's perception, motivation, engagement, and satisfaction levels of integrating ChatGpt as an educational tool in English Language learning classrooms to learn English writing skills. It aims to collect valuable insights from students who have been part of the experimental group using ChatGPT.

This questionnaire is divided into three sections, ,one for the student's demographic information, second section for their perceptions regarding each component of the research model and 3rd section is for open-ended questions to gain their insights on ChatGPT's Role in Learning English Writing Skills. All of the questions in the second section of the questionnaire will be adapted from the technology acceptance model (TAM). Four of the main constructs from the TAM are measured in the study: Perceived ease of use (PEOU), perceived usefulness (PU), attitudes towards use (ATU), and behavioral intention (BI).

The respondent's email (fainoor0799@gmail.com) was recorded on submission of this form.

Section 1: Demographic Information

1. Age *

- ☐ a) Under 18
- ☒ b) 18-24
- ☐ c) 25-34
- ☐ d) 35 to onward

2. Gender *

- ☐ a) Male
- ☒ b) Female
- ☐ c) Prefer not to say
- ☐ d) Other

3. Previous experience with AI-based learning tools *

- ☐ a) None
- ☒ b) Limited
- ☐ c) Moderate
- ☐ d) Extensive

Section 2: Perceptions on ChatGPT Using TAM Constructs

Please read each statement and indicate your level of agreement with the following statements using a scale from 1 (Strongly Disagree) to 5 (Strongly Agree). Please read the statements carefully but don't spend a lot of time on each statement, your 1st impression is fine.

Perceived Ease of Use (PEOU) *

	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
I find ChatGPT easy to interact with when learning English writing skills.	☐	☐	☐	☒	☐
Learning to operate ChatGPT for writing assistance was easy for me.	☐	☐	☐	☒	☐
My interaction with ChatGPT during writing exercises is clear and understandable.	☐	☐	☐	☐	☒
I find ChatGPT to be flexible in terms of use when writing in English.	☐	☐	☐	☒	☐

Perceived Usefulness (PU) *

	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
I find ChatGPT useful in my English writing development.	☐	☐	☐	☒	☐
Using ChatGPT improves my efficiency in writing in English.	☐	☐	☐	☒	☐
ChatGPT enhances the quality of my English writing.	☐	☐	☐	☐	☒
ChatGPT helps me complete writing tasks more quickly than if I did them without assistance.	☐	☐	☐	☒	☐

Attitudes Towards Use (ATU) *

	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
I have a positive attitude towards using Chatgpt for learning English writing.	☐	☐	☐	☒	☐
I feel confident using ChatGPT to improve my English writing skills.	☐	☐	☐	☒	☐
I am motivated to use ChatGPT regularly for learning.	☐	☐	☐	☒	☐
I am satisfied with the assistance Chatgpt provides for English Writing.	☐	☐	☐	☐	☒

Behavioral Intention (BI) *

	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
I intend to continue using ChatGPT for learning English writing in the future.	☐	☐	☐	☒	☐
ChatGPT is a beneficial tool for receiving immediate feedback on writing.	☐	☐	☐	☐	☒
I would recommend ChatGPT to others who want to improve their English writing skills.	☐	☐	☐	☐	☒
I plan to explore more features of ChatGPT to aid my learning.	☐	☐	☐	☐	☒

Section 3: ChatGPT's Role in Learning English Writing Skills

1. In what ways has ChatGPT been beneficial in assisting your English writing skills? *

It has helped me in improving my vocabulary and grammar.

2. Are there specific features or aspects of ChatGPT that you find particularly helpful for * learning English writing? Mention them.

It's easy to use, have vast vocabulary and has contextual awareness.

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The respondent's email (faryal0315@gmail.com) was recorded on submission of this form.

Section 1: Demographic Information

1. Age *

- ☐ a) Under 18
- ☐ b) 18-24
- ☒ c) 25-34
- ☐ d) 35 to onward

2. Gender *

- ☐ a) Male
- ☒ b) Female
- ☐ c) Prefer not to say
- ☐ d) Other

3. Previous experience with AI-based learning tools *

- ☐ a) None
- ☐ b) Limited
- ☒ c) Moderate
- ☐ d) Extensive

Section 2: Perceptions on ChatGPT Using TAM Constructs

Please read each statement and indicate your level of agreement with the following statements using a scale from 1 (Strongly Disagree) to 5 (Strongly Agree). Please read the statements carefully but don't spend a lot of time on each statement, your 1st impression is fine.

Perceived Ease of Use (PEOU) *

	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
I find ChatGPT easy to interact with when learning English writing skills.	☐	☐	☐	☐	☒
Learning to operate ChatGPT for writing assistance was easy for me.	☐	☐	☐	☒	☐
My interaction with ChatGPT during writing exercises is clear and understandable.	☐	☐	☐	☒	☐
I find ChatGPT to be flexible in terms of use when writing in English.	☐	☐	☐	☒	☐

Perceived Usefulness (PU) *

	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
I find ChatGPT useful in my English writing development.	☐	☐	☐	☐	☒
Using ChatGPT improves my efficiency in writing in English.	☐	☐	☐	☒	☐
ChatGPT enhances the quality of my English writing.	☐	☐	☐	☒	☐
ChatGPT helps me complete writing tasks more quickly than if I did them without assistance.	☐	☐	☐	☐	☒

Attitudes Towards Use (ATU) *

	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
I have a positive attitude towards using Chatgpt for learning English writing.	☐	☐	☐	☐	☒
I feel confident using ChatGPT to improve my English writing skills.	☐	☐	☐	☐	☒
I am motivated to use ChatGPT regularly for learning.	☐	☐	☐	☐	☒
I am satisfied with the assistance Chatgpt provides for English Writing.	☐	☐	☐	☐	☒

Behavioral Intention (BI) *

	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
I intend to continue using ChatGPT for learning English writing in the future.	☐	☐	☐	☐	☒
ChatGPT is a beneficial tool for receiving immediate feedback on writing.	☐	☐	☐	☒	☐
I would recommend ChatGPT to others who want to improve their English writing skills.	☐	☐	☐	☐	☒
I plan to explore more features of ChatGPT to aid my learning.	☐	☐	☐	☐	☒

Section 3: ChatGPT's Role in Learning English Writing Skills

1. In what ways has ChatGPT been beneficial in assisting your English writing skills? *

It improves my grammar and vocabulary in English writing.

2. Are there specific features or aspects of ChatGPT that you find particularly helpful for * learning English writing? Mention them.

Yes, it is easy to use and free of cost.

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The respondent's email (sariasaeed3@gmail.com) was recorded on submission of this form.

Section 1: Demographic Information

1. Age *

- ☐ a) Under 18
- ☐ b) 18-24
- ☒ c) 25-34
- ☐ d) 35 to onward

2. Gender *

- ☐ a) Male
- ☒ b) Female
- ☐ c) Prefer not to say
- ☐ d) Other

3. Previous experience with AI-based learning tools *

- ☐ a) None
- ☒ b) Limited
- ☐ c) Moderate
- ☐ d) Extensive

Section 2: Perceptions on ChatGPT Using TAM Constructs

Please read each statement and indicate your level of agreement with the following statements using a scale from 1 (Strongly Disagree) to 5 (Strongly Agree). Please read the statements carefully but don't spend a lot of time on each statement, your 1st impression is fine.

Perceived Ease of Use (PEOU) *

	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
I find ChatGPT easy to interact with when learning English writing skills.	☐	☐	☐	☐	☒
Learning to operate ChatGPT for writing assistance was easy for me.	☐	☐	☐	☐	☒
My interaction with ChatGPT during writing exercises is clear and understandable.	☐	☐	☐	☐	☒
I find ChatGPT to be flexible in terms of use when writing in English.	☐	☐	☐	☐	☒

Perceived Usefulness (PU) *

	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
I find ChatGPT useful in my English writing development.	☐	☐	☐	☐	☒
Using ChatGPT improves my efficiency in writing in English.	☐	☐	☐	☐	☒
ChatGPT enhances the quality of my English writing.	☐	☐	☐	☐	☒
ChatGPT helps me complete writing tasks more quickly than if I did them without assistance.	☐	☐	☐	☒	☐

Attitudes Towards Use (ATU) *

	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
I have a positive attitude towards using ChatGPT for learning English writing.	☐	☐	☐	☐	☒
I feel confident using ChatGPT to improve my English writing skills.	☐	☐	☐	☐	☒
I am motivated to use ChatGPT regularly for learning.	☐	☐	☐	☒	☐
I am satisfied with the assistance ChatGPT provides for English Writing.	☐	☐	☐	☐	☒

Behavioral Intention (BI) *

	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
I intend to continue using ChatGPT for learning English writing in the future.	☐	☐	☐	☒	☐
ChatGPT is a beneficial tool for receiving immediate feedback on writing.	☐	☐	☐	☐	☒
I would recommend ChatGPT to others who want to improve their English writing skills.	☐	☐	☐	☐	☒
I plan to explore more features of ChatGPT to aid my learning.	☐	☐	☐	☐	☒

Section 3: ChatGPT's Role in Learning English Writing Skills

1. In what ways has ChatGPT been beneficial in assisting your English writing skills? *

It enhances grammar, vocabulary, and writing flow, aiding in smoother expression. It stimulates idea generation and prompt handling for improved adaptability

2. Are there specific features or aspects of ChatGPT that you find particularly helpful for * learning English writing? Mention them.

it provides instant feedback on grammar, vocabulary, and sentence structure, helping students identify and correct their mistakes. also it fosters creativity

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The respondent's email (sk7057997@gmail.com) was recorded on submission of this form.

Section 1: Demographic Information

1. Age *

- ☐ a) Under 18
- ☐ b) 18-24
- ☒ c) 25-34
- ☐ d) 35 to onward

2. Gender *

- ☒ a) Male
- ☐ b) Female
- ☐ c) Prefer not to say
- ☐ d) Other

3. Previous experience with AI-based learning tools *

- ☐ a) None
- ☐ b) Limited
- ☐ c) Moderate
- ☒ d) Extensive

Section 2: Perceptions on ChatGPT Using TAM Constructs

Please read each statement and indicate your level of agreement with the following statements using a scale from 1 (Strongly Disagree) to 5 (Strongly Agree). Please read the statements carefully but don't spend a lot of time on each statement, your 1st impression is fine.

Perceived Ease of Use (PEOU) *

	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
I find ChatGPT easy to interact with when learning English writing skills.	☐	☐	☐	☒	☐
Learning to operate ChatGPT for writing assistance was easy for me.	☐	☐	☐	☐	☒
My interaction with ChatGPT during writing exercises is clear and understandable.	☐	☐	☐	☒	☐
I find ChatGPT to be flexible in terms of use when writing in English.	☐	☐	☐	☐	☒

Perceived Usefulness (PU) *

	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
I find ChatGPT useful in my English writing development.	☐	☐	☐	☒	☐
Using ChatGPT improves my efficiency in writing in English.	☐	☐	☐	☐	☒
ChatGPT enhances the quality of my English writing.	☐	☐	☐	☒	☐
ChatGPT helps me complete writing tasks more quickly than if i did them without assistance.	☐	☐	☐	☐	☒

Attitudes Towards Use (ATU) *

	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
I have a positive attitude towards using Chatgpt for learning English writing.	☐	☐	☐	☒	☐
I feel confident using ChatGPT to improve my English writing skills.	☐	☐	☐	☐	☒
I am motivated to use ChatGPT regularly for learning.	☐	☐	☐	☒	☐
I am satisfied with the assistance Chatgpt provides for English Writing.	☐	☐	☐	☐	☒

Behavioral Intention (BI) *

	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
I intend to continue using ChatGPT for learning English writing in the future.	☐	☐	☐	☒	☐
ChatGPT is a beneficial tool for receiving immediate feedback on writing.	☐	☐	☐	☐	☒
I would recommend ChatGPT to others who want to improve their English writing skills.	☐	☐	☐	☒	☐
I plan to explore more features of ChatGPT to aid my learning.	☐	☐	☐	☐	☒

1. In what ways has ChatGPT been beneficial in assisting your English writing skills? *

Grammar and Syntax Correction: ChatGPT can help identify and correct grammar and syntax errors in your writing. By interacting with the model and receiving feedback, you can learn from your mistakes and improve your understanding of sentence structure and language rules.

Vocabulary Expansion: You can use ChatGPT to learn new words and phrases, as it can provide synonyms, explanations, and context for different terms. This can enhance your vocabulary and make your writing more diverse and nuanced.

Writing Practice: Engaging in conversations with ChatGPT provides an opportunity for consistent writing practice. You can write paragraphs, essays, or even stories, receiving instant feedback and corrections that help you refine your skills over time.

Ideation and Brainstorming: If you're stuck on ideas or need inspiration for your writing, ChatGPT can help by generating prompts, suggesting topics, or even assisting in the brainstorming process. This can be especially helpful for creative writing or essay development.

Language Style and Tone: ChatGPT can adapt its responses based on different writing styles and tones. By interacting with the model, you can observe how language can be adjusted to convey formality, informality, persuasion, or other tones, helping you develop a versatile writing style.

Proofreading Assistance: After drafting your content, you can use ChatGPT to proofread and identify any spelling or grammatical errors. This can be a helpful final step in the writing process to ensure your work is polished and error-free.

Cultural Context: ChatGPT can provide information about cultural nuances and expressions in English, helping learners understand the context in which certain words or phrases are used. This can contribute to more accurate and culturally appropriate writing.

It's important to note that while ChatGPT is a powerful tool, it's not a perfect substitute for human feedback and learning resources. Integrating it into a comprehensive language learning plan that includes reading, writing exercises, and interactions with native speakers will be most effective in improving your English writing skills.

2. Are there specific features or aspects of ChatGPT that you find particularly helpful for * learning English writing? Mention them.

Grammar Correction: ChatGPT can identify and correct grammar mistakes in your sentences, helping you understand proper sentence structure.

Vocabulary Enhancement: The model can provide synonyms, antonyms, and explanations for words, helping you expand your vocabulary.

Contextual Usage: ChatGPT can demonstrate how words and phrases are used in context, improving your understanding of their proper usage.

Writing Style Variation: It can adapt its responses to different writing styles and tones, allowing you to observe and practice writing in various registers.

Sentence Formation: By interacting with the model, you can improve your skills in forming coherent and well-structured sentences.

Idea Generation: ChatGPT can help generate ideas and prompts, aiding in the brainstorming process for essays, stories, or other writing projects.

Cultural Context Insights: The model can provide information on cultural nuances, idioms, and expressions in English, enhancing your understanding of language in a cultural context.

Consistent Writing Practice: Engaging in conversations with ChatGPT provides regular opportunities for writing practice and skill improvement.

Proofreading Assistance: You can use ChatGPT to proofread your writing, identifying and correcting spelling and grammatical errors.

Real-time Feedback: Immediate responses from ChatGPT allow for instant feedback, helping you learn from mistakes and make corrections on the spot.

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The respondent's email (nailaakram101@gmail.com) was recorded on submission of this form.

Section 1: Demographic Information

1. Age *

- ☐ a) Under 18
- ☒ b) 18-24
- ☐ c) 25-34
- ☐ d) 35 to onward

2. Gender *

- ☐ a) Male
- ☒ b) Female
- ☐ c) Prefer not to say
- ☐ d) Other

3. Previous experience with AI-based learning tools *

- ☐ a) None
- ☒ b) Limited
- ☐ c) Moderate
- ☐ d) Extensive

Section 2: Perceptions on ChatGPT Using TAM Constructs

Please read each statement and indicate your level of agreement with the following statements using a scale from 1 (Strongly Disagree) to 5 (Strongly Agree). Please read the statements carefully but don't spend a lot of time on each statement, your 1st impression is fine.

Perceived Ease of Use (PEOU) *

	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
I find ChatGPT easy to interact with when learning English writing skills.	☐	☐	☐	☐	☒
Learning to operate ChatGPT for writing assistance was easy for me.	☐	☐	☐	☒	☐
My interaction with ChatGPT during writing exercises is clear and understandable.	☐	☐	☐	☐	☒
I find ChatGPT to be flexible in terms of use when writing in English.	☐	☐	☐	☒	☐

Perceived Usefulness (PU) *

	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
I find ChatGPT useful in my English writing development.	☐	☐	☐	☐	☒
Using ChatGPT improves my efficiency in writing in English.	☐	☐	☐	☐	☒
ChatGPT enhances the quality of my English writing.	☐	☐	☐	☐	☒
ChatGPT helps me complete writing tasks more quickly than if I did them without assistance.	☐	☐	☐	☐	☒

Attitudes Towards Use (ATU) *

	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
I have a positive attitude towards using Chatgpt for learning English writing.	☐	☐	☐	☐	☒
I feel confident using ChatGPT to improve my English writing skills.	☐	☐	☐	☐	☒
I am motivated to use ChatGPT regularly for learning.	☐	☐	☐	☐	☒
I am satisfied with the assistance Chatgpt provides for English Writing.	☐	☐	☐	☐	☒

Behavioral Intention (BI) *

	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
I intend to continue using ChatGPT for learning English writing in the future.	☐	☐	☐	☐	☒
ChatGPT is a beneficial tool for receiving immediate feedback on writing.	☐	☐	☐	☐	☒
I would recommend ChatGPT to others who want to improve their English writing skills.	☐	☐	☐	☐	☒
I plan to explore more features of ChatGPT to aid my learning.	☐	☐	☐	☐	☒

Section 3: ChatGPT's Role in Learning English Writing Skills**1. In what ways has ChatGPT been beneficial in assisting your English writing skills? ***

It provides a guideline or different outlines for the essay, it also writes an English essay with extraordinary vocabulary and with correct usage of grammar and tenses. It collects information or content for the essay from all over the internet which is not possible for a human being to do this personally.

2. Are there specific features or aspects of ChatGPT that you find particularly helpful for * learning English writing? Mention them.

It is very helpful for English writing as I am not a native speaker of English, so I am not a master of vocabulary or grammar of English. ChatGPT helps me understand this in a better way and provide me with good content for learning English.

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The respondent's email (sanaadnan717@gmail.com) was recorded on submission of this form.

Section 1: Demographic Information

1. Age *

- ☐ a) Under 18
- ☒ b) 18-24
- ☐ c) 25-34
- ☐ d) 35 to onward

2. Gender *

- ☐ a) Male
- ☒ b) Female
- ☐ c) Prefer not to say
- ☐ d) Other

3. Previous experience with AI-based learning tools *

- ☐ a) None
- ☐ b) Limited
- ☒ c) Moderate
- ☐ d) Extensive

Section 2: Perceptions on ChatGPT Using TAM Constructs

Please read each statement and indicate your level of agreement with the following statements using a scale from 1 (Strongly Disagree) to 5 (Strongly Agree). Please read the statements carefully but don't spend a lot of time on each statement, your 1st impression is fine.

Perceived Ease of Use (PEOU) *

	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
I find ChatGPT easy to interact with when learning English writing skills.	☐	☐	☐	☐	☒
Learning to operate ChatGPT for writing assistance was easy for me.	☐	☐	☐	☐	☒
My interaction with ChatGPT during writing exercises is clear and understandable.	☐	☐	☐	☐	☒
I find ChatGPT to be flexible in terms of use when writing in English.	☐	☐	☐	☐	☒

Perceived Usefulness (PU) *

	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
I find ChatGPT useful in my English writing development.	☐	☐	☐	☐	☒
Using ChatGPT improves my efficiency in writing in English.	☐	☐	☐	☐	☒
ChatGPT enhances the quality of my English writing.	☐	☐	☐	☐	☒
ChatGPT helps me complete writing tasks more quickly than if I did them without assistance.	☐	☐	☐	☐	☒

Attitudes Towards Use (ATU) *

	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
I have a positive attitude towards using Chatgpt for learning English writing.	☐	☐	☐	☐	☒
I feel confident using ChatGPT to improve my English writing skills.	☐	☐	☐	☐	☒
I am motivated to use ChatGPT regularly for learning.	☐	☐	☐	☐	☒
I am satisfied with the assistance Chatgpt provides for English Writing.	☐	☐	☐	☐	☒

Behavioral Intention (BI) *

	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
I intend to continue using ChatGPT for learning English writing in the future.	☐	☐	☐	☐	☒
ChatGPT is a beneficial tool for receiving immediate feedback on writing.	☐	☐	☐	☐	☒
I would recommend ChatGPT to others who want to improve their English writing skills.	☐	☐	☐	☐	☒
I plan to explore more features of ChatGPT to aid my learning.	☐	☐	☐	☐	☒

Section 3: ChatGPT's Role in Learning English Writing Skills

1. In what ways has ChatGPT been beneficial in assisting your English writing skills? *

It corrects me grammatically, the verbal use has been enhanced since I started using this AI tool.

2. Are there specific features or aspects of ChatGPT that you find particularly helpful for * learning English writing? Mention them.

Chat GTP is an over all effective AI tool

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Questionnaire on Learners' Perceptions of ChatGPT in English Language Learning Classrooms

Questionnaire on Learners' Perceptions of ChatGPT in English Language Learning Classrooms

This questionnaire is developed by Farah Jamil, a Mphil student of English Linguistics at NUML(Multan Campus) in order to asses learner's perception, motivation, engagement, and satisfaction levels of integrating ChatGpt as an educational tool in English Language learning classrooms to learn English writing skills. It aims to collect valuable insights from students who have been part of the experimental group using ChatGPT.

This questionnaire is divided into three sections, ,one for the student's demographic information, second section for their perceptions regarding each component of the research model and 3rd section is for open-ended questions to gain their insights on ChatGPT's Role in Learning English Writing Skills. All of the questions in the second section of the questionnaire will be adapted from the technology acceptance model (TAM). Four of the main constructs from the TAM are measured in the study: Perceived ease of use (PEOU), perceived usefulness (PU), attitudes towards use (ATU), and behavioral intention (BI).

The respondent's email (qaziawan12345@gmail.com) was recorded on submission of this form.

Section 1: Demographic Information

1. Age *

- ☐ a) Under 18
- ☐ b) 18-24
- ☒ c) 25-34
- ☐ d) 35 to onward

2. Gender *

- ☐ a) Male
- ☒ b) Female
- ☐ c) Prefer not to say
- ☐ d) Other

3. Previous experience with AI-based learning tools *

- ☐ a) None
- ☐ b) Limited
- ☒ c) Moderate
- ☐ d) Extensive

Section 2: Perceptions on ChatGPT Using TAM Constructs

Please read each statement and indicate your level of agreement with the following statements using a scale from 1 (Strongly Disagree) to 5 (Strongly Agree). Please read the statements carefully but don't spend a lot of time on each statement, your 1st impression is fine.

Perceived Ease of Use (PEOU) *

	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
I find ChatGPT easy to interact with when learning English writing skills.	☐	☐	☐	☒	☐
Learning to operate ChatGPT for writing assistance was easy for me.	☐	☐	☐	☒	☐
My interaction with ChatGPT during writing exercises is clear and understandable.	☐	☐	☐	☒	☐
I find ChatGPT to be flexible in terms of use when writing in English.	☐	☐	☐	☒	☐

Perceived Usefulness (PU) *

	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
I find ChatGPT useful in my English writing development.	☐	☐	☐	☒	☐
Using ChatGPT improves my efficiency in writing in English.	☐	☐	☐	☒	☐
ChatGPT enhances the quality of my English writing.	☐	☐	☐	☒	☐
ChatGPT helps me complete writing tasks more quickly than if I did them without assistance.	☐	☐	☐	☒	☐

Attitudes Towards Use (ATU) *

	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
I have a positive attitude towards using Chatgpt for learning English writing.	☐	☐	☐	☐	☒
I feel confident using ChatGPT to improve my English writing skills.	☐	☐	☐	☐	☒
I am motivated to use ChatGPT regularly for learning.	☐	☐	☐	☒	☐
I am satisfied with the assistance Chatgpt provides for English Writing.	☐	☐	☐	☒	☐

Behavioral Intention (BI) *

	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
I intend to continue using ChatGPT for learning English writing in the future.	☐	☐	☐	☐	☒
ChatGPT is a beneficial tool for receiving immediate feedback on writing.	☐	☐	☐	☐	☒
I would recommend ChatGPT to others who want to improve their English writing skills.	☐	☐	☐	☐	☒
I plan to explore more features of ChatGPT to aid my learning.	☐	☐	☐	☐	☒

Section 3: ChatGPT's Role in Learning English Writing Skills

1. In what ways has ChatGPT been beneficial in assisting your English writing skills? *

It is beneficial in various ways as it is prompt in responding to the queries and provides appropriate data.

2. Are there specific features or aspects of ChatGPT that you find particularly helpful for learning English writing? Mention them. *

Yes, there are many. Specially the analysis part of ChatGPT is really helpful to do linguistic or semiotic analysis.

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The respondent's email (ummaairkhan13@gmail.com) was recorded on submission of this form.

Section 1: Demographic Information

1. Age *

- ☐ a) Under 18
- ☐ b) 18-24
- ☒ c) 25-34
- ☐ d) 35 to onward

2. Gender *

- ☒ a) Male
- ☐ b) Female
- ☐ c) Prefer not to say
- ☐ d) Other

3. Previous experience with AI-based learning tools *

- ☐ a) None
- ☒ b) Limited
- ☐ c) Moderate
- ☐ d) Extensive

Section 2: Perceptions on ChatGPT Using TAM Constructs

Please read each statement and indicate your level of agreement with the following statements using a scale from 1 (Strongly Disagree) to 5 (Strongly Agree). Please read the statements carefully but don't spend a lot of time on each statement, your 1st impression is fine.

Perceived Ease of Use (PEOU) *

	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
I find ChatGPT easy to interact with when learning English writing skills.	☐	☐	☐	☒	☐
Learning to operate ChatGPT for writing assistance was easy for me.	☐	☐	☐	☒	☐
My interaction with ChatGPT during writing exercises is clear and understandable.	☐	☒	☐	☐	☐
I find ChatGPT to be flexible in terms of use when writing in English.	☐	☐	☐	☒	☐

Perceived Usefulness (PU) *

	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
I find ChatGPT useful in my English writing development.	☐	☐	☐	☒	☐
Using ChatGPT improves my efficiency in writing in English.	☐	☐	☐	☒	☐
ChatGPT enhances the quality of my English writing.	☐	☒	☐	☐	☐
ChatGPT helps me complete writing tasks more quickly than if I did them without assistance.	☐	☐	☐	☒	☐

Attitudes Towards Use (ATU) *

	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
I have a positive attitude towards using ChatGPT for learning English writing.	☐	☐	☐	☒	☐
I feel confident using ChatGPT to improve my English writing skills.	☐	☒	☐	☐	☐
I am motivated to use ChatGPT regularly for learning.	☐	☒	☐	☐	☐
I am satisfied with the assistance ChatGPT provides for English Writing.	☐	☒	☐	☐	☐

Behavioral Intention (BI) *

	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
I intend to continue using ChatGPT for learning English writing in the future.	☐	☐	☐	☒	☐
ChatGPT is a beneficial tool for receiving immediate feedback on writing.	☐	☐	☐	☒	☐
I would recommend ChatGPT to others who want to improve their English writing skills.	☐	☐	☐	☒	☐
I plan to explore more features of ChatGPT to aid my learning.	☐	☐	☐	☒	☐

Section 3: ChatGPT's Role in Learning English Writing Skills

1. In what ways has ChatGPT been beneficial in assisting your English writing skills? *

Regarding grammar mistakes.

2. Are there specific features or aspects of ChatGPT that you find particularly helpful for * learning English writing? Mention them.

I haven't find some special tool for writing.

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The respondent's email (hassan280398@gmail.com) was recorded on submission of this form.

Section 1: Demographic Information

1. Age *

- ☐ a) Under 18
- ☐ b) 18-24
- ☒ c) 25-34
- ☐ d) 35 to onward

2. Gender *

- ☒ a) Male
- ☐ b) Female
- ☐ c) Prefer not to say
- ☐ d) Other

3. Previous experience with AI-based learning tools *

- ☐ a) None
- ☐ b) Limited
- ☒ c) Moderate
- ☐ d) Extensive

Section 2: Perceptions on ChatGPT Using TAM Constructs

Please read each statement and indicate your level of agreement with the following statements using a scale from 1 (Strongly Disagree) to 5 (Strongly Agree). Please read the statements carefully but don't spend a lot of time on each statement, your 1st impression is fine.

Perceived Ease of Use (PEOU) *

	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
I find ChatGPT easy to interact with when learning English writing skills.	☐	☐	☐	☒	☐
Learning to operate ChatGPT for writing assistance was easy for me.	☐	☐	☐	☐	☒
My interaction with ChatGPT during writing exercises is clear and understandable.	☐	☐	☐	☒	☐
I find ChatGPT to be flexible in terms of use when writing in English.	☐	☐	☐	☒	☐

Perceived Usefulness (PU) *

	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
I find ChatGPT useful in my English writing development.	☐	☐	☐	☒	☐
Using ChatGPT improves my efficiency in writing in English.	☐	☐	☐	☒	☐
ChatGPT enhances the quality of my English writing.	☐	☐	☐	☒	☐
ChatGPT helps me complete writing tasks more quickly than if i did them without assistance.	☐	☐	☐	☐	☒

Attitudes Towards Use (ATU) *

	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
I have a positive attitude towards using Chatgpt for learning English writing.	☐	☐	☐	☒	☐
I feel confident using ChatGPT to improve my English writing skills.	☐	☐	☐	☒	☐
I am motivated to use ChatGPT regularly for learning.	☐	☐	☐	☒	☐
I am satisfied with the assistance Chatgpt provides for English Writing.	☐	☐	☐	☒	☐

Behavioral Intention (BI) *

	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
I intend to continue using ChatGPT for learning English writing in the future.	☐	☐	☐	☒	☐
ChatGPT is a beneficial tool for receiving immediate feedback on writing.	☐	☐	☐	☐	☒
I would recommend ChatGPT to others who want to improve their English writing skills.	☐	☐	☐	☐	☒
I plan to explore more features of ChatGPT to aid my learning.	☐	☐	☐	☐	☒

Section 3: ChatGPT's Role in Learning English Writing Skills**1. In what ways has ChatGPT been beneficial in assisting your English writing skills? ***

In today's digital age, language learning has been revolutionized by technology. One such tool that has greatly assisted me in improving my English writing skills is ChatGPT. But it has also some negative impact on the thinking ability of younger generations as they are no longer able to think or suggest anything on their own rather they depend on AI tools such as ChatGPT that hinders student's development of essential skills such as research, critical analysis, and independent thought.

2. Are there specific features or aspects of ChatGPT that you find particularly helpful for * learning English writing? Mention them.

One of the most valuable features of ChatGPT is its ability to provide grammar and spelling suggestions. It acts as a proofreader, helping me identify and correct errors in my writing. ChatGPT has been instrumental in suggesting alternative ways to express my ideas and also suggest different vocabulary words therefore expanding my vocabulary is very important for effective writing. It also offers synonyms and word choices that have enriched my writing. By incorporating these suggestions, I have been able to make my work more engaging and captivating for my readers.

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Questionnaire on Learners' Perceptions of ChatGPT in English Language Learning Classrooms

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The respondent's email (mishailkhan533@gmail.com) was recorded on submission of this form.

Section 1: Demographic Information

1. Age *

- ☐ a) Under 18
- ☐ b) 18-24
- ☒ c) 25-34
- ☐ d) 35 to onward

2. Gender *

- ☐ a) Male
- ☒ b) Female
- ☐ c) Prefer not to say
- ☐ d) Other

3. Previous experience with AI-based learning tools *

- ☐ a) None
- ☒ b) Limited
- ☐ c) Moderate
- ☐ d) Extensive

Section 2: Perceptions on ChatGPT Using TAM Constructs

Please read each statement and indicate your level of agreement with the following statements using a scale from 1 (Strongly Disagree) to 5 (Strongly Agree). Please read the statements carefully but don't spend a lot of time on each statement, your 1st impression is fine.

Perceived Ease of Use (PEOU) *

	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
I find ChatGPT easy to interact with when learning English writing skills.	☐	☐	☐	☐	☒
Learning to operate ChatGPT for writing assistance was easy for me.	☐	☐	☐	☐	☒
My interaction with ChatGPT during writing exercises is clear and understandable.	☐	☐	☐	☐	☒
I find ChatGPT to be flexible in terms of use when writing in English.	☐	☐	☐	☐	☒

Perceived Usefulness (PU) *

	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
I find ChatGPT useful in my English writing development.	☐	☐	☐	☐	☒
Using ChatGPT improves my efficiency in writing in English.	☐	☐	☐	☐	☒
ChatGPT enhances the quality of my English writing.	☐	☐	☐	☐	☒
ChatGPT helps me complete writing tasks more quickly than if I did them without assistance.	☐	☐	☐	☐	☒

Attitudes Towards Use (ATU) *

	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
I have a positive attitude towards using Chatgpt for learning English writing.	☐	☐	☐	☐	☒
I feel confident using ChatGPT to improve my English writing skills.	☐	☐	☐	☐	☒
I am motivated to use ChatGPT regularly for learning.	☐	☐	☐	☐	☒
I am satisfied with the assistance Chatgpt provides for English Writing.	☐	☐	☐	☐	☒

Behavioral Intention (BI) *

	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
I intend to continue using ChatGPT for learning English writing in the future.	☐	☐	☐	☐	☒
ChatGPT is a beneficial tool for receiving immediate feedback on writing.	☐	☐	☐	☐	☒
I would recommend ChatGPT to others who want to improve their English writing skills.	☐	☐	☐	☐	☒
I plan to explore more features of ChatGPT to aid my learning.	☐	☐	☐	☐	☒

Section 3: ChatGPT's Role in Learning English Writing Skills

1. In what ways has ChatGPT been beneficial in assisting your English writing skills? *

It has been very beneficial, It has helped me alot. It has improved my english, I've been able to explore new words sentences etc

2. Are there specific features or aspects of ChatGPT that you find particularly helpful for learning English writing? Mention them. *

Alla features are good

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Questionnaire on Learners' Perceptions of ChatGPT in English Language Learning Classrooms

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The respondent's email (ayeshadawood980@gmail.com) was recorded on submission of this form.

Section 1: Demographic Information

1. Age *

- ☐ a) Under 18
- ☒ b) 18-24
- ☐ c) 25-34
- ☐ d) 35 to onward

2. Gender *

- ☐ a) Male
- ☒ b) Female
- ☐ c) Prefer not to say
- ☐ d) Other

3. Previous experience with AI-based learning tools *

- ☐ a) None
- ☒ b) Limited
- ☐ c) Moderate
- ☐ d) Extensive

Section 2: Perceptions on ChatGPT Using TAM Constructs

Please read each statement and indicate your level of agreement with the following statements using a scale from 1 (Strongly Disagree) to 5 (Strongly Agree). Please read the statements carefully but don't spend a lot of time on each statement, your 1st impression is fine.

Perceived Ease of Use (PEOU) *

	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
I find ChatGPT easy to interact with when learning English writing skills.	☐	☐	☐	☐	☒
Learning to operate ChatGPT for writing assistance was easy for me.	☐	☐	☐	☐	☒
My interaction with ChatGPT during writing exercises is clear and understandable.	☐	☐	☐	☒	☐
I find ChatGPT to be flexible in terms of use when writing in English.	☐	☒	☐	☐	☐

Perceived Usefulness (PU) *

	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
I find ChatGPT useful in my English writing development.	☐	☐	☐	☐	☒
Using ChatGPT improves my efficiency in writing in English.	☐	☐	☐	☒	☐
ChatGPT enhances the quality of my English writing.	☐	☐	☐	☒	☐
ChatGPT helps me complete writing tasks more quickly than if I did them without assistance.	☐	☐	☐	☐	☒

Attitudes Towards Use (ATU) *

	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
I have a positive attitude towards using ChatGPT for learning English writing.	☐	☐	☐	☒	☐
I feel confident using ChatGPT to improve my English writing skills.	☐	☐	☐	☐	☒
I am motivated to use ChatGPT regularly for learning.	☐	☐	☐	☒	☐
I am satisfied with the assistance ChatGPT provides for English Writing.	☐	☐	☐	☒	☐

Behavioral Intention (BI) *

	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
I intend to continue using ChatGPT for learning English writing in the future.	☐	☐	☐	☐	☒
ChatGPT is a beneficial tool for receiving immediate feedback on writing.	☐	☐	☐	☐	☒
I would recommend ChatGPT to others who want to improve their English writing skills.	☐	☐	☒	☐	☐
I plan to explore more features of ChatGPT to aid my learning.	☐	☐	☐	☒	☐

Section 3: ChatGPT's Role in Learning English Writing Skills

1. In what ways has ChatGPT been beneficial in assisting your English writing skills? *

ChatGPT give feedback on our writing and also give contextual examples.

2. Are there specific features or aspects of ChatGPT that you find particularly helpful for learning English writing? Mention them. *

Yes,there are some features of ChatGPT that are helpful e.g grammer correction,sentence structure suggestions and also it provided synonyms to expand vocabulary.

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The respondent's email (jamilfasiha105@gmail.com) was recorded on submission of this form.

Section 1: Demographic Information

1. Age *

- ☐ a) Under 18
- ☒ b) 18-24
- ☐ c) 25-34
- ☐ d) 35 to onward

2. Gender *

- ☐ a) Male
- ☒ b) Female
- ☐ c) Prefer not to say
- ☐ d) Other

3. Previous experience with AI-based learning tools *

- ☐ a) None
- ☐ b) Limited
- ☒ c) Moderate
- ☐ d) Extensive

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Please read each statement and indicate your level of agreement with the following statements using a scale from 1 (Strongly Disagree) to 5 (Strongly Agree). Please read the statements carefully but don't spend a lot of time on each statement, your 1st impression is fine.

Perceived Ease of Use (PEOU) *

	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
I find ChatGPT easy to interact with when learning English writing skills.	☐	☐	☐	☒	☐
Learning to operate ChatGPT for writing assistance was easy for me.	☐	☐	☐	☐	☒
My interaction with ChatGPT during writing exercises is clear and understandable.	☐	☐	☐	☒	☐
I find ChatGPT to be flexible in terms of use when writing in English.	☐	☐	☐	☐	☒

Perceived Usefulness (PU) *

	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
I find ChatGPT useful in my English writing development.	☐	☐	☒	☐	☐
Using ChatGPT improves my efficiency in writing in English.	☐	☐	☐	☐	☒
ChatGPT enhances the quality of my English writing.	☐	☐	☐	☒	☐
ChatGPT helps me complete writing tasks more quickly than if i did them without assistance.	☐	☐	☐	☐	☒

Attitudes Towards Use (ATU) *

	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
I have a positive attitude towards using Chatgpt for learning English writing.	☐	☐	☐	☐	☒
I feel confident using ChatGPT to improve my English writing skills.	☐	☐	☐	☒	☐
I am motivated to use ChatGPT regularly for learning.	☐	☐	☐	☐	☒
I am satisfied with the assistance Chatgpt provides for English Writing.	☐	☐	☐	☐	☒

Behavioral Intention (BI) *

	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
I intend to continue using ChatGPT for learning English writing in the future.	☐	☐	☐	☒	☐
ChatGPT is a beneficial tool for receiving immediate feedback on writing.	☐	☐	☐	☐	☒
I would recommend ChatGPT to others who want to improve their English writing skills.	☐	☐	☐	☐	☒
I plan to explore more features of ChatGPT to aid my learning.	☐	☐	☐	☒	☐

Section 3: ChatGPT's Role in Learning English Writing Skills**1. In what ways has ChatGPT been beneficial in assisting your English writing skills? ***

ChatGPT has been beneficial in assisting my English writing skills by providing instant feedback and corrections, suggesting alternative phrasing or word choices, and offering explanations for grammar. It has also exposed me to a wide range of writing styles and vocabulary, helping me improve my language proficiency over time.

2. Are there specific features or aspects of ChatGPT that you find particularly helpful for learning English writing? Mention them. *

Here are some features of ChatGPT that can be particularly helpful for learning English writing:

1. Vocabulary Expansion: through context based responses, ChatGPT introduced users to new vocabulary words and phrases
2. Feedback and Suggestion: ChatGPT can offer feedback and suggestions on writing samples, helping users identify strengths and areas for improvement in their English writing skills.
3. Writing Prompts and Practice : Users can request writing prompts from ChatGPT providing opportunities for structured practice and improvement in various writing genres and formats.

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This questionnaire is divided into three sections, ,one for the student's demographic information, second section for their perceptions regarding each component of the research model and 3rd section is for open-ended questions to gain their insights on ChatGPT's Role in Learning English Writing Skills. All of the questions in the second section of the questionnaire will be adapted from the technology acceptance model (TAM). Four of the main constructs from the TAM are measured in the study: Perceived ease of use (PEOU), perceived usefulness (PU), attitudes towards use (ATU), and behavioral intention (BI).

The respondent's email (mahnooryaseen567@gmail.com) was recorded on submission of this form.

Section 1: Demographic Information

1. Age *

- ☐ a) Under 18
- ☒ b) 18-24
- ☐ c) 25-34
- ☐ d) 35 to onward

2. Gender *

- ☐ a) Male
- ☒ b) Female
- ☐ c) Prefer not to say
- ☐ d) Other

3. Previous experience with AI-based learning tools *

- ☐ a) None
- ☐ b) Limited
- ☒ c) Moderate
- ☐ d) Extensive

Section 2: Perceptions on ChatGPT Using TAM Constructs

Please read each statement and indicate your level of agreement with the following statements using a scale from 1 (Strongly Disagree) to 5 (Strongly Agree). Please read the statements carefully but don't spend a lot of time on each statement, your 1st impression is fine.

Perceived Ease of Use (PEOU) *

	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
I find ChatGPT easy to interact with when learning English writing skills.	☐	☐	☐	☐	☒
Learning to operate ChatGPT for writing assistance was easy for me.	☐	☐	☐	☒	☐
My interaction with ChatGPT during writing exercises is clear and understandable.	☐	☐	☐	☐	☒
I find ChatGPT to be flexible in terms of use when writing in English.	☐	☐	☐	☐	☒

Perceived Usefulness (PU) *

	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
I find ChatGPT useful in my English writing development.	☐	☐	☐	☒	☐
Using ChatGPT improves my efficiency in writing in English.	☐	☐	☐	☒	☐
ChatGPT enhances the quality of my English writing.	☐	☐	☐	☐	☒
ChatGPT helps me complete writing tasks more quickly than if I did them without assistance.	☐	☐	☐	☐	☒

Attitudes Towards Use (ATU) *

	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
I have a positive attitude towards using ChatGPT for learning English writing.	☐	☐	☐	☒	☐
I feel confident using ChatGPT to improve my English writing skills.	☐	☐	☐	☐	☒
I am motivated to use ChatGPT regularly for learning.	☐	☐	☐	☐	☒
I am satisfied with the assistance ChatGPT provides for English Writing.	☐	☐	☐	☐	☒

Behavioral Intention (BI) *

	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
I intend to continue using ChatGPT for learning English writing in the future.	☐	☐	☐	☒	☐
ChatGPT is a beneficial tool for receiving immediate feedback on writing.	☐	☐	☐	☐	☒
I would recommend ChatGPT to others who want to improve their English writing skills.	☐	☐	☐	☒	☐
I plan to explore more features of ChatGPT to aid my learning.	☐	☐	☐	☒	☐

Section 3: ChatGPT's Role in Learning English Writing Skills**1. In what ways has ChatGPT been beneficial in assisting your English writing skills? ***

ChatGPT has been super helpful in improving my English writing skills. It helps me with grammar, vocabulary, and sentence structure. It's like having a virtual writing buddy!

2. Are there specific features or aspects of ChatGPT that you find particularly helpful for * learning English writing? Mention them.

There are a few features of ChatGPT that I find especially helpful for learning English writing:

1. Grammar and Sentence Correction: ChatGPT can help me identify and correct grammar mistakes in my writing. It suggests alternative sentence structures and helps me improve my overall sentence fluency.
2. Vocabulary Expansion: ChatGPT introduces me to new words and phrases, helping me expand my vocabulary. It suggests synonyms and provides context for using them correctly.
3. Writing Style Guidance: ChatGPT offers suggestions on how to improve the overall style and tone of my writing. It helps me find the right balance between formal and informal language.
4. Prompt Expansion: If I'm stuck with a writing prompt, ChatGPT can generate ideas and provide different perspectives to help me brainstorm and develop my thoughts.

Overall, ChatGPT is like a language coach that supports me in various aspects of English writing. It's been a game-changer for me!

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The respondent's email (raojahan925@gmail.com) was recorded on submission of this form.

Section 1: Demographic Information

1. Age *

- ☐ a) Under 18
- ☒ b) 18-24
- ☐ c) 25-34
- ☐ d) 35 to onward

2. Gender *

- ☒ a) Male
- ☐ b) Female
- ☐ c) Prefer not to say
- ☐ d) Other

3. Previous experience with AI-based learning tools *

- ☐ a) None
- ☐ b) Limited
- ☒ c) Moderate
- ☐ d) Extensive

Section 2: Perceptions on ChatGPT Using TAM Constructs

Please read each statement and indicate your level of agreement with the following statements using a scale from 1 (Strongly Disagree) to 5 (Strongly Agree). Please read the statements carefully but don't spend a lot of time on each statement, your 1st impression is fine.

Perceived Ease of Use (PEOU) *

	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
I find ChatGPT easy to interact with when learning English writing skills.	☐	☐	☐	☒	☐
Learning to operate ChatGPT for writing assistance was easy for me.	☐	☐	☐	☐	☒
My interaction with ChatGPT during writing exercises is clear and understandable.	☐	☐	☐	☒	☐
I find ChatGPT to be flexible in terms of use when writing in English.	☐	☐	☐	☒	☐

Perceived Usefulness (PU) *

	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
I find ChatGPT useful in my English writing development.	☐	☐	☐	☐	☒
Using ChatGPT improves my efficiency in writing in English.	☐	☐	☐	☐	☒
ChatGPT enhances the quality of my English writing.	☐	☐	☐	☒	☐
ChatGPT helps me complete writing tasks more quickly than if i did them without assistance.	☐	☐	☐	☐	☒

Attitudes Towards Use (ATU) *

	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
I have a positive attitude towards using Chatgpt for learning English writing.	☐	☐	☐	☒	☐
I feel confident using ChatGPT to improve my English writing skills.	☐	☐	☐	☒	☐
I am motivated to use ChatGPT regularly for learning.	☐	☐	☐	☒	☐
I am satisfied with the assistance Chatgpt provides for English Writing.	☐	☐	☐	☒	☐

Behavioral Intention (BI) *

	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
I intend to continue using ChatGPT for learning English writing in the future.	☐	☐	☐	☐	☒
ChatGPT is a beneficial tool for receiving immediate feedback on writing.	☐	☐	☐	☐	☒
I would recommend ChatGPT to others who want to improve their English writing skills.	☐	☐	☐	☐	☒
I plan to explore more features of ChatGPT to aid my learning.	☐	☐	☐	☐	☒

Section 3: ChatGPT's Role in Learning English Writing Skills

1. In what ways has ChatGPT been beneficial in assisting your English writing skills? *

It provides personalised feedback and assistance in writing english tasks.

2. Are there specific features or aspects of ChatGPT that you find particularly helpful for * learning English writing? Mention them.

Yes, it is easy to use and provides personalised feedback and free of cost

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The respondent's email (raotayyeb@gmail.com) was recorded on submission of this form.

Section 1: Demographic Information

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Section 2: Perceptions on ChatGPT Using TAM Constructs

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Perceived Ease of Use (PEOU) *

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Learning to operate ChatGPT for writing assistance was easy for me.	☐	☐	☐	☒	☐
My interaction with ChatGPT during writing exercises is clear and understandable.	☐	☐	☐	☐	☒
I find ChatGPT to be flexible in terms of use when writing in English.	☐	☐	☐	☐	☒

Perceived Usefulness (PU) *

	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
I find ChatGPT useful in my English writing development.	☐	☐	☐	☒	☐
Using ChatGPT improves my efficiency in writing in English.	☐	☐	☐	☐	☒
ChatGPT enhances the quality of my English writing.	☐	☐	☐	☐	☒
ChatGPT helps me complete writing tasks more quickly than if i did them without assistance.	☐	☐	☐	☐	☒

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I feel confident using ChatGPT to improve my English writing skills.	☐	☐	☐	☒	☐
I am motivated to use ChatGPT regularly for learning.	☐	☐	☐	☐	☒
I am satisfied with the assistance Chatgpt provides for English Writing.	☐	☐	☐	☒	☐

Behavioral Intention (BI) *

	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
I intend to continue using ChatGPT for learning English writing in the future.	☐	☐	☐	☐	☒
ChatGPT is a beneficial tool for receiving immediate feedback on writing.	☐	☐	☐	☒	☐
I would recommend ChatGPT to others who want to improve their English writing skills.	☐	☐	☐	☒	☐
I plan to explore more features of ChatGPT to aid my learning.	☐	☐	☐	☐	☒

Section 3: ChatGPT's Role in Learning English Writing Skills

1. In what ways has ChatGPT been beneficial in assisting your English writing skills? *

It saves time. And provide the required answers within a second. It provides personalised feedback which helps to improve english writing skills.

2. Are there specific features or aspects of ChatGPT that you find particularly helpful for * learning English writing? Mention them.

Yes, it provides personalised feedback and assistance to users. It is easy to use and free of cost.

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APPENDIX H

LESSON PLAN FOR DAY 1

Class Duration: 60 minutes

Group: Experimental (using ChatGPT)

Objectives:

- Students will be introduced to ChatGPT, including its capabilities, limitations, and ethical concerns in writing assistance.
- Students will observe how ChatGPT generates text, answers questions, and provides feedback.
- Students will reflect on the potential uses of ChatGPT for academic writing and critical thinking.

Class Segments:

1. Introduction (10 minutes)

Objective: Instructor introduces the day's topic and objectives.

1. Overview:

- The instructor introduces the concept of AI in education and specifically the use of ChatGPT as a tool for writing, brainstorming, and learning.
- Briefly discuss how ChatGPT can assist in different writing tasks (brainstorming ideas, structuring paragraphs, grammar checking, etc.).

2. Introduction to ChatGPT:

Define ChatGPT, explaining that it's an AI model developed by OpenAI designed to generate human-like text based on prompts.

Outline three key capabilities of ChatGPT:

- Text generation (how it creates sentences, paragraphs).
- Question answering (its ability to respond accurately to factual inquiries).
- Feedback provision (how it can provide suggestions for grammar, vocabulary, and structure).

Discuss limitations:

- ChatGPT lacks understanding and may generate incorrect or nonsensical information.
- Cannot provide critical or context-sensitive analysis beyond its trained data.

Discuss ethical concerns:

- Over-reliance on AI for writing, originality issues (plagiarism concerns).
- How to use ChatGPT responsibly for learning and self-improvement.

2. Main Activity (30 minutes)

Objective: Students engage in writing tasks, with different approaches for experimental and control groups.

Writing Task:

Prompt: “Write a short paragraph about the benefits and challenges of using technology in education.”

Students Use ChatGPT to generate ideas and suggestions on structuring the paragraph. Students Ask ChatGPT for vocabulary help or feedback on sentence structure.

Reflection and Analysis:

Experimental Group students Reflect on ChatGPT’s responses and feedback.

3. Feedback and Discussion (10 minutes)

Objective: Facilitate discussion and gather feedback on the activity.

1. Focus on questions like:

Did ChatGPT help generate new ideas or perspectives?

Were there any challenges using ChatGPT?

2. Ethical Reflection:

- Discuss whether students felt ChatGPT influenced their writing style or decision-making.

- Introduce the idea of academic integrity and the responsible use of AI tools in education.

4. Closing (10 minutes)

Objective: Summarize the lesson and assign follow-up tasks or homework.

1. Key Points Recap:

- Summarize the capabilities (text generation, answering questions and feedback).
- Reiterate the limitations and ethical concerns discussed earlier.
- Emphasize the balance between using AI tools for support and maintaining

original critical thinking in writing.

2. Q&A and Clarification:

- Address any remaining questions or concerns regarding ChatGPT's role in writing assistance

3. Homework Assignment: Write a reflection on how ChatGPT influenced your writing process today. How would you use it responsibly in future assignments?

Lesson Plan for Control Group (Day 1)

Class Duration: 60 minutes

Objectives:

- Introduce students to the basics of sentence structure, punctuation, and key grammar rules.
- Engage students in a writing activity to apply these fundamentals.
- Provide feedback on students' understanding of writing mechanics.

Class Segments:

1. Introduction (10 minutes)

Objective: Introduce the topic and objectives for the day.

1. Introduction to Writing Fundamentals:

The instructor explains the importance of understanding sentence structure, punctuation, and grammar for effective writing. Students will understand how to construct clear, grammatically correct sentences.

Key points to cover:

- Sentence Structure: Simple sentences (subject + verb + object) and compound sentences (using conjunctions).
- Punctuation: Importance of periods, commas, and question marks.
- Grammar Rules: Basic subject-verb agreement, capitalization, and tense consistency.

2. Main Activity (30 minutes)

Objective: Students engage in a writing activity, applying the writing fundamentals introduced.

Writing Task

Prompt: Write 3-5 sentences about a favorite hobby or activity. Focus on using correct sentence structure, punctuation, and grammar.

Students write their sentences and check them using traditional methods (grammar handouts, dictionaries) to write and self-check their sentences. They focus on applying the rules discussed during the introduction.

3. Feedback and Discussion (10 minutes)

Objective: Facilitate feedback and discussion on the writing tasks.

Select a few students to read aloud one of their sentences or share a common mistake they corrected. Discuss what changes were made to improve the sentences.

Discuss common mistakes that came up (e.g., punctuation misuse, run-on sentences, subject-verb agreement issues). Explore how students can improve their writing by paying closer attention to sentence structure and grammar.

4. Closing (10 minutes)

Objective: Summarize the key points, address questions, and assign follow-up tasks or homework.

Recap the basics of sentence structure (subject-verb-object), punctuation rules (using periods, commas, etc.), and basic grammar (subject-verb agreement, capitalization).

Emphasize how these rules form the foundation of clear and effective writing.

Q&A:

- Allow students to ask any final questions about sentence structure, punctuation, or grammar.

Homework Assignment:

- Assign a short writing task for students to complete at home:

Task: Write a short paragraph (4-5 sentences) about an event or activity, using correct sentence structure, punctuation, and grammar.