POTENTIALS WITHIN ChatGPT TO ENHANCE ESP WRITING SKILLS (AUTONOMOUS LANGUAGE LEARNING): THE CASE OF EFL SAUDI LEARNERS

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Abstract

The term "artificial intelligence" (AI) has lost much of its mystique. In November 2022, ChatGPT, a language open-source AI platform, became incredibly popular in the field of education. AI technology has become a turning point in advancing language education for teachers, learners, and language experts. However, the integration of AI and automation in second language acquisition and curriculum design has not yet received much attention in Saudi Arabia's educational institutions. Finding out what might be the advantages and disadvantages of AI in higher education in Saudi Arabia, particularly in English language skills acquisition and curriculum design. The

study focuses on using intelligent digital technologies like Generative Artificial Intelligence (GAI) and its large language models (LLMs) that have produced revolutionary products such as ChatGPT and other chatbots. These technologies have significant implications for language students, teachers, and educational institutions. The study explores using ChatGPT as a natural language open-source AI platform to develop curriculum design and assessment strategies for Saudi universities. The aim is to make them more challenging for generative AI while educating students.

Keywords: ChatGPT, Autonomous Language Learning, EFL, Saudi Arabia, Curriculum Design, Generative Artificial Intelligence, ESP Writing Skills, Language Education.

INTRODUCTION

The advent of artificial intelligence (AI) has caused a paradigm change in many fields, including education. In November 2022, language specialists, educators, and students all across the globe were captivated by the publication of ChatGPT, an open-source language model. This groundbreaking development propelled artificial intelligence (AI) from its theoretical realm to a practical use in education. There has been a lot of talk about how AI may revolutionize many fields, including language learning and curriculum development (Li, 2020; Yin et al., 2021).

The lack of comprehensive research on the implications and uses of these technologies by Saudi Arabian educational institutions has left a noticeable vacuum in the literature. A lot of people all around the globe are interested in the concept of using AI and automation to help people learn a second language. Various applications of artificial intelligence (AI) in the field of education have been investigated, ranging from intelligent tutoring systems to personalized learning environments (Voigt et al., 2020; Wang et al., 2021). The topic of artificial intelligence (AI) is still in its infancy in Saudi Arabia's educational system, especially when it comes to English as a foreign language (EFL) teaching (Alajmi et al., 2019; Althobaiti et al., 2021). This research aims to fill that void by investigating the potential benefits and challenges of integrating ChatGPT into Saudi Arabia's higher education system.

A commitment to educational innovation and excellence is reflected in Saudi Arabia's Vision 2030 strategy (Al-Esmail et al., 2022). This commitment has not translated into a comprehensive study of AI's potential applications in language classrooms and course development. This project is located at the intersection of technological innovation and educational development. It seeks to explore how university professors in Saudi Arabia may intentionally use generative AI capabilities to build demanding curricula and assessments. At a crossroads, the Saudi Arabian educational system must embrace AI technologies and put them to work for the benefit of students and educators alike.

In the short term, the study's implications extend beyond Saudi Arabia; it expands our understanding of AI's role in language acquisition globally. There is a lot of study on the overall impact of AI on education, but very little on the application of ChatGPT and other huge language models in EFL teaching. To address this information gap, this paper investigates the intricate dynamics of artificial intelligence integration in Saudi Arabia's university system. By studying how teachers can make the most of ChatGPT, this project hopes to provide data that may improve educational policy and practice in Saudi Arabia and serve as a model for schools throughout the world.

A new paradigm has emerged because of the rise of artificial intelligence, and the educational system is no exception (AI). In November 2022, language specialists, educators, and students across the globe were captivated by the publication of ChatGPT, an open-source language model. This groundbreaking development propelled artificial intelligence (AI) from its theoretical realm to a practical use in education. There has been a lot of talk about how AI may revolutionize many fields, including language learning and curriculum development (Li, 2020; Yin et al., 2021). The lack of comprehensive research on the implications and uses of these technologies by Saudi Arabian educational institutions has left a noticeable vacuum in the literature.

Saudi Arabia Context

A lot of people all around the globe are interested in the concept of using AI and automation to help people learn a second language. Various applications of artificial intelligence (AI) in the field of education have been investigated, ranging from intelligent tutoring systems to personalized learning environments (Voigt et al., 2020; Wang et al., 2021). The topic of artificial intelligence (AI) is still in its infancy in Saudi Arabia's educational system, especially when it comes to English as a foreign language (EFL) teaching (Alajmi et al., 2019; Althobaiti et al., 2021). This research aims to fill that void by investigating the potential benefits and challenges of integrating ChatGPT into Saudi Arabia's higher education system.

Research Objectives:

1. To explore the potential benefits of integrating ChatGPT into ESP education in Saudi Arabia.

2. To identify and analyze the challenges associated with the implementation of ChatGPT in the higher education landscape.

3. To propose effective strategies for curriculum design and assessment that leverage the capabilities of ChatGPT to enhance ESP writing skills.

4. To investigate the impact of ChatGPT integration on student engagement, autonomy, and overall learning outcomes in ESP courses.

Research Questions:

1. What are the perceived benefits of incorporating ChatGPT into ESP education in Saudi Arabian higher education institutions?

2. What challenges arise in implementing ChatGPT in ESP courses, and how can these challenges be mitigated?

3. How can curriculum design and assessment strategies be adapted to effectively integrate ChatGPT into ESP courses, ensuring a symbiotic relationship between generative AI and pedagogical goals?

4. How does ChatGPT integration impact student engagement, autonomy, and performance in ESP writing skills development?

The main objective is to discover how Saudi university instructors may strategically create exams and courses that push pupils and make use of generative AI. The educational landscape in Saudi Arabia is reaching a turning point as AI technologies advance. It's critical to accept these developments and use them to the advantage of educators and students. The study's ramifications go beyond Saudi Arabia in the near term, adding to our knowledge of artificial intelligence's involvement in language learning worldwide.

LITERATURE REVIEW

Introduction to AI in Education

The use of artificial intelligence (AI) techniques and technology in the field of education is known as AI in education (Ajigini, 2022). These tools and technologies improve student instruction, maximize instructional strategies, and enrich the learning process. Artificial Intelligence has the potential to transform both student and teacher education. AI technologies have the potential to improve education by making it more effective, efficient, and customized to each student's needs (Lee, 2019).

AI in education is revolutionizing the conventional educational system in a big way. The use of artificial intelligence (AI) in the classroom has the ability to revolutionize instruction by making it more efficient, effective, and tailored to each individual learner. Through increased efficiency, effectiveness, and personalization, artificial intelligence (AI) in education has the potential to completely transform how teachers and students learn. It can provide students with individualized learning experiences by assessing their areas of strength and weakness, customizing the curriculum to meet their needs, and giving them immediate feedback.

Artificial Intelligence (AI) in education makes it possible to automate time-consuming administrative processes like scheduling and grading, freeing up teachers to concentrate on teaching (Elbawab& Henriques, 2023). With the use of this technology, instructors may create curriculum and content and have access to a multitude of tools and materials. Additionally, intelligent tutoring systems—where students receive individualized assistance and support in their learning process—can be made possible by AI in education. In general, artificial intelligence (AI) in education seeks to enhance the educational experience for students by utilizing technology to produce individualized and effective learning environments (Lee, 2019).

However, there is still uncertainty about the full impact and potential of AI in education, both for teachers and the process of teaching and learning in higher education. AI in education has the ability to help build curriculum, automate administrative work, give students tailored learning experiences, and enable intelligent tutoring systems (Elbawab& Henriques, 2023).

These developments in AI have the potential to completely transform education by increasing productivity, customizing the educational process, and giving students immediate feedback. Additionally, AI in education can analyze large amounts of data to identify trends and patterns, allowing educators to make data-driven decisions and interventions to support student success. Furthermore, AI technologies can support students with special needs by providing adaptive

and inclusive learning environments (Ali, 2020). Overall, the role of AI in education is to enhance the learning process by providing personalized experiences, automating administrative tasks, assisting in curriculum development, and facilitating data-driven decision-making for educators.

In summary, the role of AI in education is to enhance efficiency, effectiveness, and personalization in teaching and learning (Elbawab& Henriques, 2023). AI in education aims to leverage technology to provide personalized and efficient learning experiences, automate administrative tasks, assist in curriculum development, facilitate intelligent tutoring systems, and support data-driven decision-making for educators (Lee, 2019).

Artificial Intelligence (AI) in education seeks to use technology to offer individualized and compelling learning experiences, automate administrative duties, help with curriculum development, enable intelligent tutoring systems, and enhance educators' data-driven decision-making. AI in education aims to improve the learning experience for students through personalized and efficient educational experiences, automating administrative tasks, assisting in curriculum development, and facilitating intelligence.

Understanding the Basics of Artificial Intelligence

Artificial Intelligence (AI) is the ability of computers or other devices to carry out tasks that normally require human intelligence. Personalized learning experiences, administrative work automation, curriculum creation support, intelligent tutoring systems, and data-driven decision-making for educators are just a few ways artificial intelligence (AI) improves teaching and learning processes.

Artificial Intelligence (AI) in education seeks to use technology to offer individualized and effective learning experiences, automate administrative duties, help with curriculum development, enable intelligent tutoring systems, and enhance educators' data-driven decision-making. With the help of artificial intelligence (AI), educators may use student data and behavior to spot trends and adjust lessons to give each student a more unique and exciting learning experience.

AI can also automate administrative duties like monitoring student records and assignment grading, freeing up teachers' time to concentrate more on teaching. AI can also help with curriculum building by evaluating vast volumes of educational data and pointing out any weaknesses or potential areas for development. Artificial intelligence (AI) in education aims to improve student learning, offer tailored experiences, automate chores, and assist teachers in making data-driven decisions. Artificial Intelligence (AI) in education seeks to use technology to deliver efficient and individualized learning experiences, automate administrative processes, support curriculum creation, and enable intelligent tutoring systems (Zheng & Badarch, 2022).

Influence of AI on Contemporary Curriculum

Using AI in the classroom is revolutionizing the way students learn, bringing both new possibilities and new challenges. The impact of AI on individualization, classrooms, special education, and educational innovation is explored in this analysis.

Machine Learning and Tailored Education

An ongoing goal has been to tailor educational experiences to each student's unique interests and requirements. AI-driven adaptive learning systems evaluate each student's unique set of skills, areas of weakness, and pace of learning in order to personalize lessons, materials, and assessments. According to research by Hwang et al. (2020), students' engagement and performance in the classroom were both enhanced by AI-personalised learning systems. Privacy concerns and limited access to technology are ongoing issues (Attali, 2020).

Teaching with AI

Instructors and students alike might benefit from AI-powered feedback systems and tutors that provide immediate, personalized assistance. AI can give pupils individualized feedback and support, as demonstrated by MyBot by Baker et al. (2010). On the other hand, relying too much on AI instructors can make it harder to think critically and engage socially (Means et al., 2017).

Implementing AI in the Field of Special Education

With the help of AI, students with special needs may soon have access to tailored therapies and adaptive devices. Read&Write by Texthelp and other speech-to-text solutions aid dyslexic students' writing (O'Brien et al., 2017). We must consider the ethics of AI algorithm biases and fair access to technology (Holmes et al., 2018).

Obstacles & Constraints

The potential of AI in education is not without its challenges. Algorithm bias could be a sustaining factor in educational inequity (Elish & Boyd, 2017). Excessive reliance on technology can hinder analytical reasoning and social communication (Means et al., 2017). Discuss the ethics of student autonomy and data privacy (Attali, 2020).

The Role of Artificial Intelligence in Postsecondary Learning

Regardless of these challenges, the future of AI in education is bright. Intelligent tutoring, adaptive assessments, and personalized learning might all benefit from educational technology incorporating natural language processing and machine learning. AI's development and ethical application are of utmost importance in fostering educational equity and human connection. Personalization of learning, adaptation to different needs, and enhanced instruction are all areas where AI can enhance education. However, ethical considerations, responsible development, and user-centered design are essential to fully realize AI's promise in the classroom.

AI and GAI for Language Acquisition: 1.6.1

The potential of AI to personalize learning, boost engagement, and enhance outcomes has been increasingly recognized in the field of language acquisition (Wang & Huang, 2023). Language acquisition might be radically altered by GAI—a subfield of AI that produces writing of a human standard—through the provision of personalized feedback, dynamic practice exercises, and authentic instructional resources (Hu & Niu, 2021). Adaptive learning systems and language tutors driven by GAI have been proven to improve proficiency, vocabulary, and grammar in several studies (Wu et al., 2022; Chen & Chang, 2023).

The use of GAI-powered language tutors outperformed more traditional methods in improving students' fluency and accuracy in oral communication (Lin et al., 2022). Similarly to Han et al (2021).

Generative Artificial Intelligence (GAI) has shown promise in language learning, which has fueled the rapid expansion of AI in educational settings. Exciting opportunities await EFL teachers and students thanks to GAI's language translation, human-quality text production, and relevant response generation capabilities.

Research has shown that GAI-powered language learning tools are quite promising. When compared to more conventional approaches, Lin et al. (2022) found that GAI-powered language instructors considerably improved students' accuracy and fluency in speaking. According to a study conducted by Han et al., an adaptive learning system that relies on GAI enhanced both reading comprehension and vocabulary (2021).

GAI's Benefits for French Language Acquisition:

Many aspects of EFL classrooms could improve from GAI:

A few examples of writing chores that GAI-powered apps may assist with include grammar checkers, word recommendations, and alternative phrasing. Individualized comments improve writing and learning (Bin-Hady, 2023).

Students may practice writing in a safe and supportive atmosphere with the aid of interactive GAI platforms. Their writing improves as a result of the encouragement to try out new forms and styles (Ali, 2023). It is possible that GAI's feedback and suggestions can help students improve their grammar and vocabulary use (AwadAlAfnan, 2023).

- GAI's suggestions, frameworks, and sentence patterns may assist authors in creating more logical and natural writing (AwadAlAfnan, 2023).

Section 2.1.3: Virtue

Ethical issues with assessment fairness, authenticity, and plagiarism in EFL learning are raised by GAI, despite its potential advantages. Researchers like Selwyn worry about the moral consequences of AI replacing human teachers (2020).

With careful planning and ethical usage of AI, we may overcome these challenges and make AI a tool that complements human connection rather than a replacement for it (Siemens & Baker, 2018).

Writing Training for Students of English as a Second Language: Students' capacity to communicate effectively in their chosen fields is improved by quality writing instruction for ESP. Writing activities, critical thinking abilities, and specialist grammar and vocabulary education are all necessary for this (Dudley-Evans & St John, 2013; Hyland, 2006).

Encouraging Efficient Writing for ESP Requirements:

Several methods for teaching English as a Second Language writing have been developed from research such as students who complete real-world writing assignments that are directly related

to their intended fields of study via the use of the Task-Based Learning methodology (Bygate, 2001).

- Integrated Skills Development: Promotes the simultaneous development of all four linguistic talents (Grabe & Stoller, 2002).

The growth of students is dependent on their obtaining detailed and timely feedback on their work (Ferris, 2006).

This method, which is referred to as "self-directed learning," promotes active learning by having students establish goals, evaluate their progress, and request assistance when needed (Benson, 2013).

Including Technology to Empower EFL Learners:

English as a Foreign Language (EFL) students benefit from the use of technology in their studies and communication (Levy, 2020). Warschauer (2010) and Lynch (2013) found that students have more agency in tech-enhanced classrooms when: chances for immersion in the target language and realistic learning resources are given. Creating individualised lesson plans and giving pupils enough opportunity for independent study. Students may work together more effectively and communicate more effectively via the use of online groups and platforms.

Concerns Regarding the Use of Technology Too Much

Although technology helps EFL students become more self-reliant, it also poses risks of reliance and hinders critical thinking (Selwyn, 2011). Integrating technology in a way that helps rather than hinders students requires careful design and implementation.

Use of GAI in Second Language Writing (2.4)

Among GAI's distinctive offerings for bolstering ESP writing instruction are:

A Comprehensive Review of ESP Writing Therapy and ChatGPT

The use of GAI in language learning has been encouraging, and there has been fast development of AI in the field of education. Both ESL teachers and their students stand to gain a lot from GAI models like ChatGPT. Such models are capable of producing instructionally sound results from complicated queries, translating languages, and generating writing of a human quality. This study review discusses the pros and downsides of using ChatGPT in ESP writing teaching, including learning results, learner autonomy, and ethics.

A Foundational Theory 2.1: This study places an emphasis on effective language learning by referencing theories of second language acquisition (SLA) that advocate for task-based learning, scaffolding, and personalized feedback. This article explores the ways in which technological advancements in the classroom foster students' growth as autonomous, intrinsically driven, and analytical thinkers (Levy, 2020; Warschauer, 2010).

The Development of GAI for Language Acquisition (2.2): Gai models like ChatGPT have changed the game when it comes to people's ability to interact and exchange information. Their data-handling and synthesis skills have made individualized language instruction and increased

student engagement a reality (Hu & Niu, 2021; Wu et al., 2022). Han et al. (2021) and Lin et al. (2021) found that reading comprehension, vocabulary, and fluency were all improved by GAI-powered language tutors and adaptive learning systems (2022).

ChatGPT provides an advantage to ESP writers: In this review, we will be looking into ChatGPT and its features with an eye on ESP writing instruction: Instantly find new words to add to your vocabulary, alternative methods of expressing concepts, and spelling and grammatical problems using ChatGPT. Writing is improved, learning is accelerated, and self-confidence is increased via this individualized feedback loop (Ferris, 2006; Bin-Hady, 2023). Students may enhance their writing skills via ChatGPT's interactive writing assignments and conversations (2.3.2). People may work on their writing fluency and confidence in a controlled setting where they can try out various forms and styles and get fast feedback (Ali, 2023; Hu & Niu, 2021). With ChatGPT's large vocabulary and grammatical correct phrases, students may improve their writing vocabulary and grammar abilities (2.3.3 Improved Vocabulary and Grammar Acquisition) (AwadAlAfnan, 2023; Chen & Chang, 2023).

Improvement of Coherence and Fluency in Writing: ChatGPT helps students organize their writing by offering suggestions for sentence structures, outlining their work, and inspiring thoughts. This assistance may help students write more smoothly and efficiently (AwadAlAfnan, 2023; Bygate, 2001).

AI development with ethics in mind: Ethical questions about plagiarism, authenticity, and grading fairness are raised by ChatGPT in ESP writing instruction, despite its apparent benefits. Researchers like Selwyn (2020) argue that in order for technology to complement human interaction rather than replace it, ethical AI development and deployment are of the utmost importance. Tackling ethical concerns and establishing relationship between instructors and their kids requires honesty, careful preparation, and good implementation.

Methods for Teaching ESP Writing of High Quality: Writing education in English as a Second Language (ESL) improves students' field-specific communication skills. This includes activities that test analytical and critical thinking abilities, subject-specific grammar and vocabulary, and real-world writing abilities (Dudley-Evans & St John, 2013; Hyland, 2006). Some good methods for teaching writing to ESL students are as follows:

Task-Based Learning: Students may improve their language abilities with real-world writing projects that are related to their future careers in this method of instruction (Bygate, 2001).

This method of skill development emphasizes the interrelated nature of language learning with the aim of simultaneously developing reading, writing, listening, and speaking (Grabe & Stoller, 2002).

Effective Criticism and Error Correction

Students learning English as a second language (ESL) should get detailed and timely feedback on their writing assignments. As Ferris pointed out, it is essential to provide feedback that is both detailed and simple to apply (2006). Teachers may foster students' growth in self-awareness and reflective thinking by providing detailed feedback on their work.

Independent Study:

Encouraging pupils to actively participate in their own learning may cultivate independence and intrinsic motivation. According to Benson, self-directed learners should plan ahead, monitor their progress, and seek assistance when they get stuck (2013). With ChatGPT, students may become more engaged in their education and cultivate skills that will benefit them for the rest of their lives.

Technology and the Independence of English as a Foreign Language Learners: With the use of technology, EFL students may increase their independence in several ways:

Thanks to technological advancements, ESP-specific online journals, podcasts, and papers are now within students' reach. This real-life language experience could improve their area competence, motivation to study, and vocabulary. Personalized learning routes may be created via adaptive learning systems powered by GAI that consider learners' strengths, areas for improvement, and objectives (2.6.3). Maximizing learning potential, this approach customizes education and assistance for every student.

Despite its many advantages, technology does have certain drawbacks, such as the risk of reliance and the stifling of critical thinking (2.7 Excessive Use of Technology). Selwyn (2011) argues that when we put too much faith in technology, it could lead to dependent learning instead of autonomous discovery. Therefore, it is essential to combine technology-supported learning with learner-centered activities that encourage critical thinking, problem-solving, and independent inquiry.

Pros and Cons of ChatGPT and ESP versus Writing:

Using ChatGPT for teaching English as a Second Language writing has several benefits:

Making Genuine Writing Exercises and Materials: ChatGPT has the ability to provide real-life scenarios-based writing prompts and ESP-related materials that inspire students to write about meaningful subjects (Alqohfa et al., 2023).

Tailored Feedback and Recommendations: ChatGPT is able to assess students' writing and provide tailored feedback on areas like as style, vocabulary, grammar, and ESP-related subjects (Bin-Hady, 2023). Group writing projects that promote critical thinking and peer learning may be initiated with ChatGPT (2.8.3). (Ali, 2023). With ChatGPT, students may quickly locate appropriate sources, arrange their findings in a logical way, and write their first drafts of reports and articles (2.8.4 Research and Writing Support) (AwadAlAfnan, 2023).

Adding ChatGPT is likewise not an easy task.

If students depend too much on ChatGPT to fix their mistakes, it might compromise their critical thinking and independence (2.8.5 AI Overreliance) (Benson, 2013).

While ChatGPT's results are usually correct, they aren't immune to biases or factual mistakes, thus it's important for instructors and students to verify their comprehension before using the tool (Chen & Chang, 2023).

Ethical Considerations: AI brings up questions of validity, evaluation equality, and creativity. The onus is on educators to encourage ethical AI usage and provide tests that are resistant to AI (Selwyn, 2020).

Educators must be aware of the benefits and drawbacks of ChatGPT integration in order to go to **Assistance and Training for Teachers**. Teachers need up-to-date training and continuous support to manage ethical issues, provide a welcoming classroom environment, and make successful use of ChatGPT (Siemens & Baker, 2018).

Lessening Challenge:

When issues arise with ChatGPT integration, there are many ways to fix them:

Promote Skills in Analysis and Evaluation (2.9.1): Tell your pupils to use caution and their best judgment while analyzing and evaluating ChatGPT data (Hu & Niu, 2021).

METHODOLOGY

A carefully designed mixed-methods research methodology was used in this large-scale study project to thoroughly examine ChatGPT's integration into English as a Foreign Language (EFL) instruction inside Saudi Arabia's complicated and changing higher education system. Using both quantitative and qualitative data gathering techniques, this study sought to explore the complex ways in which ChatGPT affects EFL writers' abilities. This methodological framework's incorporation of measures to guarantee the reliability and validity of the study's conclusions was crucial.

Participants

The study's participants were carefully chosen from a wide range of EFL students and instructors from different Saudi universities. A purposive sample technique was utilized to ensure variety in English proficiency levels, academic backgrounds, and experiences with AI technology, which enhanced the study's external validity.

Gathering of Data

One of the most important parts of gathering data was conducting surveys before and after ChatGPT was integrated. These questionnaires were designed to record how EFL students' views about ChatGPT integration have changed over time, how it has affected learning results, and how satisfied they were overall. Educators concurrently participated in surveys to clarify their experiences, difficulties, and complex viewpoints regarding incorporating ChatGPT into curriculum design and assessment procedures. A rigorously chosen group of students and instructors participated in in-depth interviews that gave the study an additional qualitative dimension. These in-depth interviews provided a comprehensive picture of the subjective factors related to ChatGPT integration by delving into the specifics of individual experiences. Additionally, careful administration of objective writing tests before and after ChatGPT integration allowed for quantitative analysis of the quantifiable gains in EFL writers' proficiency.

Using a mixed-methods approach, the study ensured the validity and reliability of the results while thoroughly examining ChatGPT's influence on ESP writing teaching through integrating quantitative and qualitative data-gathering techniques. Quantitative Information: Before and after tests Standardized writing tests were given both before and after ChatGPT was integrated into ESP lessons. The tests were created to evaluate grammar, vocabulary, fluency, and coherence. The evaluations employed defined scoring procedures and rubrics to guarantee the uniformity and dependability of the results. The pre-test set a baseline, and the improvements ascribed to ChatGPT's integration were measured by the post-test, enabling a statistical assessment of its efficacy.

Online questionnaires were used to collect quantitative data from ESP teachers and students. The surveys employed validated tools that exhibited good internal consistency and reliability, with Cronbach alpha ratings surpassing 0.70. The surveys investigated opinions regarding ChatGPT's advantages, difficulties, and general efficacy in improving ESP writing training. The data was statistically examined to find patterns and perspectives across various roles in the learning environment. Qualitative Data: Semi-structured Interviews: Students and teachers participated in individual and focus group interviews. Semi-structured methods were used to direct these interviews to extract comprehensive and nuanced information regarding their actual experiences using ChatGPT in the classroom. Participants were prompted by probing questions to explore the effects on learning engagement, autonomy, critical thinking, and particular writing process components.

Researchers watched how ESP students used ChatGPT in the classroom. The dynamics of the classroom setting, interactions between teachers and students, and student interactions using ChatGPT were all captured in in-depth field notes. Using well-established qualitative frameworks, these observations were examined to find best practices for instruction, possible cultural issues, and unforeseen consequences of integrating ChatGPT. Document Analysis: Student writing examples and ESP curricular materials were examined. This investigation evaluated potential changes in writing style, substance, and organization resulting from using ChatGPT and looked at how it was being incorporated into the learning environment. A methodology for document analysis was created to guarantee uniformity and rigor in the analysis process.

Ensuring Prudence and Moral Behavior

Triangulation: The findings were more valid and reliable when a variety of data collection techniques (such as surveys, interviews, observations, and written assessments) were used.

Member checking: To ensure the validity of the qualitative data and appropriately represent the participants' viewpoints, interview transcripts were distributed to the participants for review and correction. Pilot Testing: To ensure that research tools (such as writing prompts and questionnaires) are feasible, suitable, and clear, a small group tested them before they were fully implemented. This procedure guaranteed the validity and reliability of the instruments for the target population.

Inter-coder Reliability: To guarantee consistency and agreement in qualitative data analysis, two separate researchers coded the observations and interviews. This procedure reduced bias and increased the dependability of the qualitative findings. Transparency: To guarantee scientific rigor and transparency, comprehensive explanations of the methodology, data analysis processes, restrictions, and Cronbach alpha ratings for the instruments were given. Data Saturation: To guarantee that enough data was acquired for a thorough study, data gathering was carried out indefinitely or until no new themes or insights could be identified. Expert Consultation: To make sure the study followed ethical guidelines, followed current best practices, and made use of suitable research techniques, experts in ESP and AI technology were consulted at several points during the investigation.

Quantitative Data: Pre- and post-tests, questionnaires, and other methods of gathering quantitative data were analyzed using statistical software. This investigation evaluated the effect of ChatGPT on writing skills and found statistically significant connections between variables. Before data processing, Cronbach alpha ratings were computed for each instrument to guarantee internal consistency and reliability.

Qualitative Data: Software for thematic analysis was used to examine the information gathered from observations and interviews. This analysis, which revealed important themes, trends, and insights from the qualitative data, enabled a deep comprehension of the real-world ChatGPT experiences in the ESP classroom.

Moral Aspects to Take into Account

Each subject gave informed consent prior to participating in the study. This procedure guaranteed that they understood the goals, methods, possible hazards, and advantages of the study. Anonymity and Confidentiality: Throughout the entire research procedure, participant anonymity and confidentiality were guaranteed. The participants' identities were kept separate from their responses in any reports or publications, and the data was de-identified and securely maintained. Data Security: Only authorized researchers have access to the safely kept data. Precautions were taken to guarantee that the data was shielded from loss, misuse, and illegal access. Ethical Guidelines: The study was carried out in compliance with accepted ethical standards for human subjects research. Assuring participant well-being, upholding their dignity and autonomy, and safeguarding their privacy were all part of this.

This study sought to shed light on ChatGPT's potential for improving ESP writing training in Saudi higher education by using this thorough and rigorous research approach. The results could influence the creation of best practices for using AI tools in ESP classes and add to the continuing discussion about the role of AI in language acquisition and education.

Data Analysis: Strict statistical analyses were performed on quantitative data, which included computing means, standard deviations, and inferential statistics. Robust statistical tests, such as paired-sample t-tests, were used to compare the pre-and post-assessment scores to determine the effectiveness of ChatGPT integration. Regarding the qualitative aspect, the thematic analysis extensively investigated recurrent themes and patterns found in the abundant qualitative data obtained from open-ended survey questions and interview replies.

Data organization and analysis: Classification and coding Well-known qualitative data analysis software was used to code data from qualitative sources (interviews, observations). The computer code. The procedure was directed by a codebook that researchers cooperatively built, and theoretical frameworks provided guidance. This maintained uniformity and made it easier to spot important themes and trends. Triangulation and Member Verification: To improve the validity and trustworthiness of the study, conclusions from several data sources were combined. In order to further ensure the accuracy and reliability of the data, participant comments and verification of transcripts and preliminary findings were solicited as part of the member-checking process.

Quantitative Data Analysis: Statistical software analyzed pre- and post-test and survey data. To evaluate ChatGPT's effect on writing abilities and find statistically significant correlations between variables, descriptive statistics, paired t-tests, and other suitable statistical tests were used.

Cronbach Alpha Scores: Cronbach alpha coefficients were computed to evaluate each survey instrument's internal consistency and dependability. Scores higher than 0.70 indicated a high level of internal consistency and confirmation of the authenticity of the data gathered, which were regarded as appropriate.

Measures of validity included ensuring the study's conclusions were reliable and credible. Experts in AI and language education collaboratedto carefully preserve content validity carefully when creating survey and interview questions. Carefully chosen established measures with established construct validity were used to assess pertinent dimensions, including writing competency and student engagement. Careful comparisons between ChatGPT-integrated tests and conventional evaluations were used to prove concurrent validity.

Measures of Reliability: Reliability was a vital component of this study, confirming the accuracy and uniformity of the metrics used. Survey instruments' internal consistency and dependability were evaluated by calculating Cronbach's alpha coefficients. The statistical metrics yielded significant insights into the measurement stability and consistency among different survey components. Furthermore, inter-rater reliability analyses were performed on qualitative data, namely interview and open-ended response coding. The consistency and dependability of qualitative analyses were ensured by several researchers' independent coding of data.

Cronbach's Alpha Scores: The survey instruments' internal consistency and dependability were further supported by calculating Cronbach's alpha coefficients. The Cronbach's alpha scores for each survey instrument are shown in the following tables:

Survey Instrument	Cronbach's Alpha
Student Perception Survey	0.89
Educator Experience Survey	0.92

These alpha coefficients testify to the robustness and internal consistency of the measurement instruments employed throughout the study.

Ethical Considerations:

Strict ethical standards served as a compass for this study's ethical considerations. All participants are guaranteed the opportunity to withdraw from the study at any moment, and informed consent processes are in place to ensure their confidentiality and anonymity. We were sure to seek and acquire approval from the Institutional Review Board (IRB) before collecting data.

Finally, this meticulous study design and methodology, supplemented by reliability and validity assessments, provide a complete and detailed picture of how ChatGPT is used in EFL classrooms in the unique Saudi Arabian setting. The addition of Cronbach's alpha ratings lends credibility and openness to the study results while also confirming the reliability and internal consistency of the measuring tools. This research lays the groundwork for well-informed conversations and additional investigation into the revolutionary possibilities of AI technologies in language teaching worldwide.

RESULTS AND DISCUSSION

Results

This comprehensive section meticulously dissects the intricacies of our data analysis, focusing keenly on the transformative impact of ChatGPT integration on English as a Foreign Language (EFL) learners in Saudi Arabia. The lens is finely tuned towards enhancing English for Specific Purposes (ESP) writing skills through autonomous language learning. The synthesis of quantitative and qualitative data offers an exhaustive exploration of the manifold facets of the integration, providing a nuanced understanding of its implications, challenges, and potential contributions to the broader language education landscape.

Research Question 1: What are the perceived benefits of incorporating ChatGPT into ESP education in Saudi Arabian higher education institutions?

The survey responses from EFL learners form the bedrock of our exploration into their nuanced perceptions of ChatGPT integration. Table 1 encapsulates the dynamic mean scores before and after integration, complemented by the associated p-values, presenting compelling evidence of the perceived benefits.

Table 1: Perceived Benefits of ChatGPT Integration for EFL Learners

Benefits	Pre-Integration (Mean ± SD)	Post-Integration (Mean ± SD)	p-value (paired t-test)
Enhanced Writing Proficiency	3.78 ± 0.91	4.42 ± 0.76	< 0.001
Increased Engagement	3.42 ± 0.87	4.18 ± 0.92	< 0.001
Personalized Learning Experience	3.65 ± 0.88	4.32 ± 0.77	< 0.001

It appears that EFL learners in Saudi Arabia saw a considerable improvement in their writing skills, more engagement, and a more tailored learning experience after integrating ChatGPT, as indicated by the statistical significance of the observed rise in perceived advantages.

The benefits of AI-driven tools for language acquisition have been highlighted in prior research (Smith et al., 2021; Kim & Lee, 2022), and our results are consistent with those findings.

Quantitative: Results from both the pre-and post-tests showed that students' scores on tests of coherence, vocabulary, fluency, and grammar improved significantly after using ChatGPT in their ESP classes. The results align with those of earlier research showing that language models powered by AI can improve writing abilities (Wu et al., 2023; Zhang et al., 2022).

Consistent with earlier studies on the efficacy of AI-powered language models in promoting language acquisition, the results give compelling evidence that ChatGPT can considerably increase ESP writing skills. Because of this, ChatGPT could be a great resource for ESP teachers and students in Saudi Arabia.

Qualitative: These results were validated by interviews and document analysis. Students' increased self-assurance in their grammar and vocabulary skills is consistent with findings from earlier studies conducted by Chen and Chen (2020). Results from writing samples demonstrated a rise in language diversity and complexity, lending credence to the claims made by Mohammadi et al. (2021) regarding the ability of AI tools to enhance writing quality.

Research Question 2: What challenges arise in implementing ChatGPT in ESP courses, and how can these challenges be mitigated?

Qualitative insights derived from educator surveys and interviews afford us a deeper understanding of the challenges entailed in ChatGPT implementation. Table 2 elucidates these challenges alongside proposed mitigation strategies, enriching the narrative with practical considerations.

Table 2: Challenges and Mitigation Strategies in ChatGPT Implementation

Challenges	Mitigation Strategies
Lack of Familiarity with AI	Provide comprehensive training for educators.
Ethical Considerations	Implement clear ethical guidelines and training programs.
Technical Issues	Establish robust technical support mechanisms.
Resistance to Change	Foster a culture of openness and continuous improvement.

The highlighted difficulties and the solutions offered here are consistent with what is already out there in the literature (Jones & Wang, 2020; Garcia et al., 2021). They highlight the significance of a culture that enthusiastically welcomes innovation in education and the necessity for organized training, ethical standards, and substantial technical assistance.

According to the surveys, teachers and students both saw the value in ChatGPT. In line with other studies by Mohammadi et al., instructors highly appreciated the individualized feedback and scaffolding features (2021). As Chen and Chen found, students valued help with grammar, vocabulary, and brainstorming (2020).

These advantages were further discussed in interviews and through observations. According to instructors, ChatGPT made feedback more efficient, and students said they could overcome some writing obstacles with its help. This backs the findings of earlier studies by Wu et al. (2023) and Zhang et al. (2022). Previous research has shown that AI technologies can improve

language learning experiences, and the results of this study corroborate those claims. Instructors and students alike seem to gain from ChatGPT. This indicates that ChatGPT can potentially improve the learning experience for both teachers and students by tackling some typical issues in ESP writing instruction.

Research Question 3: How can curriculum design and assessment strategies be adapted to effectively integrate ChatGPT into ESP courses, ensuring a symbiotic relationship between generative AI and pedagogical goals?

The amalgamation of quantitative and qualitative data enriches our exploration of curriculum design and assessment strategies. Table 3 introduces a comparative analysis of writing assessments pre and post-ChatGPT integration.

Table 3: Comparative Analysis of Writing Assessments

Assessment Metrics	Pre-Integration (Mean ± SD)	Post-Integration (Mean ± SD)	p-value (paired t-test)
Grammar and Syntax	68.2% ± 12.3%	79.8% ± 9.6%	< 0.001
Creativity and Critical Thinking	55.6% ± 10.8%	67.9% ± 8.7%	< 0.001
Use of Vocabulary	72.1% ± 11.6%	83.2% ± 10.2%	< 0.001

Writing exams showed statistically significant gains, which is a good sign for ESP writing abilities in vocabulary, creativity, critical thinking, and grammar. Chen et al. (2019) and Liang and Lee (2021) also found similar results, demonstrating that AI-driven tools can improve specific language skills.

Through observations and document analysis, a number of critical components of efficient ChatGPT integration were uncovered. Like the many uses detailed in earlier work by Mohammadi et al., instructors used ChatGPT in various contexts, such as group projects, peer review sessions, and individual writing assignments (2021).

Consistent with the findings of Chen & Chen (2020) regarding the significance of student autonomy in AI-assisted language learning, students actively utilized ChatGPT for self-directed learning and improvement.

According to the results, various applications, student participation, and chances for self-directed learning are critical components of a good ChatGPT integration. This supports other studies that looked at how to use AI technologies in language learning settings best, and it emphasizes the significance of adapting methods to different situations and the needs of individual learners.

Research Question 4: How does ChatGPT integration impact student engagement, autonomy, and performance in ESP writing skills development?

Quantitative and qualitative analyses work in concert to unpack the impact of ChatGPT on EFL learners in Saudi Arabia. Table 4 amalgamates the findings, offering a holistic view of the transformative potential.

Table 4: Impact on EFL Learners - Engagement, Autonomy, and Performance

Impact Metrics	Pre-Integration (Mean ± SD)	Post-Integration (Mean ± SD)	p-value (paired t-test)
Student Engagement	3.54 ± 0.92	4.21 ± 0.88	< 0.001
Autonomy in Learning	3.45 ± 0.91	4.12 ± 0.85	< 0.001
Overall Performance	3.63 ± 0.89	4.32 ± 0.78	< 0.001

Students' increased involvement, autonomy, and overall performance following the implementation of ChatGPT provide strong evidence of its beneficial effects on developing ESP writing abilities. These results are in perfect harmony with those of Wang et al. (2020) and Zheng et al. (2022), which show that AI can significantly improve student independence and involvement in their learning. Interviews and classroom observations highlighted the need for well-defined rules and regulations for the appropriate and moral use of ChatGPT. Students were encouraged to critically analyze ChatGPT's outputs while instructors guided conversations on AI technology's limitations and potential biases. This method is in line with other studies conducted by Wu et al. (2023) that highlighted the significance of developing analytical thinking abilities in conjunction with using AI in language acquisition.

The results stress the need for careful ethical deliberation while using ChatGPT within ESP curricula. Consistent with earlier studies on the moral consequences of AI in the classroom, we should equip students to assess the quality of AI outputs. This shows that instructors need to take proactive measures to ensure students get the most out of ChatGPT while keeping hazards to a minimum if they want it to be used safely and ethically. The results shed light on how ChatGPT could improve ESP writing classes in Saudi Arabia. Educators may significantly enhance learning outcomes and empower students to become confident and booming writers by skillfully incorporating ChatGPT and supporting safe use. More study is required to better understand ChatGPT's long-term effects, identify the most effective ways to incorporate it into various ESP settings, and respond to new ethical questions about the use of AI in language classrooms.

Comparison with Previous Studies:

Our findings complement and build upon prior studies in the vast area of artificial intelligence (AI) integration in language instruction. Our findings of enhanced perceived benefits and writing assessments are similar to those of Smith et al. (2021), who also used AI-driven tools to show improved writing skill. The conclusions of Garcia et al. (2021) that extensive training is necessary and that ethical considerations must be addressed are in line with our own challenges and solutions. Similar to our findings, research by Liang and Lee (2021) and Chen et al. (2019) highlighted the beneficial effects of AI on particular language abilities, such as vocabulary, creativity, critical thinking, and grammar. In addition, the results provided by Wang et al. (2020) and Zheng et al. are in perfect harmony with the beneficial effects on student engagement and autonomy (2022).

To summarize, this data analysis thoroughly examines the effects of ChatGPT integration on English as a foreign language (EFL) students' ESP writing abilities in Saudi Arabian universities, and it also provides detailed insights into the advantages and disadvantages of AI-

driven language learning. The congruence between our results and those of other studies shows that our good findings are consistent and applicable to a wide range of situations. With the educational landscape changing at a quick pace due to technological breakthroughs, this study lays a solid groundwork for future research on how to use AI technologies like ChatGPT to facilitate autonomous language acquisition.

Recommendations:

1. Given the recognized difficulty of teachers' unfamiliarity with AI, schools should fund extensive training programs for teachers. These programs should cover not only the nuts and bolts of ChatGPT but also how to teach students to use AI in the classroom.

2. To handle ethical concerns, educational authorities and institutions should work together to establish transparent, ethical standards for the application of AI in language classrooms. To guarantee AI's ethical and responsible integration, these standards should cover topics such as privacy, data security, and algorithmic bias.

3. Institutions should put technical solid support procedures in place to deal with any technical problems that may arise. To ensure that any technical issues encountered during the adoption of ChatGPT are immediately resolved, dedicated IT support teams, regular system maintenance, and constant monitoring are all part of the package.

4. Building an Open and Improvement Culture: To get people to stop being resistant to change, it is essential to cultivate an innovation culture. Organizations should foster an innovative spirit by giving teachers a place to talk about what has worked for them and what has not. This change in mindset can be a significant factor in the smooth incorporation of ChatGPT and other AI technologies.

5. To stay up with the ever-changing field of artificial intelligence (AI) in education, institutions should set aside funds for continuous study and evaluation. This involves keeping up with the latest developments in AI-driven language learning tools, determining the long-term effects of ChatGPT integration, and finding ways to enhance.

6. Investing in developing instructional materials to exploit ChatGPT successfully is an intelligent move for institutions. This involves ensuring that the AI tool's capabilities are compatible with the tasks and tests that will be given so that the integration is smooth and does not interfere with the learning process.

7. Advice and Assistance for Students: Understanding the importance of learner autonomy, educational institutions should provide students with clear guidance on using ChatGPT effectively for their independent language learning. Workshops, tutorials, and other materials are provided to enable students to utilize this AI-powered application.

CONCLUSION

Findings from this study indicate that autonomous language learning can significantly improve students' English for Specific Purposes (ESP) writing abilities when using ChatGPT in EFL classes at Saudi Arabian universities. The results have shed light on this integration's perceived

advantages and disadvantages, which is quite helpful. The favorable impact of ChatGPT on EFL learners in Saudi Arabia is highlighted by the perceived benefits, which include improved writing skills, higher engagement, and a more individualized learning experience. These results corroborate those of earlier research, which found promise in AI-powered resources for language instruction.

Nevertheless, strategic interventions are required to address obstacles like unfamiliarity with AI, ethical concerns, technological difficulties, and reluctance to change. Educators, institutions, and lawmakers can use the aforementioned suggestions to overcome these obstacles and get the most out of ChatGPT integration. To keep up with the ever-changing educational landscape, stakeholders should be proactive, encourage a culture of innovation, and regularly reevaluate techniques to ensure that EFL students benefit from AI integration that aligns with pedagogical aims. This will allow us to fully utilize the revolutionary power of ChatGPT and other autonomous language learning technologies, which will help shape a paradigm shift in language education towards something more modern and forward-thinking.

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