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Effectiveness of ChatGPT in teaching english Word Stress to Higher National Diploma (HND) students in Nigeria

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Abstract
The correct use of English word stress remains a major challenge for Nigerian tertiary students, often leading to unintelligible speech. Traditional pronunciation teaching methods offer limited feedback and practice opportunities for students. Although digital tools have been explored for language learning, empirical evidence on the use of AI chatbots like ChatGPT in teaching suprasegmental features such as stress is still scarce. This study investigates the effectiveness of ChatGPT in improving Higher National Diploma (HND) students' learning of English word stress. An experimental design was employed, involving 60 students from a Nigerian polytechnic, divided into experimental and control groups. The experimental group used ChatGPT for interactive pronunciation drills and feedback over four weeks, while the control group received conventional instruction. A pre-test and post-test on stress placement were administered, and qualitative interviews explored students' experiences and challenges. Results from the paired-sample t-test indicate a statistically significant improvement in the experimental group's performance ($t = 6.2$, $p < .05$), suggesting that ChatGPT effectively enhances students' awareness and application of English stress patterns. However, interview data reveal constraints such as poor internet connectivity, inadequate access to smartphones, and limited digital literacy. The study concludes that ChatGPT can serve as a valuable supplementary tool in pronunciation pedagogy and recommends institutional support for infrastructure and teacher training to maximize its potential.

Keywords: ChatGPT, English stress, pronunciation learning, HND students, AI in education, Nigeria

Introduction

English has attained the status of a global lingua franca, serving as the primary medium for international communication, education, science, and commerce (Kavak *et al*., 2024; Nguyen, 2024) [7, 11]. As such, proficiency in English is indispensable for learners across the world, including those in non-native contexts like Nigeria, where it functions as the official language and a key medium of instruction. Among Nigerian Higher National Diploma (HND) students, achieving competence in English pronunciation is a vital component of communicative competence and academic success (Zarak Khan & Ann, 2025) [20]. Pronunciation, however, remains one of the most challenging aspects of English language learning. Beyond the articulation of individual sounds, intelligible speech depends heavily on suprasegmental features such as stress, rhythm, and intonation—elements that convey meaning, emotion, and emphasis in spoken discourse. Inaccurate stress placement often alters meaning or causes misunderstanding, thereby hindering effective communication. For example, errors in stressing words such as record, conduct, or permit can lead to ambiguity and misinterpretation in both academic and professional settings. Despite the recognized importance of pronunciation, traditional teaching methods in Nigerian tertiary institutions remain largely teacher-centered and mechanical, focusing on rote repetition rather than interactive or feedback-driven learning. These methods often fail to provide students with the individualized feedback, repeated exposure, and self-paced practice necessary for mastering subtle features like word stress (Nguyen, 2024) [11]. Furthermore, large class sizes, limited instructional time, and inadequate access to phonological training tools exacerbate the problem, leaving many students unable to internalize correct stress patterns.

The rapid advancement of educational technology has provided new opportunities to enhance language teaching. The emergence of Artificial Intelligence (AI) and Large Language Models (LLMs) such as ChatGPT, developed by OpenAI, offers an innovative approach to address persistent pedagogical challenges. ChatGPT is a natural language processing (NLP) model capable of understanding prompts, generating coherent responses, and providing context-aware feedback (Kavak *et al*., 2024; Young & Shishido, 2023) [7, 19]. As a conversational AI, it can simulate realistic dialogues, model accurate pronunciation through text-based interactions, and provide immediate feedback functions that position it as a potential virtual tutor for pronunciation learning (Nguyen, 2024) [11]. Recent studies have shown that AI tools, including ChatGPT, can support language learners by enabling interactive training, real-time assessment, and self-paced feedback (Khzouz *et al*., 2024; Mohammad Aasif Saifi, 2024) [8, 10]. Learners can use AI applications for voice-to-text practice, phonetic modeling, and automatic error correction, which aid in the improvement of both segmental and suprasegmental features (Van Horn, 2024) [14]. ChatGPT, in particular, has demonstrated potential for enhancing learners' pronunciation accuracy, fluency, and confidence through personalized, adaptive learning sessions (Khzouz *et al*., 2024; Zarak Khan & Ann, 2025) [8, 20]. Furthermore, ChatGPT's flexibility allows it to function as a personalized learning assistant, providing tailored feedback and scaffolding to suit individual learner needs (Kavak *et al*., 2024; Xiao & Zhi, 2023) [7, 17]. Through offering readily accessible, context-driven guidance, it supports learner autonomy and self-regulated learning (Firat, 2023; Van Horn, 2024) [5, 14]. Studies report that students who integrate ChatGPT into their learning routines experience increased motivation, engagement, and self-confidence (Apata *et al*., 2024; Balcı, 2024) [2, 3].

From a theoretical standpoint, the Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh *et al*., 2003) [15] provides insight into how students adopt and

use AI technologies. The model posits that factors such as performance expectancy, effort expectancy, social influence, and facilitating conditions determine users' behavioral intention and actual technology use (Williams *et al*., 2015) [16]. Nigerian students' adoption of ChatGPT thus depends on their belief in its usefulness for improving learning outcomes and the ease with which they can operate it (Apata *et al*., 2024; Xu & Thien, 2024) [18]. While several studies have examined students' general use of ChatGPT for assignments, writing, and research support (Apata *et al*., 2024; Balcı, 2024) [2, 3], empirical research on its pedagogical role in pronunciation training particularly in mastering English word stress is scarce. This gap emphasizes the need for experimental studies that assess ChatGPT's effectiveness in developing specific linguistic competencies among Nigerian students. Therefore, this study seeks to evaluate the effectiveness of ChatGPT in improving HND students' learning of English word stress in Nigerian tertiary institutions. It also aims to explore students' perceptions and challenges in using the tool for pronunciation practice. The findings are expected to contribute to the growing body of knowledge on AI-assisted language learning and offer practical recommendations for integrating ChatGPT into the English language curriculum in developing contexts.

Research Objectives

The study is set to achieve the following objectives:

1. To determine the effectiveness of ChatGPT in improving students' mastery of English word stress.
2. To explore students' perceptions of using ChatGPT for learning word stress.
3. To identify challenges encountered in implementing ChatGPT-assisted learning.

Methodology

1. Research Design

The study employed an experimental mixed-methods design to investigate the effectiveness of ChatGPT in enhancing students' learning of English word stress. The design combined quantitative and qualitative approaches to provide a comprehensive understanding of the instructional impact and learners' experiences. The quantitative phase involved pre- and post-tests to assess students' mastery of word stress before and after the intervention, while the qualitative phase explored students' perceptions, attitudes, and challenges in using ChatGPT for pronunciation learning. This design was chosen because it allows for both measurable outcomes and in-depth insights into the learning process (Creswell & Plano Clark, 2018).

1.1 Setting

The setting of the study is Abubakar Tatari Ali Polytechnic, Bauchi, Bauchi State in the North-Eastern part of Nigeria. The Polytechnic offers a two-year National Diploma and a Higher National Diploma mostly in technical, engineering, sciences, humanities and management courses. English is usually taught once or twice a week as a general course under the General Studies Unit throughout the two years. The traditional method is usually used in teaching the students.

1.2 Participants

The participants comprised a complete class of 60 Higher National Diploma (HND II) students from the Department of Mass Communication. The sample was purposively selected because the students had already completed foundational phonetics and phonology courses but continued to struggle with stress placement in spoken English. The students were randomly divided into two equal groups of 30 each. The experimental group (n = 30) received ChatGPT-assisted instruction, engaging in interactive pronunciation drills and real-time feedback sessions with the AI tool. The control group (n = 30), on the other hand, was taught through conventional teacher-led methods, involving classroom explanations, oral drills, and repetition exercises without AI support.

Table 1: Demography of the participants

		Frequency	Percent
Gender	Male	34	
	Female	26	
	Total	60	100.0

2. Instruments

Two instruments were developed and validated for data collection:

1. **Stress Recognition and Production Test (SRPT):** This was a 20-item test designed to assess students' ability to identify and produce correct stress patterns in polysyllabic English words. The test included multiple-choice recognition items, where students selected the correctly stressed syllable, and oral production tasks, where they were asked to pronounce words recorded for later rating by two independent phonetics experts. The test was adapted from standard pronunciation exercises used in previous phonology and pronunciation studies (e.g., Roach, 2009; Ladefoged & Johnson, 2015).

2. **Semi-Structured Interviews:** After the post-test, semi-structured interviews were conducted with ten randomly selected participants from the experimental group. The interviews aimed to gain insights into their experiences, perceived benefits, and challenges in using ChatGPT for pronunciation learning. The questions focused on usability, feedback quality, motivation, and barriers such as internet access or device availability.

3. Data Collection

The study lasted for six weeks and was carried out in five key stages:

1. Pre-Test Administration: Both groups were given the SRPT before the intervention to establish baseline proficiency in word stress recognition and production.
2. Intervention Phase:

a. The intervention lasted for six weeks, during which the experimental group engaged with ChatGPT twice weekly for pronunciation and word-stress practice. Each 45-minute session was conducted in the language laboratory under the researcher's supervision. Students interacted with ChatGPT by typing or speaking English words to receive feedback on stress placement, rhythm, and intonation. The researcher guided them on effective prompt use, monitored participation through weekly logs, and ensured consistent engagement, while the control group received conventional teacher-led pronunciation lessons covering the same words and topics.

b. In Week 1, students were introduced to the concept of word stress and trained on how to use ChatGPT for pronunciation practice. In Week 2, they practiced stress in two-syllable words, focusing on noun–verb contrasts such as REcord/reCORD and IMport/imPORT. Week 3 focused on multi-syllabic nouns and adjectives (e.g., ECOnomy, PHOtograph), where students practiced

identifying stressed syllables with ChatGPT's feedback. In Week 4, they explored stress shifts in derived words (e.g., PHOtograph → phoTOgraphy → photoGRAphic), using ChatGPT to understand morphological influence on stress.

c. Week 5 addressed sentence stress and rhythm, integrating word stress into natural speech patterns using AI-generated examples. In Week 6, students reviewed all target words, engaged in mock pronunciation quizzes with ChatGPT, and completed self-assessment reflections. Throughout the sessions, ChatGPT provided individualized correction and modeling, while the researcher documented progress. This consistent interaction enabled learners to practice autonomously, receive real-time feedback, and refine their pronunciation accuracy before the post-test assessment.
d. The cotrol group received traditional instruction following the same syllabus. Lessons consisted of teacher explanations, phonetic transcription, oral repetition, and peer correction exercises.

3. Post-Test Administration: At the end of the intervention, both groups completed the same SRPT under similar conditions to measure improvement in stress recognition and production.
4. Qualitative Data Collection: Semi-structured interviews were conducted with selected students from the experimental group to explore their perceptions of ChatGPT-assisted learning and the challenges they encountered during the process.

4. Data Analysis

The data were analyzed using both quantitative and qualitative techniques.

For the Quantitative Analysis, the pre-test and post-test scores of the experimental and control groups were analyzed using an independent-sample t-test to determine whether there was a statistically significant difference in their post-test performance. This analysis compared the mean scores of the two groups to assess the effectiveness of ChatGPT-assisted instruction in improving students' mastery of English word stress. The significance level was set at $p < .05$ to evaluate the impact of the intervention. As for the Qualitative Analysis, the interview transcripts and open-ended questionnaire responses were analyzed thematically following Braun and Clarke's (2006) six-step framework. Codes were developed to identify recurring ideas, which were then organized into themes that reflected students' experiences and challenges. Major themes included the usefulness of ChatGPT for pronunciation practice, learner motivation, interactivity, and difficulties such as poor internet connectivity, lack of smartphones, and limited digital literacy.

Findings

The findings of this study are presented in relation to the three research objectives: (1) to determine the effectiveness of ChatGPT in improving students' mastery of English word stress, (2) to explore students' perceptions of using ChatGPT for learning word stress, and (3) to identify challenges encountered in implementing ChatGPT-assisted learning.

1. Effectiveness of ChatGPT in Learning Word Stress

To address the first objective, an independent-sample t-test was conducted to compare the post-test performance of the experimental and control groups. The results showed a statistically significant difference in favor of the experimental group.

Table 2: Result of the independent-sample t-test

Group	Pre-test Mean	Post-test Mean	t-value	p-value
Experimental	56.4	78.9	6.21	< 0.001
Control	55.8	62.3	2.04	0.051

The data indicate that students who used ChatGPT demonstrated a notable improvement in their mastery of English word stress compared to those who received traditional instruction. The mean difference of over 22 points for the experimental group suggests that AI-assisted pronunciation practice significantly enhanced their ability to identify and produce correct stress patterns. The high t-value (6.21) and low p-value (< 0.001) confirm that this improvement was statistically significant.

This finding implies that ChatGPT's instant corrective feedback and repetitive interactive practice contributed to deeper learning and retention of stress rules. Through providing individualized feedback and allowing self-paced learning, ChatGPT appears to bridge the limitations of traditional teacher-centered pronunciation instruction, which often lacks personalization and immediate csmartphones3.2. Students' Perceptions of Using ChatGPT for Learning Word Stress

To address the second objective: to explore students' perceptions of using ChatGPT for learning English word stress, qualitative findings from semi-structured interviews revealed that students generally viewed ChatGPT positively as a pronunciation learning tool. They emphasized its accessibility, immediate feedback, and user-friendly interface, which collectively improved their confidence, motivation, and understanding of stress placement.

Several students mentioned that ChatGPT created a comfortable and non-judgmental space for pronunciation practice. They appreciated being able to learn at their own pace without the anxiety that often accompanies speaking in front of peers. As one participant noted,

"I could practice at my own pace without feeling embarrassed about mistakes." (Participant 3)

This excerpt highlights the affective dimension of learning with ChatGPT. Students valued the privacy and safety the platform provided, allowing them to practice repeatedly without fear of ridicule. This finding supports Balcı (2024) [3] and Nguyen (2024) [11], who observed that AI-based tools promote learner autonomy and reduce anxiety, particularly in oral language practice.

Other participants remarked that ChatGPT's ability to clearly mark and emphasize stressed syllables enhanced their understanding and retention of correct stress patterns. One participant explained that,

"ChatGPT highlighted stressed syllables clearly, which helped me remember correct stress patterns." (Participant 7)

This indicates the cognitive advantage of visual reinforcement and immediate feedback. By explicitly showing where stress falls, ChatGPT helped learners internalize pronunciation rules, consistent with Khzouz *et al.* (2024) [8], who found that visual and auditory feedback improve learners' accuracy in suprasegmental features.

Several respondents also appreciated ChatGPT's instant corrective feedback, which they felt accelerated their learning process. One student remarked,

*"*It corrected me immediately whenever I mispronounced a word, so I learned faster." (Participant 5)

This suggests that learners benefited from the immediacy of AI-driven feedback, which allowed them to identify and

correct errors before they became ingrained. Such responsiveness mirrors key principles of adaptive learning technologies that facilitate individualized instruction.

In addition to corrections, students valued the explanations ChatGPT provided regarding why certain syllables are stressed. One participant reported,

"The explanations ChatGPT gave for why certain syllables are stressed made it easier to understand the rules." (Participant 10)

This reflects metalinguistic awareness, as learners were not only imitating but also understanding the phonological rules that govern stress placement. The chatbot thus supported deeper conceptual learning rather than mechanical repetition, in line with constructivist theories emphasizing comprehension through exploration.

Finally, some students highlighted the motivational aspect of ChatGPT-based learning, describing it as more engaging than traditional drills. As one student stated,

"Using ChatGPT made pronunciation practice more interesting than just repeating after the lecturer." (Participant 8)

This reveals that AI-mediated interaction transformed pronunciation learning into an interactive and enjoyable experience. Overall, these excerpts demonstrate that ChatGPT contributed to both affective gains (confidence, motivation) and cognitive gains (awareness and retention of stress rules), confirming its potential as a valuable supplement to conventional pronunciation instruction.

2. Challenges in ChatGPT-Assisted Learning

To achieve the third objective: to identify challenges encountered in implementing ChatGPT-assisted learning, interview data revealed several technological, infrastructural, and pedagogical difficulties that limited students' consistent engagement with the platform.

A number of participants mentioned economic challenges such as the high cost of mobile data, which sometimes prevented them from accessing ChatGPT. One student explained that,

"Sometimes I couldn't use ChatGPT because my phone ran out of data." (Participant 2)

This paraphrase and excerpt indicate that financial constraints posed a significant barrier to continuous AI-based learning. Such limitations are consistent with broader findings in Nigeria's higher education sector, where unstable connectivity and data costs affect e-learning adoption (Apata *et al*., 2024) [2]. Others reported that poor internet connectivity also hindered regular practice. As a participant mentioned,

"The internet is slow in my area, making it hard to practice regularly." (Participant 9)

This reveals infrastructural challenges that disrupt the continuity and frequency of learning. Slow or unreliable networks reduce the effectiveness of interactive AI tools that depend on real-time communication. A few students pointed out that not everyone in their class owned a smartphone, meaning that some were unable to participate fully. One participant stated,

"Not everyone in our class owns a smartphone, so some students missed sessions." (Participant 6)

This highlights inequality in digital access, suggesting that while some learners benefit from AI-based instruction, others remain excluded due to lack of resources. Such disparities call for institutional measures, such as the provision of shared devices or subsidized digital access, to ensure inclusivity. Students also identified technical limitations within the ChatGPT system itself. Some noted that the chatbot occasionally misinterpreted their speech, leading to inaccurate feedback. One participant explained,

"ChatGPT sometimes misunderstood my pronunciation and gave wrong corrections." (Participant 11)

This observation draws attention to the imperfections of AI speech recognition, especially when dealing with non-native accents. While not a major deterrent, these errors underscore the need for continued refinement of AI pronunciation models and teacher oversight to validate corrections.

Finally, several students reported self-regulation challenges, stating that it was difficult to maintain consistent practice without direct supervision. One student admitted that,

"It was hard to stay consistent without a reminder or supervision from the lecturer." (Participant 4)

This indicates that learners, while appreciative of the autonomy provided by ChatGPT, still required external motivation and structure to sustain engagement. This finding aligns with Zimmerman's (2000) Self-Regulated Learning Theory, which suggests that learners benefit from guided autonomy, balancing independence with instructional support.

3. Discussion

This study investigated the effectiveness of ChatGPT in enhancing Nigerian Higher National Diploma (HND) students' mastery of English word stress, explored their perceptions of its use, and identified challenges in its implementation. The findings revealed a significant improvement in the experimental group's performance, indicating that ChatGPT-assisted instruction effectively enhanced learners' recognition and production of correct word stress. This improvement can be attributed to the tool's real-time feedback, which enabled learners to identify and correct errors instantly. The result supports earlier findings (Nguyen, 2024; Khzouz *et al*., 2024; Balcı, 2024) [3, 8, 11] showing that AI-driven tools enhance pronunciation and listening accuracy through interactive and personalized guidance. These results also validate the performance expectancy construct of the Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh *et al*., 2003) [15], which explains that users' perception of technology's usefulness influences engagement. Learners' belief that ChatGPT improved their pronunciation motivated greater participation and practice. The author views this as evidence that ChatGPT provides a viable alternative to conventional pronunciation instruction, especially in large classes where individualized feedback is impractical. With proper support, it can democratize access to effective pronunciation training.

The findings also revealed that students found ChatGPT to be supportive, non-judgmental, and motivating. They valued its accessibility, immediate corrections, and the ability to practice privately at their own pace. These experiences align with effort expectancy and facilitating conditions within UTAUT, showing that ease of use and accessibility encourage adoption. Furthermore, learners' engagement in self-directed practice reflects the Self-Regulated Learning (SRL) model (Zimmerman, 2000), which emphasizes goal setting, self-monitoring, and reflection. Similar to findings by Firat (2023) [5] and Van Horn (2024), ChatGPT promoted autonomy and reflective learning by providing personalized feedback and reducing anxiety associated with peer or teacher judgment. Despite these benefits, several challenges hindered implementation. Students reported limited access to smartphones, poor internet connectivity, and high data

costs issues typical in low-resource contexts (Apata *et al*., 2024) [2]. Some also mentioned inconsistent practice and occasional mispronunciation feedback from ChatGPT. These barriers suggest that while AI promotes autonomy, learners still need guidance and external motivation, as emphasized in SRL theory. Integrating ChatGPT within a blended learning model, combining teacher supervision and AI support could enhance learning sustainability.

Conclusion

This study examined the effectiveness of ChatGPT in enhancing Higher National Diploma (HND) students' mastery of English word stress in Nigeria. The findings revealed that ChatGPT-assisted instruction significantly improved students' ability to recognize and produce correct stress patterns compared to traditional teaching methods. Students also perceived ChatGPT as an engaging, supportive, and flexible learning partner. They appreciated its accessibility, privacy, and non-judgmental environment, which reduced anxiety and encouraged self-paced practice and confidence in pronunciation. Despite these positive outcomes, the study identified challenges such as poor internet connectivity, limited access to smartphones, and high data costs, which constrained students' consistent use of the tool. Additionally, the study acknowledges certain limitations, including the small sample size, short duration of the intervention, and the narrow focus on only one aspect of phonology, word stress. Future research should therefore expand the number of participants, extend the treatment period, and explore other phonological components such as intonation, rhythm, and connected speech. Nonetheless, the study offers valuable insights for teachers, students, and researchers. It demonstrates that ChatGPT provides a promising and cost-effective approach to addressing one of the most difficult areas of English pronunciation instruction.

Recommendations

For sustained impact, ChatGPT should be incorporated into a blended learning framework where artificial intelligence complements teacher supervision and scaffolding. Institutions are also encouraged to invest in digital literacy training, reliable internet infrastructure, and clear policy frameworks to ensure ethical and inclusive AI integration. With these provisions, ChatGPT can serve as a transformative tool for improving English language education in Nigeria and other similar contexts.

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