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From Chalk to Chatbots: Students' Perceptions of ChatGPT as a Cognitive Scaffold in Undergraduate Linguistics

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Abstract
This study aims to examine students' perceptions of the use of ChatGPT as a learning support tool in undergraduate linguistics education. The rapid development of Artificial Intelligence has introduced new tools that influence teaching and learning in higher education. Among these tools, ChatGPT has become widely used by students to support academic learning. This study examined students' perceptions of the use of ChatGPT in learning Linguistics at the Muslim University of Morogoro. A qualitative research approach was employed, and data were collected through mixed questions (closed and open-ended questions) via a questionnaire from 92 undergraduate Linguistics students. The findings indicate that most students use ChatGPT mainly to understand difficult linguistic concepts, while others use it to solve syntax and phonology exercises. However, perceptions about its impact on analytical thinking were mixed. Some students believed that ChatGPT encourages critical thinking, while others argued that over-reliance on AI may weaken independent reasoning and analytical skills. The study concludes that ChatGPT can be a valuable supporting tool in learning Linguistics; however, to bridge the gap between AI integration and independent reasoning, this study proposes a 'Linguistic-Critical AI-Audit Framework (L-CAAF)' for Linguistics education. This framework contributes to pedagogical practice by shifting the lecturer's role from a content provider to a critical facilitator.

Keywords: AI in education, analytical thinking, ChatGPT, higher education, linguistics education, students' perceptions.

1.0 INTRODUCTION

The rapid advancement of Artificial Intelligence (AI) has significantly reshaped higher education, transforming both teaching practices and student learning experiences (Klimova & Pikhart, 2025). In the field of Linguistics, students face specific technical challenges, particularly in mastering syntax (complex tree structures) and phonetic transcription (IPA accuracy). These areas are traditionally labour-intensive, making AI an ideal digital scaffold that can generate large-scale linguistic data and preliminary analyses instantaneously.

However, the "hallucinations" and theoretical inconsistencies often found in AI-generated linguistic outputs necessitate a structured intervention. This study argues that while AI can serve as a foundational support or scaffold, its use must be coupled with active human oversight to prevent the erosion of independent reasoning. To address this, the study introduces the Linguistic-Critical AI Audit Framework (L-CAAF). By proposing this framework, the study contributes to pedagogical practice by offering a model for curriculum design that treats AI as a starting point for critical analysis rather than a final answer.

In recent years, generative AI systems, particularly large language models (LLMs), have gained widespread adoption in academic contexts. Among these tools, ChatGPT, developed by OpenAI, has emerged as one of the most influential AI applications in education. Its ability to generate coherent explanations, simulate dialogue, and provide structured responses has prompted global discussions regarding its pedagogical implications.

Research on AI in higher education predates the emergence of generative AI and has consistently highlighted the transformative potential of intelligent systems in supporting personalised learning, automated feedback, and adaptive instruction (Zawacki-Richter et al., 2019; Holmes et al., 2019).

While both Zawacki-Richter (2019) and Holmes et al. (2022) agree that AI is fundamentally reshaping higher education, they offer differing perspectives on its implementation. Zawacki-Richter emphasises the systemic efficiency of AI, categorising its role primarily in supporting institutional frameworks and student support services. In contrast, Holmes adopts a more critical pedagogical lens, arguing that without transparency and human-centred design, AI tools may undermine the learner's agency. Synthesising these views within the context of Linguistics reveals a critical tension: while Zawacki-Richter's model supports the efficiency of AI in generating complex linguistic datasets (the 'scaffold'), Holmes's warnings highlight the risk of students losing their analytical rigour if the 'black box' of AI is not critically audited. This study bridges these perspectives by proposing the L-CAAF framework, which utilises AI for institutional efficiency while maintaining the human-centric critical oversight that Holmes advocates. However, the release of ChatGPT has intensified scholarly attention due to its accessibility and capacity to produce human-like academic discourse. Recent studies suggest that ChatGPT can assist students in clarifying complex concepts, drafting academic responses, and engaging in self-directed learning (Kasneci et al., 2023; Rudolph et al., 2023). At the same time, concerns have emerged regarding academic integrity, cognitive dependency, and the erosion of critical thinking skills (Cotton et al., 2023; Bender et al., 2021).

In linguistics education, the integration of AI presents a particularly compelling case. Linguistics is a scientific discipline requiring systematic analysis of linguistic data across multiple levels, including phonology, morphology, syntax, semantics, and discourse. Mastery of these areas depends not merely on content recall but on analytical reasoning and structured problem-solving. Yet, students frequently encounter difficulties in applying theoretical knowledge to practical analysis, especially in syntactic parsing and phonetic transcription. Traditional lecture-based approaches may limit individualised feedback and sustained analytical practice.

From a theoretical perspective, AI tools such as ChatGPT may function as cognitive scaffolds. Drawing on Vygotsky's (1978) concept of the Zone of Proximal Development, AI can potentially support learners by offering guided explanations that bridge the gap between current competence and desired mastery. Furthermore, when examined through Bloom's Taxonomy (Bloom et al., 1956; Anderson & Krathwohl, 2001), AI-assisted learning may facilitate movement from lower-order cognitive processes (remembering

and understanding) toward higher-order processes (analysing and evaluating). However, this progression is not automatic. Without structured pedagogical guidance, AI use may instead encourage surface-level engagement or passive reliance.

Recent empirical studies provide mixed insights. Some research indicates that students perceive ChatGPT as a valuable supplementary tutor that enhances understanding and confidence (Kasneci et al., 2023; Gilson et al., 2023). Other studies caution that over-reliance on AI-generated responses may reduce independent reasoning and blur ethical boundaries (Cotton et al., 2023; Rudolph et al., 2023). Notably, much of the existing literature focuses broadly on AI in education or on second-language learning contexts rather than on linguistics as an academic discipline concerned with structural and theoretical analysis.

Therefore, there remains a gap in discipline-specific empirical research examining how students perceive the impact of ChatGPT on learning linguistics. Understanding student experiences is critical, as perceptions influence patterns of usage, depth of engagement, and academic outcomes. This study addresses this gap by investigating undergraduate students' perceptions of ChatGPT's impact on their learning of linguistics, focusing on usage patterns, perceived academic benefits, analytical thinking development, and ethical concerns.

By grounding the investigation in established educational theory and emerging AI scholarship, this study contributes to ongoing debates about responsible AI integration in higher education. Rather than framing ChatGPT as inherently beneficial or detrimental, the study evaluates its pedagogical role within linguistics education and offers evidence-based recommendations for structured implementation that preserves analytical rigour while leveraging technological innovation.

The general objective of the study is to examine students' perceptions of the impact of ChatGPT on learning Linguistics. The two specific objectives are: (1) to explore how students use ChatGPT in learning Linguistics concepts and solving linguistic tasks, and (2) to examine students' perceptions of the impact of ChatGPT on their analytical thinking and learning process in Linguistics. The study is guided by the following research questions:

1. How do students use ChatGPT in learning Linguistics concepts and solving linguistic problems?
2. What are students' perceptions of the impact of ChatGPT on their analytical thinking and learning in Linguistics?

2.0 LITERATURE REVIEW

2.1 The Rise of AI Chatbots in Higher Education

The advent of generative AI tools, particularly publicly available chatbots such as ChatGPT, has stimulated substantial research in higher education contexts. Studies indicate that AI chatbots are increasingly adopted as learning aids, tutoring assistants, and writing supports across disciplines (Schei, Møgelvang, & Ludvigsen, 2024). A scoping review of 24 empirical studies by Schei et al. (2024) concludes that students generally perceive these tools as useful and motivating for immediate feedback and task execution. However, a methodological limitation of this scoping review is its reliance on early-stage empirical data (2022–2023), which often prioritised broad student "satisfaction" over specific disciplinary accuracy. While the review identifies concerns regarding reliability, it does not provide a specialised framework for how these tools should be audited in high-stakes analytical subjects like Linguistics.

Similarly, systematic reviews by Al-Abdullatif and Alsubaie (2024) suggest that AI influences academic practice while introducing challenges of overreliance. While their findings are robust, their study primarily utilises quantitative survey data, which measures student intentions and perceptions rather than the actual cognitive "how" of AI-human interaction during complex problem-solving. This methodological gap, measuring what students think rather than how they verify AI data, highlights a significant opening for the current research.

Thus, these studies underscore a growing interest in student interaction with AI but reveal a lack of domain-specific intervention strategies. For linguistics students, who must navigate the technical nuances of syntax and phonetics, the "black-box" nature of AI (Holmes, 2022) poses a unique risk to independent

reasoning. Consequently, this study moves beyond general perceptions to propose the Linguistic-Critical AI Audit Framework (L-CAAF). By shifting the focus from general AI usage to a structured" Audit-and-Verify" process, this research directly addresses the "reasoning gap" left by the broad, institution-focused models found in existing scholarship.

Moreover, contemporary researchers highlight the specialised benefits of AI in language-specific tasks. For instance, Baskara and Mukarto (2023)argue that ChatGPT functions most effectively when integrated as a supportive partner that provides authentic language materials, while Zou et al. (2023)demonstrate that AI-powered speaking programs offer a low-stakes environment that reduces the 'social-evaluative threat' often found in traditional classrooms. Furthermore, Singh (2024) and Amiri et al. (2025) frame AI as a 'metacognitive scaffold' that supports self-regulation and reflection.

2.2 Students' Perceptions of ChatGPT

Empirical research indicates that student perceptions of ChatGPT are shaped by a tension between functional utility and academic integrity. Beyond mere convenience, Baek et al. (2024) found that students increasingly perceive AI as a vital "co-pilot" for brainstorming and summarising complex academic texts. This is particularly evident among non-native English speakers, who view ChatGPT as a crucial resource for bridging language gaps in scholarly communication (Odeniyi, 2024).

However, this perceived value is often mediated by technological trust. Ding et al. (2023) observed that while students are enthusiastic about AI's speed, they remain sceptical of its "black-box" nature, expressing concerns that over-reliance might erode their own critical thinking. These mixed feelings suggest that students do not see AI as a replacement for human instruction, but rather as a digital scaffold that requires professional oversight to be effective (Tiwari & Bhat, 2024).

2.2.1 General Perceptions in Higher Education

The discussion on contextual differences in student perceptions highlights how factors such as digital literacy and institutional context influence AI adoption (Schei et al., 2024). However, a critical limitation in existing scholarship, such as the quantitative surveys by Al-Abdullatif and Alsubaie (2024), is the failure to account for how these variables interact with discipline-specific analytical reasoning. In Linguistics, where mastery involves mapping abstract structures like theta-roles or determining allomorph distribution, digital literacy must be redefined as "Linguistic AI Literacy."

This means that in an institutional context with high AI access but low pedagogical guidance, a student may possess the technical skill to generate a syntax tree using ChatGPT but lack the analytical rigour to recognise theoretical violations, such as a breach of the Head-First principle. This creates a significant" Reasoning Gap" where the student's perception of AI utility is high, but their actual theoretical mastery is declining. In such cases, the tool becomes a crutch for cognitive offloading rather than a productive scaffold for learning, a nuance that general pedagogical studies often overlook.

Consequently, this study argues that the impact of institutional context depends heavily on the student's baseline of independent reasoning. To address this, the Linguistic-Critical AI Audit Framework (L-CAAF) is proposed as a necessary intervention. By requiring a "Theoretical Verification Phase," the L-CAAF ensures that, regardless of a student's prior digital literacy or institutional background, they are forced to engage in the high-order cognitive tasks required to validate linguistic data against established theories.

2.2.2 Perceptions Across Contexts

Students' perceptions vary based on prior experience with digital tools, AI familiarity, and institutional context. Those with higher digital literacy tend to report more favourable perceptions, whereas those with limited exposure express scepticism and ethical concerns (Al Abdullatif & Alsubaie, 2024).

Contextual studies indicate that cultural and institutional factors also shape perceptions. For example, Xu et al. (2024) found that in Chinese undergraduate programs, peer interaction, teaching practices, and local curriculum influence how students adopt AI tools. These findings underscore the importance of examining discipline-specific perceptions, as students in linguistics may encounter

unique challenges related to analytical and structural reasoning tasks.

2. 3 Cognitive and Pedagogical Implications

2.3.1 Impact on Learning and Critical Thinking

While perceptions are often positive, concerns regarding higher-order thinking and cognitive engagement persist. ChatGPT can improve learning performance and provide instant assistance, but evidence on its impact on analysis, synthesis, and deep reasoning is mixed (Schei et al., 2024).

Students may benefit from cognitive scaffolding when ChatGPT offers guided explanations, step-by-step problem-solving, or clarifying examples, aligning with Vygotsky's Zone of Proximal Development (Vygotsky, 1978). However, overreliance may reduce opportunities for independent reasoning and diminish neural engagement in complex cognitive processing (Al Abdullatif & Alsubaie, 2024).

2.3.2 Implications for Instruction

From a pedagogical perspective, instructors must balance the benefits of AI-assisted support with tasks requiring critical thinking. ChatGPT can provide instant feedback, clarification of concepts, and examples for practice, yet educators should design learning experiences that promote analytical reasoning rather than surface-level completion of tasks (Xu et al., 2024).

Ethical considerations—including academic integrity, potential bias in AI responses, and responsible implementation—also remain central to effective adoption in higher education (Schei et al., 2024).

2.4 Gaps in the Current Literature

Despite the growing body of research on student perceptions of AI chatbots, several gaps remain:
Discipline-Specific Evidence: Most studies focus on broad higher education contexts or STEM/technical subjects; few address analytical disciplines like linguistics (Schei et al., 2024).

Analytical Thinking Development: Limited empirical evidence links students' perceptions to the development of domain-specific analytical skills, such as syntactic analysis or phonological problem solving.

Global South and Contextual Diversity: Existing literature predominantly reflects Western and Asian educational contexts, with minimal research from African or non-Western systems (Xu et al., 2024).

Integration with Educational Theory: Few studies explicitly examine ChatGPT through cognitive scaffolding (Vygotsky, 1978) or frameworks like Bloom's Taxonomy (Bloom, 1956; Anderson & Krathwohl, 2001) to show how AI might support higher-order thinking.

2.5 Positioning This Study

This study addresses these gaps by focusing on undergraduate linguistics students, exploring not only whether students like ChatGPT but also how they perceive its role as a cognitive scaffold supporting or hindering analytical competence.

By grounding the investigation in educational theory and discipline-specific learning needs, the study contributes evidence on: Students' perceived usefulness and limitations of ChatGPT in structural linguistic tasks; Relationship between perceptions and analytical reasoning engagement; Implications for pedagogical practices that preserve deep learning while leveraging AI responsibly.

2.6 Conceptual Framework

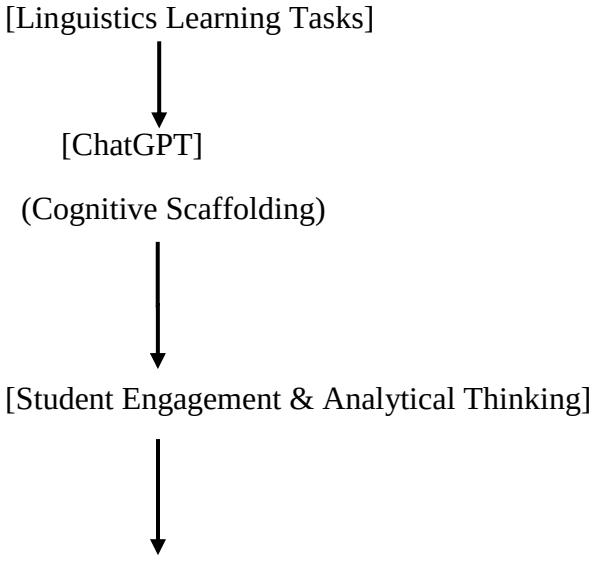
ChatGPT as a Cognitive Scaffold in Linguistics Learning
Input: Linguistics tasks (syntax, phonology, and semantics).

Mediating Tool: ChatGPT provides step-by-step explanations, clarifications, and examples.

Mechanism: Cognitive scaffolding (guided support within learners' Zone of Proximal Development).

Learner Engagement: Analytical reasoning and critical thinking with AI assistance.

Outcome: Improved understanding, mastery of analytical skills, balanced reliance.



2.6.1 Explanation of the Conceptual Framework: The Relational Dynamics of AI Scaffolding

The conceptual framework illustrates the dynamic relational process between AI support and linguistic mastery through four interconnected stages:

1. From Input to Mediating Tool (The Trigger)

The process begins with Linguistic Tasks (Input), such as syntax tree construction, phonetic transcription, or morphological analysis. These complex tasks act as a catalyst that necessitates the use of ChatGPT (Mediating Tool). The relationship here is one of assistance-seeking, where the AI provides the initial "scaffold"—offering step-by-step explanations and preliminary data that lower the cognitive barrier to entry for abstract theoretical concepts.

2. From Mediating Tool to Learner Engagement (The Interaction)

This stage represents the core of the framework, where ChatGPT functions as a Cognitive Scaffold within the learner's Zone of Proximal Development (ZPD). The relationship is dialectical: the AI's output serves as a "draft" that triggers Learner Engagement. Because AI can "hallucinate" or oversimplify linguistic rules, the student is forced into analytical reasoning and critical thinking to verify the output against established linguistic theories. This interaction ensures the student remains an active auditor rather than a passive recipient.

3. From Engagement to Learning Outcomes (The Transformation)

The final relationship is transformative, shifting the student from assisted performance to independent mastery. Through the active process of auditing and refining AI-generated data, the student internalises the analytical skills required for professional linguistic analysis. The final Learning Outcome is a state of balanced reliance, where the "scaffold" provided by the AI eventually "fades," leaving the student with the cognitive autonomy to validate linguistic truth independently.

METHODOLOGY

This study employed a qualitative research design to explore undergraduate linguistics students' perceptions of ChatGPT as a cognitive scaffold in learning. Qualitative research design is adopted as the most suitable approach for examining students' perceptions and experiences with ChatGPT. Unlike quantitative methods that prioritise numerical trends, a qualitative design allows for an in-depth exploration of the "how" and "why" behind student interactions with AI. This approach is particularly critical in linguistics, where the nuances of analytical reasoning and the subjective feeling of "cognitive offloading" cannot be captured by standardised surveys alone. By utilising a qualitative lens, the researcher can uncover the rich, contextual meanings students attach to AI as a "scaffold," providing a detailed understanding of the tension between technological efficiency and independent theoretical mastery.

A total of 92 students from Year 1 and Year 3 at the Muslim University of Morogoro were purposively selected, as they were actively enrolled in linguistics courses. Data were collected through an online questionnaire containing closed and open-ended questions aimed at capturing students' experiences, perceived usefulness of ChatGPT, its limitations, and its impact on analytical reasoning and engagement with linguistics tasks. The questionnaire included a total of 10 questions (6 closed and 4 open-ended questions) covering the following thematic areas: demographic information; use of ChatGPT in learning Linguistics; perceived learning benefits, critical thinking and learning behaviour; attitudes towards AI in education and student experience and recommendations. While a sample of 92 students is

large for a typical qualitative study, it was considered adequate to ensure a broad representation of diverse student experiences across different levels of linguistic study. To maintain academic rigour, data saturation was assessed through a continuous thematic analysis process. Saturation was reached when the final sets of student responses began to repeat previously identified themes such as "concerns over syntactic accuracy" and "AI as a morphological scaffold" without yielding new conceptual insights.

The data were analysed using Braun and Clarke's (2006) six-phase thematic analysis, allowing systematic identification of themes related to cognitive scaffolding, critical thinking, and discipline-specific learning. Ethical considerations were carefully observed: participation was voluntary, informed consent was obtained, and confidentiality was maintained throughout the study, as well as observing institutional ethics approval or clearance.

FINDINGS AND DISCUSSION

The thematic analysis of 92 undergraduate linguistics students' responses revealed four main themes: (1) ChatGPT as a cognitive scaffold for conceptual understanding, (2) its influence on analytical thinking, (3) limitations and epistemic challenges, and (4) the need for structured pedagogical guidance. These themes are discussed below in relation to current scholarship on AI use in education.

1. ChatGPT as a Cognitive Scaffold for Conceptual Understanding

Participants widely reported that ChatGPT helped simplify complex linguistic concepts, provided examples, and clarified difficult topics—functions they interpreted as cognitive support.
One student noted:

"ChatGPT helps me understand difficult linguistic theories such as syntax, phonology, morphology, and semantics." Another stated:

"It simplifies complex vocabulary and gives examples when I fail to understand in class." A third respondent remarked:

"It helps me capture unknown concepts and gives summaries that make topics easier."

These perceptions align with findings from recent research suggesting that generative AI tools can act as scaffolding supports by providing explanations, examples, and iterative feedback that assist learners in comprehension. For instance, Schei, Møgelvang, and Ludvigsen (2024) found that students view AI chatbots as useful for clarifying concepts and providing academic support, especially when they seek immediate clarification or more explanation beyond traditional instruction.

Similarly, Al-Abdullatif and Alsubaie (2024) reported that students with higher AI literacy often attribute learning support functions to AI generative systems, including breakdown of complex material and fact retrieval.

However, scholars caution that AI-driven scaffolding differs from human pedagogical scaffolding when the support is always available without structured fading or instructor facilitation. Continuous reliance on AI may reduce opportunities for deep independent processing unless instructors build tasks that require learners to progress beyond AI-generated explanations.

2. Influence on Analytical Thinking: Enhancement versus Dependency

Participants' responses reflected mixed perceptions regarding analytical thinking. Some students described ChatGPT as encouraging critical reasoning and helping them move from memorisation to analysis:

"ChatGPT encourages me to think critically about linguistic data and helps me move from memorisation to analysis."

"It improves analytical thinking because it explains reasoning step-by-step."

"I verify the answers before accepting them."

These reflections mirror findings in recent research showing that, when used reflectively, AI tools can act as cognitive partners that help students evaluate alternatives, generate hypotheses, or compare explanations—practices associated with higher-order thinking. For example, Xu et al. (2024) found that students who engage with ChatGPT by comparing

outputs with their own reasoning tend to report higher engagement and metacognitive reflection. Conversely, a number of participants expressed concern about reduced independent reasoning:

"Using ChatGPT reduces my independent analytical effort."

"It weakens thinking capacity when students copy answers."

"Students believe AI answers more than their own reasoning."

This aligns with current literature highlighting risks of cognitive offloading, whereby learners transfer effortful reasoning to technology rather than actively engaging with content. Ludvigsen (2024) noted that frequent uncritical reliance on AI may diminish opportunities for sustained analytical practice unless learning tasks are intentionally structured to require deeper processing.

3. Limitations and Epistemic Challenges

Students were candid about challenges encountered when using ChatGPT. A recurring issue was inaccuracy or inconsistency in AI responses, particularly in complex analyses:

"Sometimes ChatGPT provides wrong answers or slightly incorrect explanations."

"It sometimes gives different explanations from classroom notes."

"It may provide irrelevant or general information that does not fit the question."

Such concerns match documented limitations of large language models: they can produce plausible but incorrect answers (so-called "hallucinations"), especially in specialised academic domains. Bender et al. (2021) famously raised caution about stochastic parrots—models that regurgitate patterns without guaranteeing factual accuracy.

Similarly, Al-Abdullatif and Alsubaie (2024) observed that students frequently need to verify AI output against trusted sources, highlighting that AI generative systems are not substitutes for domain expertise.

Students also noted technological barriers and occasional irrelevant output, underscoring that AI support is not uniformly reliable and must be contextualised within discipline-specific requirements.

4. The Need for Structured and Guided Use

Across responses, there was a strong call for lecturer guidance and formal integration of AI into instructional practice:

"Lecturers should guide students on the proper use of ChatGPT."

"AI should be used as a helper, not a replacement for thinking."

"ChatGPT should be integrated formally into linguistics teaching, but with clear boundaries."

These recommendations align with emerging scholarship that positions AI integration as a pedagogical design problem, not merely a technical adoption issue. Rose et al. (2024) argue that educators must develop frameworks that help students use AI responsibly—balancing support with independent reasoning and critical evaluation.

Similarly, Al-Abdullatif and Alsubaie (2024) emphasise that AI literacy and careful instruction are essential for maximising educational benefits while mitigating cognitive risks.

Students' own advice—that educators provide boundaries and emphasise reflective use—indicates emerging learner awareness of both opportunities and risks. This reinforces the idea that pedagogical scaffolding should extend beyond AI tools to include human guidance and curriculum design that fosters epistemic responsibility. Overall Discussion in response to the research questions:

RQ1: How Do Students Use ChatGPT in Learning Linguistics?

In response to RQ1, the analysis of student usage patterns was derived from a systematic thematic coding process applied to 92 open-ended responses,

ensuring methodological consistency. This method, known as quantising, transforms qualitative data into numerical frequencies to highlight dominant themes while preserving contextual depth. The findings are summarised as follows:

The findings reveal that the majority of students (60 out of 92) primarily use ChatGPT to understand difficult linguistic concepts. Additionally, 14 students indicated that they use ChatGPT for all listed purposes, including solving syntax and phonology exercises, checking answers before submission, and generating examples.

Discussion

The student responses can be grouped into three major categories based on usage and perception. Firstly, 60 students reported using ChatGPT to understand complex linguistic concepts. Quotes include: "ChatGPT helps me understand linguistic theories better," "It simplifies complex linguistic concepts before I go to textbooks," and "I use it to get clearer explanations of phonological rules." This aligns with research indicating that AI tools like ChatGPT can scaffold students' understanding of abstract concepts if used with instructional guidance (Zhang et al., 2025).

Secondly, a smaller group of 9 students uses ChatGPT to practice syntax or phonology exercises, with quotes such as: "I use ChatGPT to practice tree diagrams", and "It helps me check phonetic transcription." This reflects application-oriented engagement, which can enhance learning when AI prompts critical thinking (Li & Wang, 2024).

Thirdly, 5 students primarily use ChatGPT for verifying answers: "I verify my answers with ChatGPT before submission," and "It helps confirm if my analysis is correct." This indicates metacognitive engagement, where students actively check their understanding (Chen et al., 2023).

The 14 students using ChatGPT for all purposes demonstrate intensive integration of AI in learning workflows: "I use ChatGPT for everything — explanations, examples, checking answers, and practice," and "It provides clear steps, examples, and feedback quickly." While this can be beneficial for efficiency and understanding, research warns that over-reliance may reduce independent analytical thinking (Brown & Adams, 2024).

RQ2: What are Students' Perceptions About ChatGPT's Impact on Analytical Thinking and Independent Reasoning?

Regarding students' perceptions, 28 students (30%) believe ChatGPT improves their critical thinking: "ChatGPT encourages me to think critically about linguistic data," and "It helps me move from memorisation to analysis." This is supported by studies showing that structured AI interaction can enhance critical reasoning (Kumar et al., 2025).

Conversely, 44 students (48%) felt that ChatGPT weakens analytical skills: "Over-reliance on ChatGPT may weaken students' reasoning skills," and "ChatGPT weakens analytical thinking because students depend more on it instead of using their capabilities." Scholars caution that excessive dependence can create metacognitive laziness and diminish self-driven reasoning (Johnson & Lee, 2024).

A balanced perspective emerged from 20 students (22%): "ChatGPT can improve analytical thinking if used properly, but weaknesses arise when students copy answers," and "It depends on how you use ChatGPT." This aligns with research emphasising responsible AI use to maintain cognitive engagement and critical evaluation skills (Zhang et al., 2025).

Collectively, the findings illustrate that ChatGPT functions as a double-edged pedagogical tool in linguistics education. It provides cognitive scaffolding that enhances immediate comprehension, supports example generation, and can stimulate higher-order thinking when used reflectively. However, unmediated or uncritical use may promote cognitive dependency, reduce independent reasoning, and lead to misinterpretation if AI output is inaccurate.

These results confirm recent scholarly insights that the educational impact of generative AI is contingent on instructional design, cognitive engagement, and user awareness rather than on AI alone (Schei et al., 2024; Xu et al., 2024; Al-Abdullatif & Alsubaie, 2024). They also underscore the need to integrate AI literacy into linguistics pedagogy so that students can navigate

trade-offs between efficiency and epistemic rigour. From the findings, the Linguistic Critical AI Audit Framework is proposed for pedagogical uses.

Framework Title: the Linguistic-Critical AI Audit Framework (L-CAAF)

1. Framework Objective
The L-CAAF is a pedagogical model designed to integrate ChatGPT into Linguistics education without sacrificing independent reasoning. It shifts the student's role from a passive receiver of AI answers to an active linguistic auditor.

2. Structural Components (The Triple-A Process)
Phase 1: Acquisition (Targeted Prompting)

- Student Task: Generate linguistic data (e.g., syntax trees, phonetic transcriptions) using ChatGPT.
- Lecturer Role: Designer. Sets complex tasks where AI is known to struggle or oversimplify.

Phase 2: Analysis (The Critical Audit)

- Student Task: Cross-reference AI output against core Linguistic Theories (e.g., X-Bar, Optimality Theory) and textbooks.
- Lecturer Role: Facilitator. Provides the "Audit Criteria" (specific rules the student must check).

Phase 3: Authentication (Verification Log)

- Student Task: Submit a final report showing the AI's version vs. the student's corrected version.
- Lecturer Role: Evaluator. Grades the logic of the correction rather than the initial AI output.

3. The Practical Tool: The L-CAAF Audit Log
Students submit this 3-step log with assignments for easy assessment:

- AI Output: What did ChatGPT say?
- Theoretical Conflict: What does the textbook/theory say instead?
- Student Correction: My final corrected analysis and the reason why.

4. Contributions of the L-CAAF
A. Contribution to Practice (Pedagogy & Curriculum)

- Curriculum Design: Provides a blueprint for "AI-Resistant" assessments by grading the audit process.
- Teaching Strategy: Reduces lecturer burden; the lecturer reviews the Audit Log (scannable) rather than the whole AI chat.
- Professional Skills: Trains students in "AI Oversight," a critical skill for future linguistic careers.

- B. Contribution to Theory (Learning & Linguistics)
- Extending Scaffolding Theory: Treats AI as a "Digital Scaffold" that must be critically dismantled by the learner.
- Active Learning: Forces deep engagement with linguistic data to identify machine errors.
- Cognitive Independence: Directly addresses the risk of "Cognitive Offloading" by keeping the human in charge of final analysis.

CONCLUSION AND RECOMMENDATIONS

Conclusion: The study explored the role of ChatGPT in Linguistics learning by examining both student usage patterns and perceptions of its impact on analytical thinking. The findings indicate that ChatGPT is predominantly used to clarify difficult concepts, offering students a scaffolded approach to understanding abstract linguistic theories. While some students view it as a critical tool for enhancing analytical reasoning, others express concern that over-reliance may weaken their independent thinking and problem-solving skills.

Recommendations: Structured Pedagogical Integration: Educators should design learning activities that incorporate ChatGPT as a supplementary tool, ensuring it is used alongside traditional teaching methods. This ensures students engage in active reasoning and verification rather than passive acceptance.

Critical AI Literacy Training: Institutions should provide training on AI literacy, emphasising how to verify AI outputs, evaluate their reliability, and integrate AI tools into reflective learning practices. This will foster independent thinking and responsible AI use.

Balanced Usage: Students should be encouraged to use ChatGPT strategically for clarification and concept building while retaining responsibility for independent problem-solving and analysis. This balance ensures AI serves as a cognitive aid rather than a crutch.

Ongoing Research and Monitoring: Further studies should monitor the long-term impact of AI tools like ChatGPT on analytical skills, ensuring educators can adapt their pedagogical strategies to prevent detrimental dependency and promote deeper learning.

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