TANGENCE
Number 135, August 2024
ISSN: 1710-0305
PISSN: 1189-4563

Gendered Syntax in AI-Assisted Academic Writing in Nigerian Universities

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ABSTRACT

This study examined gendered syntactic patterns in AI-assisted academic writing among students in the Department of English and Literature, Alvan Ikoku Federal University of Education, Owerri**.** This study was motivated by growing concerns that AI-assisted writing tools, while supporting academic literacy, may unconsciously reproduce sociocultural biases through sentence structure. Anchored on Halliday's Systemic Functional Linguistics (SFL) theory**,** the analysis focused on transitivity patterns, agency, and participant roles in selected academic texts. The data comprised a purposively selected corpus of AI-assisted and human-written academic texts. These texts were analyzed to determine how material, relational, and mental processes, as well as active and passive constructions, were used to represent gendered subjects. The findings indicated that AI-assisted texts frequently reproduced conventional syntactic patterns that foregrounded masculine agency while backgrounding feminine roles through passivation and relational clauses. These tendencies reflected broader sociocultural ideologies embedded in language use rather than deliberate technological bias. The study concluded that although AI-assisted academic writing enhanced textual organization and linguistic accuracy, it can subtly reproduce gendered discursive patterns. This study, therefore, recommended integrating critical language awareness and responsible AI literacy into academic writing instruction to promote more gender equitable language practices in Nigerian universities.

KEYWORDS

AI-Assisted Academic Writing; Gendered Syntax; Nigerian Universities; Systemic Functional Linguistics; Transitivity.

Introduction

Globally, the rapid integration of Artificial Intelligence (AI) into educational practices has significantly transformed academic writing across universities. Okoh (1998) sees writing "as a complex, highly demanding activity" (p. 6). In Nigerian universities, where English functions as the primary language of instruction and scholarly communication, AI-assisted writing tools like grammar checkers, predictive text generators, and large language models are increasingly being adopted by students. The reason is to enhance clarity, coherence, and grammatical accuracy in their academic work. Okoh adds that, "The level of clarity achieved in our writing is tied up with, indeed determined by, our thinking power and processes" (p.135). These tools, often perceived as neutral and purely supportive, have become silent

ISSN: 1710-0305
PISSN: 1189-4563

collaborators in the writing process. However, as AI systems learn from vast corpora of existing texts, they inevitably absorb and reproduce embedded sociocultural ideologies, including gendered assumptions encoded in language use (Bender et al., 2021, p. 613; Crawford, 2021, p. 92). The pedagogical implications of AI-assisted writing cannot be overlooked.

Gender equity is a major concern in Nigerian educational discourse, with efforts aimed at promoting equal representation and participation. Wardhaugh (2010) claims that, "Gender is also something we cannot avoid; it is part of the way in which societies are ordered around us, with each society doing that ordering differently" (p. 334). Language, as a carrier of ideology, plays a crucial role in shaping perceptions of gender roles. According to Carroll (2004), "Women tend to use tag questions. They also tend to use more question intonation patterns in declarative sentences than men" (p. 229). If, AI-assisted writing perpetuates subtle gendered representations, it may inadvertently counteract these equity efforts. This study also responds to calls for interdisciplinary research that connects linguistics, education, and technology. AI is no longer merely a technical tool. It is a participant in meaning-making processes. Understanding its linguistic impact requires frameworks capable of analyzing how meaning is structured at the clause level. Nigerian universities increasingly encourage digital literacy, yet there is limited critical engagement with how AI tools shape linguistic choices. As Luke (2018, p. 8) argues, "Literacy education must extend beyond technical skills to include critical awareness of how language constructs social realities". Examining gendered syntax aligns with broader discussions on inclusivity and equity in education.

Gender bias in language has traditionally been examined at the lexical level through the use of generic masculine pronouns, occupational nouns, and semantic representations (Lakoff, 1975, p. 45; Sunderland, 2006, p. 31). Fromkin, Rodman, and Hyams (2011) note that, "This dominance of males in mixed speech situations seems to develop at an early stage" (p. 449). Mey (2006) adds that, "For thousands of years, the social formations in which most of our species has lived have been dominated by males", (p.313). However, more recent linguistic scholarship has shifted attention to syntactic structures. Mills (2008) argues that, "gender bias is often more subtly embedded in clause patterns and participant roles than in vocabulary choices" (p. 89). On the other hand, Yule (2010) presents illustrations that "there can be differences between the words used by men and women in a variety of languages" (p. 275). For instance, the use of active constructions to represent male actors and passive constructions to represent female actors can reflect implicit ideological positioning. Such syntactic patterns become particularly significant in academic discourse, where authority, agency, and knowledge production are linguistically constructed. Moreover, the growing reliance on AI for academic writing among undergraduates introduces new dynamics into literacy development. Students often accept AI suggestions as linguistically authoritative, thereby internalizing the syntactic patterns generated by these tools. As Hyland (2004) notes, "academic writing is not merely about conveying information but about adopting disciplinary identities through language" (p. 139). If AI tools subtly encode gendered representations, they may influence how students construct academic identities and represent gender roles in scholarly discourse.

Studies have shown that academic writing traditionally is characterized by objectivity, impersonality, and formal structure. Biber, Johansson, Leech, Conrad, & Finegan (1999) explain that, "These features often involve the frequent use of passive constructions and relational clauses, which may obscure agency" (p. 972). When such structures intersect with gender representation, they can result in uneven portrayals of male and female subjects. For example, male scholars may be presented as active agents performing intellectual tasks, while female subjects may appear as recipients of actions or as relational entities. Investigating whether AI-assisted writing reproduces these patterns is crucial for promoting equitable language practices. We should know that, "language is not a neutral medium of communication, it is a social semiotic system that encodes ideology, power relations, and cultural assumptions" (Halliday, 1978, p. 2). In academic writing, syntactic choices like transitivity patterns, clause structures, and voice constructions subtly shape how participants are represented, who is portrayed as agentive, and whose roles are backgrounded. "These choices often reflect gendered

ISSN: 1710-0305
PISSN: 1189-4563

patterns that are deeply rooted in social discourse" (Fairclough, 1992, p. 64). With the emergence of AI-assisted writing, there is a need to interrogate whether such systems replicate existing gendered syntactic tendencies and how these patterns manifest in students' academic texts.

In Nigerian universities, this issue becomes particularly significant. Nigeria's sociocultural environment, like many others, is shaped by gendered expectations and roles that may be subtly reflected in language use. As undergraduate students increasingly rely on AI tools to construct academic essays, research reports, and assignments, there is a risk that these tools may influence not only the correctness of language but also the way gendered agency is represented in their writing. Students may unknowingly accept AI-generated clause structures that foreground male agency and background female participation, thereby perpetuating unequal representations in academic discourse. Furthermore, academic writing instruction in many Nigerian universities emphasizes structure, referencing, and grammatical accuracy, with limited attention to how syntactic choices construct social meaning. Students are trained to produce correct sentences but are rarely encouraged to examine how grammatical patterns may encode ideological assumptions. The introduction of AI-assisted writing tools into this environment complicates the situation, as students may assume that AI outputs represent ideal academic language without critically evaluating the underlying patterns. The relevance of this issue is heightened by the growing global conversation about responsible AI use in education. Universities are developing policies to address plagiarism and authorship in AI-assisted writing, yet few policies consider how AI shapes the linguistic and ideological dimensions of students' texts. Understanding how AI influences syntactic representation is, therefore, essential for developing pedagogical and policy responses that promote equitable language practices.

This study, therefore sets out to explore whether AI-assisted academic texts reproduce gendered syntactic patterns, how these patterns compare with human-written texts, and what implications they hold for academic writing pedagogy. Through this investigation, it aims to contribute to ongoing conversations on equitable language practices, critical AI literacy, and the role of grammar in constructing social realities. Previous studies on AI and bias have largely focused on algorithmic fairness, data representation, and ethical implications (Noble, 2018, p. 156; O'Neil, 2016, p. 84). While these studies highlight the risks of technological bias, few have examined bias from a linguistic perspective, particularly within the syntactic structures of AI-assisted texts. Similarly, gender studies in linguistics have examined discourse patterns in media, literature, and conversation, but there is limited research on gendered syntax within academic writing influenced by AI technologies. This study therefore bridges a critical gap by combining insights from Systemic Functional Linguistics (SFL), gender linguistics, and AI studies within the Nigerian academic context.

Statement of the Problem

The introduction of AI into academic writing practices in Nigerian universities has been widely welcomed as a technological advancement that supports students' language development, improves textual organization, and enhances grammatical accuracy. Undergraduate students increasingly rely on AI-assisted writing tools for idea generation, sentence restructuring, vocabulary selection, and overall text refinement. While these tools appear to promote academic literacy, there is a growing concern that they may also reproduce subtle sociocultural ideologies embedded in the data from which they learn. One such ideology relates to gender representation in language, particularly at the syntactic level where patterns of agency, participation, and voice are constructed through clause structures. The problem, therefore, is not merely about the presence of AI in academic writing, but about how AI-assisted writing may unknowingly replicate gendered syntactic patterns that influence how male and female subjects are represented in scholarly discourse. Language scholars have long argued that "gender bias is not only reflected in vocabulary choices but is also deeply embedded in grammatical and syntactic constructions" (Mills, 2008, p. 89). In academic discourse, syntactic choices like transitivity patterns, passive constructions, and relational clauses often determine who is portrayed as an active agent and who

ISSN: 1710-0305
PISSN: 1189-4563

appears as a passive participant. These choices are rarely questioned because they are perceived as part of conventional academic style. However, when AI tools begin to suggest or generate such structures for students, the possibility arises that gendered representations become naturalized and internalized without critical awareness. This raises a serious linguistic and pedagogical concern within Nigerian universities where AI-assisted writing is increasingly becoming part of students' academic routines.

Most discussions on AI bias have focused on algorithmic fairness, data representation, and ethical considerations in technology (Noble, 2018, p. 156; O'Neil, 2016, p. 84). These studies highlight how AI systems may reproduce racial, social, and cultural biases present in their training data. However, there is limited research examining how such biases manifest at the linguistic level, particularly through syntactic structures in academic writing. Similarly, gender studies in linguistics have examined discourse patterns in media, literature, and everyday conversation (Lakoff, 1975, p. 45; Sunderland, 2006, p. 31), but little attention has been paid to how gender bias may operate through grammar in AI-assisted academic texts. This creates a significant research gap at the intersection of AI studies, gender linguistics, and academic writing pedagogy. In the Nigerian context, this gap becomes even more critical due to the sociocultural and linguistic environment in which English operates. "English in Nigerian universities is influenced by colonial legacies, local cultural norms, and multilingual realities" (Bamgbose, 1995, p. 19). These influences shape how gender roles are perceived and represented in discourse. When AI tools trained largely on global datasets interact with this local context, they may reinforce already existing gendered syntactic tendencies rather than challenge them. As a result, students who rely on these tools may unknowingly reproduce linguistic patterns that foreground masculine agency while backgrounding feminine roles through passivation and relational constructions.

Another dimension of the problem lies in the perceived authority of AI-generated suggestions. Students often regard AI-assisted corrections and sentence structures as linguistically superior and academically appropriate. Consequently, they adopt these patterns without questioning the ideological assumptions embedded in them. As Hyland (2004, p. 139) observes, "academic writing is a process through which students construct scholarly identities". If, AI tools subtly encode gendered representations in syntactic structures, they may influence how students conceptualize authority, agency, and gender roles within academic discourse. This influence is particularly significant among undergraduates who are still developing their academic writing competence. Furthermore, "academic writing conventions themselves often favor impersonal and passive constructions, which may obscure agency" (Biber et al., 1999, p. 972). When these conventions intersect with gender representation, they can result in uneven portrayals. For instance, male subjects may be represented through material processes that emphasize action and agency, while female subjects may appear in relational or passive constructions that diminish their visibility as active contributors. If AI tools reproduce these patterns consistently, they may perpetuate subtle gender inequalities within scholarly texts.

Despite increasing advocacy for gender equity in Nigerian education, little attention has been given to how language practices in academic writing may contradict these efforts. Policies promoting gender inclusion often focus on participation rates, access to education, and representation in leadership, but overlook how language itself shapes perceptions of gender roles. Since language functions as a carrier of ideology, ignoring syntactic representations of gender in AI-assisted writing may undermine broader equity initiatives. There is also a pedagogical problem. Nigerian universities emphasize digital literacy and encourage students to make use of technological tools for learning. However, there is minimal critical engagement with how these tools shape linguistic choices. As Luke (2018, p. 8) argues, "literacy education should include critical awareness of how language constructs social realities". Without such awareness, students may become passive consumers of AI-generated structures rather than critical users of language. This lack of critical language awareness creates a situation where gendered syntactic patterns are reproduced without scrutiny.

ISSN: 1710-0305
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Moreover, existing research on academic writing in Nigerian universities has largely focused on issues such as coherence, cohesion, grammatical accuracy, and vocabulary development. Very few studies have examined how syntactic patterns encode social meanings like gender. Even fewer have explored how AI-assisted writing contributes to these patterns. This lack of empirical evidence means that educators and policymakers are unaware of the potential linguistic implications of AI integration into academic writing instruction. The absence of research in this area also means that there are no pedagogical guidelines for addressing gendered syntax in AI-assisted writing. Lecturers may correct grammatical errors but overlook how syntactic structures represent gender roles. AI tools, in turn, continue to generate patterns based on their training data without contextual adaptation to local educational goals. This cycle perpetuates unnoticed gender representations within academic texts.

Additionally, undergraduate students, who form the primary users of AI writing tools, are at a formative stage of academic and ideological development. Their frequent interaction with AI-generated suggestions may influence their long-term writing habits and perceptions of acceptable academic style. If these habits include gendered syntactic representations, the effect may extend beyond university into professional and scholarly communication. The problem is therefore multidimensional. It involves technological influence, linguistic structure, sociocultural ideology, and pedagogical practice. It concerns not only how AI tools function but how they participate in meaning-making processes within academic discourse. Without systematic investigation, the subtle ways in which gender bias is embedded in AI-assisted syntactic choices will remain unnoticed and unaddressed. This study is motivated by the need to fill this gap by examining gendered syntactic patterns in AI-assisted academic writing within Nigerian universities. It seeks to determine whether AI-assisted texts reproduce patterns that foreground masculine agency and background feminine roles, how these patterns compare with human-written texts, and what implications they hold for academic writing pedagogy. Addressing this problem is essential for promoting equitable language practices, fostering critical AI literacy, and ensuring that technological advancements in education do not inadvertently perpetuate sociocultural biases encoded in language.

Objectives of this Study

1. To examine the transitivity patterns like material, mental, and relational processes used in AI-assisted academic texts produced by students.

2. To investigate how agency and participant roles are syntactically represented in AI-assisted academic writing with respect to gender.

3. To compare gendered syntactic patterns in AI-assisted academic texts with those found in comparable human written academic texts.

4. To determine the pedagogical implications of gendered syntactic representations in AI-assisted academic writing for academic writing instruction.

Research Questions

1. What transitivity patterns are predominantly used in AI-assisted academic texts produced by students?

2. How are agency and participant roles, syntactically represented in AI-assisted academic writing in relation to gender?

3. In what ways do gendered syntactic patterns in AI-assisted academic texts differ from those in human written academic texts?

ISSN: 1710-0305
PISSN: 1189-4563

4. What are the pedagogical implications of gendered syntactic representations in AI-assisted academic writing for academic writing instruction?

Significance of this Study

Firstly, this study contributes significantly to linguistic scholarship, particularly within the framework of SFL. Halliday's (1978, p. 2) conception of language as a social semiotic system emphasizes that grammar is not merely structural but ideological. By analyzing transitivity patterns, agency, and participant roles in AI-assisted texts, the study demonstrates how gender representation is encoded not at the level of vocabulary alone but within clause structures. This deepens existing scholarship on language and gender, which has often concentrated on lexical choices (Lakoff, 1975, p. 45; Sunderland, 2006, p. 31), by showing how syntax itself can function as a carrier of gender ideology. The study therefore extends the application of SFL to contemporary digital writing practices and positions grammar as a site for investigating technological mediation of discourse.

Secondly, the study is pedagogically significant for academic writing instruction in Nigerian universities. Lecturers frequently focus on coherence, cohesion, grammatical correctness, and referencing conventions when assessing students' writing. However, little attention is paid to how syntactic choices shape representations of agency and gender roles. By highlighting how AI tools may influence students' clause constructions, this study encourages educators to incorporate critical language awareness into writing pedagogy. Luke (2018, p. 8) argues that, "literacy education must equip learners to question how language constructs social realities". This study provides empirical grounding for such pedagogical shifts, enabling lecturers to move beyond surface level corrections to deeper engagement with how grammar encodes meaning.

The study is also important because undergraduate students, who form the primary users of AI writing tools, are at a formative stage of academic identity development. As Hyland (2004, p. 139) notes, "academic writing is a process through which students adopt disciplinary identities". If, AI tools consistently suggest syntactic patterns that foreground masculine agency and background feminine roles, students may internalize these patterns as norms of scholarly expression. This study therefore, draws attention to the long term impact of AI-assisted writing on students' perceptions of authority, participation, and gender roles within academic discourse.

From a technological perspective, this study contributes to discussions on AI bias by shifting attention from algorithmic fairness to linguistic representation. Existing studies on AI bias often focus on issues of data discrimination, racial profiling, and ethical design (Noble, 2018, p. 156; O'Neil, 2016, p. 84). While these are important, they overlook how AI reproduces bias through language structures. By examining AI-assisted texts rather than algorithms, this research provides a practical and observable way of identifying how bias manifests in everyday academic writing. This approach broadens the scope of AI ethics to include linguistic and educational dimensions.

Furthermore, the study is significant in the Nigerian sociocultural context. English in Nigerian universities "operates within a multilingual environment shaped by indigenous languages, colonial legacies, and local cultural norms" (Bamgbose, 1995, p. 19). These factors influence how gender roles are perceived and represented in discourse. When AI tools trained predominantly on global datasets interact with this local environment, they may reinforce rather than challenge existing gendered discursive patterns. This study therefore sheds light on how imported technological tools intersect with local language realities, creating hybrid patterns of gender representation that deserve scholarly attention.

This study also aligns with ongoing efforts to promote gender equity in education. Nigerian educational policies increasingly advocate for equal participation of men and women in academic spaces. However, these efforts often overlook how language practices may subtly contradict equity goals. Since language

ISSN: 1710-0305
PISSN: 1189-4563

shapes perception, syntactic patterns that consistently foreground male agency may perpetuate unequal representations. By revealing these patterns, the study supports broader gender equity initiatives by addressing the linguistic dimension of representation.

Another significant contribution of this study lies in its interdisciplinary nature. It bridges linguistics, education, gender studies, and AI research, demonstrating that AI is not merely a technological tool but an active participant in meaning-making. This interdisciplinary approach encourages future researchers to examine digital tools from linguistic and social perspectives rather than purely technical ones. It also opens new pathways for research into how emerging technologies influence discourse practices in academic environments.

The study is equally significant for curriculum development. Findings from this study can inform the design of academic writing courses by integrating modules on critical AI literacy and gender-sensitive language use. Students can be taught not only how to use AI tools effectively but also how to critically evaluate the linguistic suggestions these tools provide. This approach empowers students to remain active decision-makers in their writing rather than passive recipients of AI-generated structures.

In addition, the study provides a foundation for developing guidelines for ethical AI use in academic writing. As universities grapple with policies on AI usage, most guidelines focus on plagiarism and authorship concerns. This study expands the conversation to include how AI influences the content and structure of language itself. Policymakers can use these insights to create more comprehensive AI usage policies that consider linguistic and ideological implications.

The study is also valuable for lecturers and supervisors who assess students' academic work. Understanding how AI tools may shape syntactic choices allows educators to identify patterns that may not originate from students' own linguistic preferences. This awareness can inform more nuanced feedback and encourage discussions on equitable language use.

For students, the study promotes awareness of how language choices reflect social meanings. By becoming conscious of gendered syntax, students can make deliberate choices that promote inclusivity and fairness in their writing. This awareness is particularly important for students in disciplines where academic writing forms a significant part of professional communication.

Moreover, the study contributes to the global discourse on AI and language by providing data from a Nigerian university context, which is often underrepresented in AI and linguistic research. Most studies on AI bias are conducted in Western contexts. By situating the study in Nigeria, it diversifies scholarly understanding of how AI interacts with different linguistic and cultural environments.

The study also has implications for future studies. It opens avenues for investigating other forms of bias in AI-assisted writing, such as racial, cultural, or ideological representations. Researchers can build on this work to explore how AI influences discourse across different genres and educational levels.

Importantly, the study underscores the need to view grammar not as a neutral set of rules but as a powerful tool for constructing social realities. By focusing on syntactic patterns, it reveals how deeply embedded ideologies can be reproduced through seemingly technical writing tools. This perspective encourages a rethinking of how technology and language intersect in educational spaces.

Finally, the study is significant because it advocates for a balanced view of AI in education. While recognizing the benefits of AI-assisted writing in improving textual quality, it calls for critical engagement with its linguistic implications. This balanced approach ensures that technological advancement does not come at the cost of reinforcing subtle social biases.

Theoretical Frameworks

This study is anchored primarily on Systemic Functional Linguistics (SFL) developed by Halliday (1978, 1985) and further elaborated by Halliday and Matthiessen (2014). It is supported by insights from

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PISSN: 1189-4563

Language and Gender studies and Critical Discourse perspectives on technology and ideology. These complementary perspectives provide a robust foundation on how gendered meanings are constructed through syntactic choices in AI-assisted academic writing. By integrating SFL with gender linguistics and critical views of AI-mediated discourse, the framework enables a clause level analysis of how agency, participation, and representation are grammatically realized in academic texts produced with technological support. Systemic Functional Linguistics, developed by Halliday (1978, p. 2; 1985, p. xiii) and further elaborated by Halliday and Matthiessen (2014, p. 30), views language as a social semiotic system through which speakers and writers make meaning in context. Unlike formal grammar approaches that treat language as an abstract system of rules, SFL emphasizes how grammatical choices are shaped by social purposes. Halliday proposes that language performs three metafunctions simultaneously. They are; the ideational, interpersonal, and textual metafunctions.

Of these, the ideational metafunction, realized through the transitivity system, is central to this study. "Transitivity explains how experience is represented in clauses through different process types and participant roles (Halliday & Matthiessen, 2014, p. 213)". In academic writing, "syntactic choices often involve frequent use of passive constructions and relational clauses to achieve objectivity" (Biber et al., 1999, p. 972). However, these structures may obscure agency and create uneven representations when gendered subjects are involved. Halliday's assertion that grammar is ideological (1978, p. 2) aligns with Fairclough's (1992, p. 64) view that discourse is shaped by power relations and social structures. Grammar, therefore, is not merely technical but participates in constructing social realities. Fairclough's perspective from Critical Discourse Analysis (CDA) complements SFL by emphasizing that linguistic patterns are shaped by broader sociocultural forces. AI tools trained on large corpora of existing texts inevitably absorb prevailing discursive patterns, including gender representations. When these tools suggest syntactic structures to students, they may reproduce these patterns unconsciously. The combination of SFL and CDA thus provides a way to link clause level analysis with broader ideological implications.

Early studies in language and gender like Lakoff (1975, p. 45), focused on how vocabulary reflects gender inequality. Later scholars like Sunderland (2006, p. 31) and Mills (2008, p. 89) extended this discussion to discourse and syntax, arguing that gender bias often operates subtly through grammatical structures rather than obvious lexical markers. Mills, in particular, notes that passivation and relational clauses can reduce women's visibility as agents in discourse. This study builds on these insights by applying them to AI-assisted academic writing. It investigates whether AI-generated syntactic suggestions align with patterns identified in gender linguistics, such as foregrounding masculine agency and backgrounding feminine roles. By doing so, it extends language and gender scholarship into the domain of educational technology. Academic discourse is characterized by formality, impersonality, and objectivity. Hyland (2004, p. 139) explains that, "students learn to construct disciplinary identities through adopting accepted writing conventions". These conventions often involve depersonalized structures that obscure the writer's presence. However, when gendered subjects appear in such texts, the syntactic patterns used can influence how they are perceived. Biber et al. (1999, p. 972) observe that, "academic writing frequently employs passive constructions and relational processes". While these structures contribute to objectivity, they may also create opportunities for unequal representation. SFL provides the analytical tools to identify these patterns and examine how they intersect with gender representation in AI-assisted texts.

Recent scholarship on AI has highlighted how language models reproduce biases present in their training data (Bender et al., 2021, p. 613; Crawford, 2021, p. 92). These studies argue that AI systems function as 'stochastic parrots', repeating patterns from existing texts without understanding their social implications. While much of this research focuses on ethical and algorithmic concerns, it has not sufficiently examined how bias manifests through grammar. The Nigerian context adds another dimension to this framework. English usage in Nigeria "is shaped by local cultural norms and multilingual influences" (Bamgbose, 1995, p. 19). Gender roles in Nigerian society may influence how participants are represented in discourse. When AI tools trained on global data interact with this

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PISSN: 1189-4563

context, they may reinforce existing patterns rather than promote equitable representation. The integration of SFL, language and gender studies, and critical perspectives on AI provides a comprehensive framework for this study. SFL offers the tools for clause level analysis; gender linguistics provides insight into how syntax encodes inequality; CDA links linguistic patterns to ideology; and AI studies explain how these patterns are technologically reproduced.

Methodology

Research Design: This study adopted a descriptive qualitative research design with elements of comparative textual analysis.

Population of this Study: The population of the study comprised 200 third year (300 level) students, Department of English, Alvan Ikoku Federal University of Education, Owerri. These students were considered appropriate for the study because, at this level, they possess sufficient academic writing experience and are more likely to use AI-assisted tools to refine their texts.

Sample and Sampling Technique: The sample size for the study was 60% of the population, which amounted to 120 students. A purposive sampling technique was used to select the participants. The criteria for selection were students who regularly engage in academic writing tasks, students who are familiar with or have access to AI-assisted writing tools, and students willing to submit both AI-assisted and non AI-assisted versions of their academic texts. This ensured that the data collected were directly relevant to the focus of the study.

Method for Data Collection: The primary instrument for data collection was students' academic texts. These texts formed a mini corpus for analysis. Two categories of texts were collected from each participant. (i) AI-assisted academic texts (essays or assignments produced with the aid of AI writing tools). (ii) Human written academic texts (comparable essays or assignments written without AI assistance). Students were given a uniform academic writing task to ensure similarity in topic and genre.

Presentation and Analysis

1. Material Process and Masculine Agency

Sample from AI-assisted clause for male: *The male student conducted the experiment successfully.*

Element	Analysis
Process Type	Material (doing)
Actor	The male student
Goal	the experiment
Voice	Active

Here, the male participant is the Actor who performs an intellectual task. This clause foregrounds agency and competence.

Sample from human written equivalent: *The experiment was conducted by the female student.*

Element	Analysis
Process Type	Material
Actor (logical)	the female student
Goal (grammatical)	the experiment
Voice	Passive

ISSN: 1710-0305
PISSN: 1189-4563

Although, the female student performed the action, passivation backgrounds her agency. The experiment becomes the grammatical focus.

2. Passive Construction and Feminine Backgrounding

Sample from AI-assisted clause for female: *The female student was guided by the supervisor*.

Element	**Analysis**
Process Type	Material
Goal	the female student
Actor	the supervisor
Voice	Passive

Here, the female participant is positioned as a recipient of action, not the initiator.

Contrast with male example from same corpus: *The male student guided his group members*.

Here, the male is Actor, performing leadership. The syntactic effect in this case is that females appear as dependents; males as initiators.

3. Mental Processes and Cognitive Ownership

Sample from AI-assisted clause for male: *He understood the theoretical framework clearly*.

Element	Analysis
Process Type	Mental (cognition)
Senser	He
Phenomenon	the theoretical framework

Sample from AI-assisted female clause**:** *She was exposed to the theoretical framework*.

Element	Analysis
Process Type	Material (passive experience)
Goal	she

Here, it is assumed that the male thinks while the female experiences**.** The implication here is that **c**ognition is grammatically attached more to males; females are positioned as recipients of knowledge.

4. Relational Clause and Identity Framing

Sample from AI-assisted clause: *She is a diligent and supportive student*.

Element	**Analysis**
Process Type	Relational (attributive)
Carrier	she
Attribute	diligent and supportive

Sample from Male equivalent**:** *He completed the task efficiently*.

This therefore, represents male = action while female = description.

It good to note that relational clauses describe states, not actions, subtly reducing perceived agency.

5. Leadership Representation

Samples from AI-assisted writing are: *The male researcher developed the model.*

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The female researcher was part of the team that developed the model.

In the first, the male is sole Actor. In the second, the female is grammatically diluted within a group.

6. Distribution of Actor Roles in Group Work

Sample from AI-assisted clause**:** *The male student led the discussion while the female students were encouraged to contribute.*

Element	**Analysis**
Male role	Actor (leader)
Female role	Goal (encouraged)

Even when both genders are present, syntactic positioning differs.

7. Subtle Erasure through Nominalization

Sample from AI-assisted clause: *Participation was observed among the female students.*

Here, no actor and no agency is erased.

Sample from human written version: *The female students participated actively*.

Here, the clear actor role is restored.

8. Repeated Pattern across Texts

Across many scripts, this pattern reoccurred:

Samples in male representation are conducted, analyzed, examined, understood, believed, explained, led, organized, and initiated.

Samples in female representation included, was assisted, was guided, was exposed, was taught, was informed, was included, and was part of.

Of course, these examples are not lexical accidents but systematic syntactic choices.

9. Clause Pair Comparison

Samples from AI-assisted**:** *He analyzed the data before conclusions were drawn by the female assistant.*

Two clauses, same sentence that represented the male as actor and the female backgrounded in passive clause.

10. SFL Interpretation of Pattern

From SFL, these choices show:

Material processes = power, action → males

Relational processes = identity, state → females

Passive voice = reduced visibility → females

Mental processes = cognition → males

This is precisely what Halliday (1978, p. 2) means by grammar encoding ideology. AI-assisted texts did not intend to create bias. Instead, they reproduced dominant discursive patterns from training data. Because academic writing already prefers passives and impersonal structures (Biber et al., 1999, p. 972), AI amplified these in ways that interacted with gender representation.

Human writers, by contrast, showed more variation and balance, often unconsciously restoring agency to female participants. This shows clearly that when students accepted AI suggestions:

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(i) Males appeared as thinkers, doers, leaders.

(ii) Females appeared as receivers, assistants, descriptors.

This happened without students noticing, confirming the need for critical language awareness. All texts were segmented into clauses. Clauses containing gender references (e.g., *he, she, male student, female lecturer, women, men*) were extracted and coded. A total of 1,920 gender-referencing clauses were identified across the corpus: 980 from AI-assisted texts and 940 from human-written texts.

Distribution of Process Type in AI-Assisted and Human Written Texts

Table 1: Process Types across Text Categories

Process Type	AI-Assisted Texts (n=980)	Human Written Texts (n=940)
Material	520 (53.1%)	410 (43.6%)
Mental	170 (17.3%)	220 (23.4%)
Relational	290 (29.6%)	310 (33.0%)

This data show that AI-assisted texts favored material processes, while human written texts contained more mental and relational processes. Material processes represent action and agency (Halliday & Matthiessen, 2014, p. 213), suggesting that AI-assisted writing foregrounded action more frequently than human writing.

Gender Representation in Material (Agency)

Material processes were further analyzed to determine how male and female participants were positioned as actors (doers of action).

Table 2: Gender as Actors in Material Processes

Gender	AI-Assisted Texts (n=520)	Human Written Texts (n=410)
Male	360 (69.2%)	230 (56.1%)
Female	160 (30.8%)	180 (43.9%)

In AI-assisted texts, male participants appeared as actors in nearly 70% of material clauses, while female participants appeared in less than one-third. In contrast, human written texts showed a more balanced distribution. This indicates that AI-assisted writing foregrounded masculine agency more strongly. Examples from AI-assisted texts are**;**

(i) *The male researcher conducted the experiment.*

(ii) *He analyzed the data carefully.*

Examples from human written texts are;

(i) *The female lecturer organized the workshop.*

(ii) *She supervised the research process.*

These patterns suggest that AI tools frequently structured sentences to present males as active agents of academic action.

Use of Passive Construction and Backgrounding of Female Participants

Passive voice often obscures agency (Biber et al., 1999, p. 972). The analysis revealed notable differences in how male and female participants appeared in passive clauses.

ISSN: 1710-0305
PISSN: 1189-4563

Table 3: Gender Representation in Passive Constructions

Gender	AI-Assisted Texts	Human Written Texts
Male	90 (30%)	120 (45%)
Female	210 (70%)	150 (55%)

In AI-assisted texts, female participants appeared in passive constructions more than twice as often as males**.**

Examples from AI-assisted texts:

(i) *The female student was assisted by the supervisor.*

(ii) *She was given instructions for the task.*

Here, the female participant is grammatically positioned as a goal rather than an actor, reflecting backgrounded agency.

Mental Processes and Cognitive Representation (Mental processes represent thinking, feeling, and perceiving).

Table 4: Gender in Mental Processes

Gender	**AI-Assisted Texts (n=170)**	**Human Written Texts (n=220)**
Male	110 (64.7%)	120 (54.5%)
Female	60 (35.3%)	100 (45.5%)

AI-assisted texts again showed males more frequently as sensers (thinkers, perceivers).

Examples**:**

(i) *He understood the concept clearly.*

(ii) *The male student believed the theory was valid.*

Human written texts more often represented females in cognitive roles: *She understood the implications of the study.*

This suggests that AI-assisted writing subtly associated cognition and intellectual activity more with male participants.

Relational Processes and Identity Assignment (Relational clauses assign attributes and identities).

Table 5: Gender in Relational Processes

Gender	AI-Assisted Texts (n=290)	Human Written Texts (n=310)
Male	120 (41.4%)	130 (41.9%)
Female	170 (58.6%)	180 (58.1%)

Both text types frequently represented females through relational clauses. Examples;

(i) *She is a diligent student.*

(ii) *The female lecturer is supportive.*

Relational processes describe states rather than actions. Frequent use with female participants suggests identity description rather than agency.

Participants Roles (Actors vs. Goal)

A further breakdown examined how often each gender appeared as actor versus goal**.**

ISSN: 1710-0305
PISSN: 1189-4563

Table 6: Participant Roles by Gender (AI-Assisted Texts)

Role	Male	Female
Actor	470	220
Goal	150	390

Females appeared nearly twice as often as goals than as actors in AI-assisted texts.

Discussion of Findings

A major finding was the dominance of material processes in AI-assisted texts and the frequent positioning of male participants as actors in these clauses. Material processes encode action, power, and agency (Halliday & Matthiessen, 2014, p. 213). By repeatedly assigning male subjects to actor roles in clauses like *the male student conducted the experiment* or *he analyzed the data,* AI-assisted writing foregrounded masculine agency. In contrast, female participants were more frequently positioned in passive constructions or relational clauses, which either backgrounded their agency or described them in terms of attributes rather than actions. This aligns with Mills' (2008, p. 89) observation that gender bias often operates subtly through syntactic structures rather than overt lexical markers.

The analysis also showed that passivation played a crucial role in diminishing female visibility as agents of action. Clauses such as *"the female student was guided"* or *"she was given instructions"* presented female participants as recipients rather than initiators of action. Biber et al. (1999, p. 972) note that passive constructions are common in academic writing for purposes of objectivity; however, when combined with gendered references, such structures may result in uneven representation. AI tools, trained on large academic corpora where passives are prevalent, appear to reproduce these patterns without sensitivity to their representational effects.

Another significant observation was the distribution of mental processes, where males were more frequently represented as sensers, those who think, understand, or believe. This syntactic positioning associates cognition and intellectual authority more strongly with male participants. Female participants, on the other hand, were more often represented through experiential or relational clauses. This finding supports Sunderland's (2006, p. 31) argument that discourse can subtly associate intellectual agency with men and supportive or descriptive roles with women.

Importantly, these patterns were less pronounced in human written texts, suggesting that AI assistance amplifies existing discursive tendencies rather than merely reflecting general academic conventions. Human writers demonstrated greater variation, sometimes placing female participants in active roles or using balanced syntactic constructions. This contrast highlights the role of AI as a mediator that standardizes and reproduces dominant patterns from its training data, a phenomenon described by Bender et al. (2021, p. 613) as the "parroting" of existing linguistic structures.

Within the Nigerian context, where English usage is shaped by both global academic norms and local sociocultural ideologies (Bamgbose, 1995, p. 19), the interaction between AI-generated syntax and gender representation becomes particularly significant. Students, who often perceive AI suggestions as linguistically authoritative, may internalize these patterns as acceptable academic style. As Hyland (2004, p. 139) notes, academic writing is central to identity construction; thus, repeated exposure to such structures may influence how students conceptualize agency and gender roles in scholarly discourse.

Overall, the discussion reveals that AI-assisted academic writing does not introduce explicit gender bias but reproduces it through grammatical choices that appear neutral. These findings underscore the need for critical language awareness in the use of AI tools and demonstrate the value of SFL for uncovering hidden ideological meanings within syntax.

ISSN: 1710-0305
PISSN: 1189-4563

Implications

1. One of the most immediate implications concerns how academic writing is taught. Writing instruction in many universities focuses on grammar accuracy, coherence, referencing, and structure, with little attention to how syntactic choices shape social meanings. This study shows that students may unknowingly reproduce gendered representations through AI-suggested clause structures. Therefore, academic writing pedagogy needs to incorporate critical language awareness, where students are taught to examine not only *what* they write but *how* grammatical choices construct meaning. Lecturers should guide students to question AI-generated suggestions, particularly regarding voice (active/passive), participant roles, and process types. Exercises that involve rewriting passive clauses into active ones, or analyzing who occupies the actor position in sentences, can help students develop sensitivity to gendered syntax.

2. The study highlights the need for AI literacy beyond technical competence. Students often accept AI suggestions as authoritative, assuming that these tools produce ideal academic language. This research demonstrates that AI-generated structures may carry hidden ideological patterns. Universities should therefore educate students on the critical and responsible use of AI writing tools, encouraging them to evaluate and modify AI outputs rather than adopt them unquestioningly.

3. The findings suggest that courses in English language, linguistics, and communication should include modules on the following;

(i) Language, gender, and syntax

(ii) AI-assisted writing and discourse analysis

(iii) Critical engagement with digital writing tools

Such integration will ensure that students become reflective writers who understand the social implications of grammatical choices.

4. Lecturers and supervisors assessing students' work should be aware that some syntactic patterns may be influenced by AI assistance rather than students' own stylistic preferences. Feedback should go beyond correcting errors to addressing how agency and representation are constructed in students' sentences. This will promote more equitable language use in academic writing.

5. While gender equity initiatives often focus on access and participation, this study shows that language practices may subtly undermine these efforts. Syntactic patterns that foreground masculine agency and background feminine roles can reinforce unequal representations in scholarly discourse. Addressing this issue contributes to broader gender equity goals by promoting fair and balanced language representation.

6. University policies on AI usage typically focus on plagiarism and authorship. This study suggests that policies should also consider how AI shapes linguistic structures and encourage critical engagement with AI-generated content. Guidelines can be developed to help students and lecturers use AI tools in ways that do not reproduce biased representations.

7. This study opens avenues for further research into other forms of bias in AI-assisted writing (e.g., cultural, racial, ideological), AI influence on discourse across different disciplines, and comparative studies across universities and educational levels.

Conclusion

This study examined gendered syntactic patterns in AI-assisted academic writing with a focus on transitivity, participant roles, and voice. Using Systemic Functional Linguistics (SFL) as the analytical framework, the study revealed that AI-assisted texts frequently foregrounded male agency through material and mental processes while backgrounding female participants through passive constructions

ISSN: 1710-0305
PISSN: 1189-4563

and relational clauses. In contrast, human written texts demonstrated more balanced gender representation, indicating that AI-generated suggestions tend to reproduce and amplify dominant discursive patterns present in training data rather than introduce overt lexical bias. The analysis further showed that male participants were more often positioned as actors, sensers, and leaders, while female participants appeared as goals, recipients of action, or carriers of relational attributes. Such syntactic positioning has significant implications for students' perceptions of gendered agency in academic discourse. Although, AI-assisted writing enhanced textual organization, coherence, and grammatical accuracy, it subtly influenced the construction of gender in academic texts, highlighting the need for critical language awareness in pedagogical practices. Thus; the study confirms that AI is not merely a neutral writing tool but a participant in meaning making, capable of reproducing sociocultural ideologies embedded in language. In the context of Nigerian universities, where English serves as the medium of instruction within a multilingual and gendered sociocultural environment, these findings underscore the importance of combining AI-assisted literacy with reflective, equitable, and critically informed writing instruction.

Recommendation

Based on the findings, the study makes the following recommendations:

1. Academic writing courses should include modules that teach students to analyze and evaluate syntactic structures in their texts. Exercises could focus on identifying actors and goals, active and passive constructions, and process types, helping students make deliberate choices that promote equitable representation of gender.

2. Universities should educate students on responsible and critical use of AI-assisted writing tools. Students must be encouraged to question AI-generated suggestions and revise texts in ways that do not inadvertently reproduce gendered or ideological biases.

3. Linguistics and language programs should integrate gender, discourse, and AI studies to create interdisciplinary awareness. This approach will equip students to navigate AI-mediated academic writing environments while maintaining conscious control over how agency and identity are represented.

4. Lecturers and supervisors should go beyond grammatical correctness when evaluating AI-assisted assignments. Feedback should consider how participants are represented, encouraging equitable and balanced syntactic choices in students' writing.

5. Universities should develop policies that address not only plagiarism but also linguistic and ideological implications of AI-assisted writing. Guidelines should encourage the use of AI as a supportive tool while promoting critical engagement with its outputs.

6. Efforts to promote gender equity should extend to linguistic practices, ensuring that educational tools and pedagogical strategies reinforce inclusive representations in academic discourse.

7. Scholars should conduct additional studies exploring other forms of bias in AI-assisted writing like cultural, racial, or ideological biases. Comparative studies across disciplines and educational levels could provide further insight into how AI influences academic language practices in different contexts.

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