Rewriting Bias: Integrating AI for Gender-Fair Language in Teaching and Learning

Adelfa C. Silor[1], Faith Stephanny C. Silor[1]

[1] Mindanao State University-Iligan Institute of Technology, Iligan City, Philippines

Correspondence: Adelfa C. Silor, Mindanao State University-Iligan Institute of Technology, Philippines.

Received: August 4, 2025 Accepted: February 3, 2026 Online Published: March 13, 2026

doi:10.5430/wjel.v16n4p159 URL: https://doi.org/10.5430/wjel.v16n4p159

Abstract

The growing call for inclusive education has highlighted the need to use gender-fair language (GFL) in teaching. As artificial intelligence (AI) continues to advance, it offers new ways to recognize and correct biased language in educational materials. This study explores how AI can help detect and rewrite gender bias in English-language teaching texts. Using a mixed-methods design, the research combined AI-based corpus analysis with classroom application. A collection of English teaching materials was examined using AI tools to find gender-biased words and patterns. These materials were then rewritten following GFL principles and used in classroom lessons with secondary students and teachers. Pre- and post-tests, surveys, and interviews captured how students and teachers responded to the AI-revised materials. The results showed that AI effectively identified and corrected gender bias, reduced the use of exclusive language, and improved students' awareness of gender representation. Students reported feeling more included and respected, while teachers found AI-generated revisions practical and time-saving. The classrooms using AI-revised materials also showed higher levels of engagement and comprehension. The study demonstrates that integrating AI in rewriting bias fosters a more inclusive and gender-sensitive approach to teaching and learning. Results provide support that AI can serve as a reliable support for educators in promoting fairness, equality, and respect through language. These findings provide useful insights for teachers, curriculum developers, and policymakers aiming to create educational systems that speak the language of inclusion.

Keywords: gender-fair language, artificial intelligence, inclusive education, English language teaching, linguistic bias, AI in education

1. Introduction

Language is a powerful social tool that both reflects and shapes values, beliefs, and power relations in society. In education, language not only communicates knowledge but also influences how learners perceive gender roles and identities. Many English language teaching (ELT) materials, however, continue to reinforce gender stereotypes—portraying men as leaders, women as followers, and excluding nonbinary identities (Lutfi et al., 2023; Tarrayo, 2023). These biases subtly sustain inequality in classrooms and limit students' awareness of diversity and inclusion.

To counter these effects, gender-fair language (GFL) has emerged as a central educational approach. GFL promotes equity and challenges hidden forms of bias by revising language that privileges one gender over others (Tarrayo, 2023; Vela-Plo & Ortega-Andrés, 2025). Despite its importance, traditional ELT resources rarely adopt inclusive language. Teachers often lack practical tools or training to detect and correct bias in classroom materials (Maulida & Gunawan, 2025). This gap calls for scalable methods that make learning materials fairer and more inclusive.

At the same time, artificial intelligence (AI) is increasingly integrated into education, offering opportunities to personalize instruction, provide automated feedback, and support language development (Bae, 2025; Erdogan & Christina, 2025). Yet, the potential of AI to detect and correct gender bias in teaching materials remains largely unexplored. Existing research mostly examines algorithmic bias in assessment and language generation (Crosthwaite & Ma, 2025; Ohashi, 2025), leaving a gap in its application for promoting inclusive language in ELT.

This gap creates an opportunity to connect linguistics, social justice, and AI in practical ways. By exploring AI-assisted rewriting for gender-fair education, this study aims to show how technology can help educators identify and revise biased language. Using AI, teachers can move beyond traditional correction methods and develop classroom materials that reflect diverse, equitable representations of gender (Fazal, 2025; Zamorano, 2025).

Therefore, this study investigates how AI-powered tools can be used to detect and rewrite gender-biased language in English teaching materials and examines their effectiveness in promoting inclusive learning environments. Grounded in critical discourse theory and feminist linguistic perspectives (Tarrayo, 2025; Vela-Plo & Ortega-Andrés, 2025), the study aims to:

1. Identify the presence and patterns of gender bias in commonly used ELT materials;

2. Apply AI tools to revise these materials according to GFL principles; and

3. Evaluate the impact of these revisions on students' engagement, comprehension, and perceptions of inclusivity.

By bridging the fields of language education, gender equity, and educational technology, this study contributes to the growing discourse on AI-assisted inclusivity in ELT. These findings will inform future curriculum design and emphasize the importance of using socially responsive language to build equitable and inclusive classrooms in the 21st century (Krsmanović & Archan, 2025; Mujumdar, 2025).

Research Questions

With these research objectives in mind, the following research questions are explored in this study:

What forms and levels of gender bias (for example, masculine generics, gender stereotypes, and gender representation inequality) are found in the chosen English learning materials?

To what extent can AI applications (ChatGPT and Grammarly) eliminate gender bias in learning materials when revised using Gender-Fair Language (GFL) guidelines?

How well do AI-assisted GFL revisions impact students' reading comprehension skills compared to non-revised learning materials?

How do students rate the inclusiveness, fairness, and stereotype removal in AI-revised gender-fair learning materials?

How do teachers rate the usefulness and feasibility of AI-assisted applications in revising learning materials for gender fairness?

This study brings together insights from language education, gender equity, and educational technology to add to the increasing literature on AI-assisted inclusivity in ELT. The results of this study provide empirical evidence for socially responsive language practices and will inform future curricula that promote the development of equitable and inclusive learning environments in the 21st century (Krsmanović & Archan, 2025; Mujumdar, 2025).

2. Literature Review

2.1 Gender Bias and Gender-Fair Language in English Language Teaching

Gender-fair language (GFL) helps correct the unfair use of words that often favor one gender over another. In English language teaching (ELT), many textbooks and lessons still show men as leaders and women in supportive roles. These patterns shape how students see gender and power in society (Lutfi et al., 2023; Tarrayo, 2023). When learners read about men as doctors and women as nurses, they start to believe that these roles as bipolar according to gender. GFL tries to change these stereotypes by using neutral words, fair character representation, and language that respects individuals' identities (Vela-Plo & Ortega-Andrés, 2025).

Teachers who use GFL make students more aware of how language influences thought and identity. However, many teachers still struggle to apply GFL because they lack training, resources, and institutional support (Tarrayo, 2025). Almashour et al. (2025) found that learners' writing styles reflect cultural norms about gender. This finding illustrates that the way students use language often mirrors social expectations. Promoting GFL in ELT, therefore, encourages learners to think critically, write inclusively, and challenge gender stereotypes in communication.

2.2 Artificial Intelligence in Language Education

Artificial Intelligence (AI) is changing how educators teach and how students learn. AI tools like ChatGPT, Grammarly, and NLP-based platforms help improve grammar, vocabulary, and writing (Eslit, 2025; Mujumdar, 2025). These tools give instant feedback and make learning more personal and engaging. They also open space for integrating inclusive language by suggesting fairer ways to express ideas.

Studies show that when students use AI chatbots, they write more confidently and learn actively (Fazal, 2025; Zamorano, 2025). Teachers use these systems to guide writing activities and to promote inclusivity. However, AI is not neutral. Because AI learns from human data, it can copy the same gender or cultural biases found in society (Crosthwaite & Ma, 2025). Educators must therefore use AI critically. AI should support learning without replacing human judgment. Embedding AI in a thoughtful, ethical framework helps balance innovation with responsibility in education.

2.3 AI for Detecting and Correcting Gender Bias

New AI tools can now read and analyze texts for gender bias. They detect biased words, such as masculine generics, and suggest fairer alternatives. Teachers can use these tools to revise textbooks, lesson plans, and materials so that they sound more balanced (Amrhein et al., 2023; Zamorano, 2025). These adjustments make classroom content more inclusive and respectful.

Still, these AI systems have limitations. Because they learn from existing data, they can reproduce the same cultural and linguistic biases they are meant to fix. Also, their decision-making processes are often hidden from users, which raises questions about transparency and fairness (Fazal, 2025; Mainard et al., 2025). Zhou et al. (2025) studied ChatGPT's use among translators and found that AI can either support or threaten professional judgment. This finding reminds teachers to use AI as a partner, not a replacement, in creating GFL materials.

2.4 Pedagogical Applications and Challenges of AI and GFL

The combination of AI and GFL offers new ways to teach English more inclusively. AI can rewrite biased texts, suggest neutral expressions, and save teachers time in editing. Students benefit from reading inclusive materials that show equal gender representation. These materials make learners think critically about language and fairness (Bae, 2025; Maulida & Gunawan, 2025).

Guo et al. (2025) found that digital environments shape how learners participate and express identity. This finding supports the goal of GFL

of helping students see language as a tool for equality. Dewi et al. (2025) further showed that digital modules can build inclusivity even among beginners. However, successful integration of AI and GFL requires strong teacher preparation, digital literacy, and curriculum redesign (Fazal, 2025; Krsmanović & Archan, 2025). Teachers must feel confident using AI tools and understanding their social impact. Only then can these technologies truly make classrooms more equitable.

2.5 Teachers' Perspectives and Institutional Challenges

Teachers play a central role in adopting AI and GFL in education. Their beliefs and motivation shape how inclusive practices are implemented. Some teachers welcome innovation, while others feel uncertain or unprepared to make significant changes to their teaching, such as using AI. Institutional rules and workload also affect their willingness to experiment with new methods. Ahmed and Alshammari (2025) showed that educators face both personal and structural challenges in integrating non-traditional practices such as gender-fair pedagogy and AI-assisted learning.

For successful adoption, schools and universities must provide training, policy support, and recognition for teachers who use inclusive methods. Without institutional backing, even the most willing teachers may struggle to sustain such practices. Encouraging collaboration and offering professional development can empower teachers to promote gender fairness through AI.

2.6 Emerging Models and Future Directions in Inclusive Language Instruction

New models in digital education show promising directions for inclusive language teaching. Bae (2025) found that informal digital learning of English (IDLE) improves learners' attitudes toward diversity and inclusivity. In these informal settings, students interact freely with AI tools and learn inclusivity naturally. Hema (2019) proposed the LOTUS model, which combines content and language learning. This model can integrate gender-fair principles through AI, helping students see inclusion as part of communication.

Menon et al. (2025) observed that technology-assisted English learning boosts student engagement and performance. Erdogan and Christina (2025) emphasized that inclusive AI instruction prepares learners for a global, equitable future. Together, these studies show that AI can make language learning more interactive and inclusive. Future models should focus on equity, critical thinking, and respect for diversity as key goals of English education.

2.7 Technology Integration, Language, and Gender in Education

The role of technology integration in teaching and learning has been identified as a revolutionary approach in the teaching and learning process. A systematic review conducted by Akram et al. (2022) illustrates that teachers view technology integration as a positive approach in improving teaching efficiency, student engagement, and feedback processes. At the same time, the systematic review underscores that technology integration for teaching and learning purposes requires a pedagogical focus rather than a mere adoption approach, pointing out that there is a gap between technology skills and their application for equity-focused outcomes. This observation is important to the current study, as it situates AI tools not only as teaching tools but also as tools for addressing linguistic inequities in educational content.

In addition to pedagogical effectiveness, language is also an important factor in constructing the identities and perceptions of learners. Elmahdi et al. (2024) show that the use of language styles on various internet sites reveals a distinct gender bias, with language use supporting stereotypical gender roles and power dynamics through subtle linguistic choices. The thematic analysis carried out in the study highlights the impact of exposure to gendered language on the normalization of inequality, even in a virtual space that is ostensibly neutral. This is similar to the concerns in English language teaching, where textbooks also represent gender in a similar manner through masculine generics, occupational stereotyping, and visibility.

Cumulatively, these studies indicate the critical nexus between the use of technology and the gendered use of language. Although technology has been found to facilitate instructional effectiveness (Akram et al., 2022), and linguistic analysis has revealed the existence of gender bias in digital discourse (Elmahdi et al., 2024), few studies have investigated the potential use of AI tools to deliberately identify, modify, and mitigate gender bias in ELT instructional materials. The existing body of studies appears to view technology integration and gendered language as two distinct areas, thus creating a research gap with regard to the potential role of AI as a useful tool for facilitating gender-fair language (GFL) in ELT.

To fill this research gap, the current study links technology integration with feminist linguistic and critical discourse studies by investigating the application of AI-based tools for the detection and rewriting of gender-biased language in ELT resources. Through this, the study not only builds upon existing literature on technology adoption but also shows how AI can be used not only for improving learning efficiency but also for promoting inclusivity, equity, and social responsibility in language learning.

2.8 Synthesis and Research Gap

The reviewed studies reveal that AI and GFL both improve English language learning but are rarely used together in classrooms. While researchers have explored AI's role in teaching and gender inclusivity separately, few have tested how AI can directly help rewrite biased texts and measure student learning outcomes afterward. This study fills that gap by using AI tools such as ChatGPT, Grammarly, and NLP models to identify and revise gender bias in English teaching materials. We then measure how these revisions affect students' comprehension, engagement, and perception of inclusivity. By combining technology and gender-responsive pedagogy, this research promotes an ethical and inclusive model for future language teaching.

3. Methodology

This study combined applied linguistics, teaching practice, and AI, resulting in the implementation of a mixed-methods approach. This approach means we looked at numbers and patterns in language (quantitative) and also listened to people's experiences and perceptions (qualitative). The goal was to understand gender bias in English teaching materials and see how AI tools could make language fairer, while keeping the experience of teachers and students at the center.

3.1 Research Design

We used a mixed-methods design, combining tests, surveys, observations, and discussions with AI-based text analysis. This approach allowed us to see patterns clearly while also understanding the real experiences of students and teachers. By collecting different types of evidence, we strengthened methodological rigor and increased trustworthiness.

The research design was further defined by the intentional specification of a convergent mixed-methods design (Creswell & Plano Clark). Quantitative data (tests and surveys) and qualitative data (classroom observations, focused group discussions, and AI-assisted text analysis) were gathered and analyzed to converge the findings. The integration of multiple data sources improved methodological rigor, validation, and the credibility and trustworthiness of the findings.

3.2 Participants

The study consisted of a total of 120 undergraduate students enrolled in English language courses at a public higher education institution in the Philippines. Participants were selected through purposive sampling, as they were actively utilizing the instructional materials analyzed and had similar English language proficiency levels based on course placement requirements.

The student participants were stratified into two groups: an experimental group (n = 60) and a control group (n = 60). The experimental group utilized AI-revised instructional materials with principles of Gender-Fair Language (GFL), while the control group utilized the original, unrevised instructional materials. Both groups shared the same syllabus, learning outcomes, instructional time, and assessment processes to ensure equivalence and control for extraneous variables.

The sample size of 120 students was deemed sufficient for the quasi-experimental design used in the study, which enabled the pre- and post-test comparisons and statistical analysis of the group differences. The sample size is in line with the recommendations for mixed-methods studies and educational interventions (Creswell & Plano Clark).

Apart from the student participants, 15 English language teachers from the same institution were also included in the study. The teachers had teaching experience ranging from 3 to 20 years and were directly involved in the development and delivery of the instructional materials. The teacher feedback was collected using a structured survey to assess the usefulness, practicality, and pedagogical value of AI tools (ChatGPT and Grammarly) in revising the instructional materials for gender equity.

The ethical considerations were strictly followed. The participants were required to give their informed consent, and the confidentiality and anonymity of the participants were maintained throughout the data collection and analysis process.

3.3 Data Collection

Corpus Analysis

We collected 20 teaching materials (textbooks, lesson plans, and handouts), resulting in about 85,000 words. Using AI tools like ChatGPT, Grammarly, and Gender Analyzer, we scanned the texts to find biased words, stereotypical roles, and imbalanced representation. This information gave us a clear, consistent picture of where gender bias appears.

AI Integration in the Classroom

Teachers and students used both the original and AI-revised materials. We measured comprehension with pre- and post-tests, collected opinions with surveys, and checked how participants used AI tools with interaction logs. This approach helped us see the difference AI could make in real learning situations.

Interviews and Focus Groups

We asked teachers and students to share their experiences with AI-revised materials. They talked about how included they felt, how fair the texts were, and how helpful the AI materials were. Their stories helped us understand the quantitative data from the surveys and tests in a human way.

3.4 Data Analysis

Numbers (Quantitative)

We counted biased terms and calculated averages and improvements. Using statistical tests like t-tests and ANOVAs, we confirmed that the changes we observed, like improved comprehension or inclusivity, were real and not just by chance.

Stories (Qualitative)

We looked for patterns in the interviews and group discussions using thematic analysis. We identified themes such as feeling represented, noticing biases, and trusting AI suggestions. This information helped us make sense of the quantitative data and understand the human side of learning.

3.5 Research Instruments and Validity

To make sure our tools measured what we wanted, we carefully checked their validity:

- Corpus Checklist: Following this approach, we trained coders to record masculine generics, stereotypes, and imbalanced roles. Agreement between coders was high (Cohen's Kappa = 0.85).
- AI Tools: ChatGPT, Grammarly, and GenderAnalyzer suggested revisions, which were reviewed by humans to ensure they made sense in context.
- Pre- and Post-Test: Tests were reviewed by experts (CVI = 0.91) and pilot-tested (Cronbach's Alpha = 0.87) to ensure reliability.
- Student Survey: The surveys included 10 questions about fairness and representation, which were tested for internal consistency (Cronbach's Alpha = 0.89).
- Focus Groups and Observations: Qualitative data helped confirm that the tests and surveys matched what actually happened in classrooms.

By checking instruments at every step, we ensured the results were accurate, reliable, and reflected real experiences.

3.6 Ethical Considerations

All participants gave informed consent. Their identities were kept confidential, and they were told how AI tools worked and what their limitations were. This approach kept the study ethical, safe, and transparent.

3.7 Tools and Technologies

- Language Analysis: ChatGPT, Grammarly, GenderAnalyzer
- Data Analysis: SPSS, R, Jamovi
- Qualitative Analysis: NVivo and manual coding for human insight
- Validation: Expert review, pilot tests, and inter-rater checks

This approach ensured that we saw the patterns clearly, understood the human experience, and trusted our results. Using AI alongside human judgment made the study both efficient and meaningful for real classrooms.

4. Results

4.1 Objective 1: Identify the Presence and Patterns of Gender Bias in Commonly Used English Teaching Materials

A corpus of 20 English language teaching documents—including textbooks, lesson plans, and handouts—totaling approximately 85,000 words was systematically analyzed using AI-based natural language processing (NLP) tools such as Grammarly, the ChatGPT API, and GenderAnalyzer. These tools enabled a comprehensive and efficient evaluation of gender-biased language across diverse instructional materials used in classroom settings (Al-Hoorie & AlShakhori, 2025; Erdogan & Christina, 2025; Mujumdar, 2025). By leveraging AI's capacity to process large volumes of text with linguistic precision, the study identified patterns of bias that may otherwise go unnoticed in traditional manual reviews (Crosthwaite & Ma, 2025; Ohashi, 2025; Zamorano, 2025).

The gender-biased elements detected were categorized into three primary types. First, masculine generics were commonly found, including terms such as "mankind" and "man-made," which implicitly center maleness as the default human experience. These terms often exclude or marginalize other gender identities, reinforcing outdated linguistic conventions that contribute to implicit gender bias (Tarrayo, 2023; Vela-Plo & Ortega-Andrés, 2025). Their frequent appearance suggests that even well-established educational materials may unintentionally reproduce exclusionary language (Lutfi et al., 2023).

Second, stereotypical gender roles appeared frequently, portraying men in dominant or authoritative positions, such as leaders, scientists, or decision-makers, while women were often depicted as caregivers, assistants, or passive figures. This category reflects deep-rooted societal narratives that can influence students' perceptions of gender-appropriate behavior and career aspirations, particularly when reinforced in formative learning environments (Maulida & Gunawan, 2025; Tarrayo, 2025).

Third, there was a noticeable imbalance in gender representation across characters and professions. Male characters were more prevalent, and when women appeared, they were often confined to limited or traditional roles. Professions such as doctors, engineers, and politicians were overwhelmingly assigned to male figures, while female characters were linked to roles like teachers, nurses, or homemakers (Fazal, 2025; Lutfi et al., 2023). This imbalance perpetuates a narrow view of gender roles and may hinder the development of inclusive mindsets among learners (Ahmed & Alshammari, 2025; Almashour et al., 2025).

Overall, the corpus analysis confirmed that gender bias remains embedded in English teaching materials, emphasizing the need for deliberate revision using inclusive language principles and AI-assisted tools (Krsmanović & Archan, 2025; Tarrayo, 2025; Zhou et al., 2025). Incorporating AI-based evaluations alongside critical pedagogical strategies can support educators in fostering more equitable and gender-fair learning environments (Fazal, 2025; Guo et al., 2025; Zamorano, 2025).

Table 1. Frequency and Distribution of Gender Bias in Instructional Materials

Type of Gender Bias	Frequency	% of Total Biased Instances
Masculine generics	128	32%
Stereotypical gender roles	154	38.5%
Imbalanced gender representation	118	29.5%
Total Biased Instances Detected	*400*	*100%*

The analysis revealed an average bias density of 4.7 biased terms per 1,000 words across the instructional materials reviewed. The most frequently occurring biases were detected in profession-related texts, where traditional gender stereotypes were consistently reinforced (Lutfi et al., 2023; Tarrayo, 2025). A representative example includes sentences such as: "The doctor examined the patient while the nurse (she) took notes." This construction perpetuates the assumption that doctors are male and nurses are female, reflecting broader societal constructs that assign men to high-status, authoritative roles and women to subordinate or caregiving positions (Almashour et al., 2025; Vela-Plo & Ortega-Andrés, 2025). These examples demonstrate that language in educational content can subtly reinforce social hierarchies and normative gender roles. As noted by scholars, credulous use of such patterns may shape learners' career aspirations and reinforce implicit gender bias from a young age (Maulida & Gunawan, 2025; Tarrayo, 2023). This use underscores the urgent need for systematic revision of educational content using inclusive language principles and AI-assisted evaluation tools to promote gender fairness in learning environments (Fazal, 2025; Zamorano, 2025).

4.2 Objective 2: Use AI Tools to Rewrite Materials According to GFL Principles

Using ChatGPT and Grammarly, the instructional materials were revised following GFL guidelines. Examples include replacing gendered terms such as "mankind" with "humankind," rephrasing occupational titles to be gender-neutral, and balancing male/female references to achieve inclusive representation.

Table 2. AI-Assisted Rewriting of Gender-Biased Language in Instructional Materials

Type of Gender Bias	Original Count	Rewritten (GFL) Count	% Reduction in Bias
Masculine generics	128	0	100%
Stereotypical gender roles	154	12	92.2%
Imbalanced gender representation	118	10	91.5%
Total	*400*	*22*	*94.5%*

Note. Counts reflect instances of gender-biased language identified in the original instructional materials and the number of instances remaining after AI-assisted rewriting. Percentage reduction indicates the effectiveness of AI tools in mitigating gender bias.

The implementation of AI tools resulted in a substantial overall reduction of 94.5% in gender-biased language, highlighting the effectiveness of ChatGPT and Grammarly in promoting GFL in educational contexts. This finding aligns with current research emphasizing AI's role in detecting and mitigating linguistic bias in English Language Teaching (ELT) materials (Fazal, 2025; Zamorano, 2025). On average, rewriting each paragraph required approximately four minutes, demonstrating the efficiency of AI-assisted editing. These edits support prior findings that AI tools can streamline instructional design while maintaining content quality (Al-Hoorie & AlShakhori, 2025; Mujumdar, 2025).

Teacher feedback further confirmed the practical value of AI interventions. Educators rated the AI-generated revisions as "Very Helpful" ($M = 4.6$, $SD = 0.5$), reflecting positive perceptions regarding ease of use, reduction in workload, and potential to foster inclusive classroom discourse. These findings resonate with earlier studies reporting that AI tools enhance student engagement, support differentiated instruction, and encourage equity-focused teaching (Erdogan & Christina, 2025; Hastomo et al., 2025).

In summary, AI-assisted rewriting demonstrated both corrective and pedagogical potential. It not only effectively reduced gender-biased language but also functioned as a supportive teaching resource, aligning with contemporary approaches to inclusive education (Krsmanović & Archan, 2025; Tarrayo, 2025).

4.3 Objective 3: Assess the Impact of Revisions on Student Engagement, Comprehension, and Perception of Inclusivity

Table 3. Pre- and Post-Test Comparison of Reading Comprehension Scores

Group	Mean Pre-Test	Mean Post-Test	Mean Gain	t-value	p-value	Interpretation
Experimental (n = 60)	68.4	84.7	+16.3	7.82	< 0.001	Significant improvement
Control (n = 60)	67.9	72.5	+4.6	2.10	< 0.05	Modest improvement

Note. The experimental group used AI-revised gender-fair language (GFL) materials, while the control group used unmodified instructional texts. Mean gain represents the difference between post-test and pre-test scores. t-value and p-value indicate the statistical significance of the gains.

The results show that students using AI-revised GFL materials achieved a significantly higher gain in reading comprehension (+16.3, $p < .001$) compared to the control group (+4.6, $p < .05$). This finding suggests that inclusive, bias-free language enhances students' ability to

process and understand content.

Engaging with texts that reflect fair and equitable gender representation can increase learners' sense of recognition and respect, boosting cognitive engagement and comprehension. These findings reinforce that language inclusivity contributes not only to equity but also to improved academic performance. The results support the integration of AI-assisted GFL as a tool for both pedagogical effectiveness and social inclusion in educational settings.

Table 4. Students' Perception of Inclusivity in AI-Rewritten Gender-Fair Language (GFL) Materials

Survey Item	Mean Pre-Test	Mean Post-Test	Interpretation
"The materials avoid stereotypes."	2.95	4.55	Perceived reduction in stereotypes; significant improvement in inclusivity

Note: The survey used a 1–5 scale (1 = Strongly Disagree, 5 = Strongly Agree) to measure changes in students' perceptions before and after using AI-rewritten GFL materials.

As shown in Table 4, students reported a notable increase in perceived inclusivity after engaging with the AI-rewritten GFL materials. The mean rating for the item "The materials avoid stereotypes" increased from 2.95 to 4.55, indicating that the revised texts effectively reduced stereotypical content. Students, particularly female and LGBTQ+ learners, felt more represented and respected, leading to higher motivation and engagement during learning activities. These results highlight the critical role of inclusive language in creating a positive, equitable, and participatory classroom environment.

Table 5. Student Perception of Gender Inclusivity in Learning Materials

Item	Experimental Group (Mean)	Control Group (Mean)	Interpretation
"The text reflects fairness to all genders."	4.65	3.12	Higher inclusivity perception in the experimental group
"I feel represented in the materials we read."	4.42	3.18	Increased student identification in the experimental group
"The materials avoid stereotypes."	4.55	2.95	Perceived reduction of stereotypes in the experimental group

Note: Responses were measured on a Likert scale from 1 (Strongly Disagree) to 5 (Strongly Agree). The experimental group was exposed to AI-revised gender-fair language (GFL) materials, while the control group used standard materials.

The results presented in Table 5 indicate that students who were exposed to AI-revised learning materials reported higher perceptions of inclusivity, feeling that the texts were fairer to all genders. Additionally, these students experienced increased identification with the materials, suggesting that they saw themselves more accurately represented in the content. The AI-revised materials were also perceived as more effective in avoiding stereotypical portrayals compared with standard texts. These findings highlight the potential of AI tools to detect and revise gender-biased language, thereby fostering more inclusive learning environments. In the context of English language teaching, these findings have several practical implications. Teachers can utilize AI to review and revise instructional materials for gender fairness, while students may engage more deeply with texts where they feel represented. Furthermore, reducing stereotypes in learning resources contributes to broader institutional goals of equity and inclusion. Future research should explore the long-term effects of AI-revised materials on students' attitudes toward gender and language use and investigate how such tools can be integrated across diverse educational settings.

5. Discussions

We examined 20 English teaching documents, including textbooks, handouts, and lesson plans, totaling about 85,000 words. Using AI tools such as Grammarly, ChatGPT, and Gender Analyzer, we scanned the texts for gender-biased language. The tools allowed us to see patterns that are easy to miss with the human eye, hear subtle cues in phrasing, and feel the implicit messages embedded in the words.

Our analysis revealed that masculine generics, such as "mankind" and "man-made," appeared frequently. These words signal maleness as the default and can make other genders feel excluded. Stereotypical roles were also common. Men were often shown as leaders, scientists, or decision-makers, while women were portrayed as caregivers or assistants. Reading these texts, one can almost visualize the hierarchy they suggest, shaping how students imagine gender-appropriate behavior and career paths.

Gender representation across characters and professions was noticeably imbalanced. Male figures dominated high-status roles, while female figures remained in traditional positions. Students who read these materials might sense a limitation on what women and men can achieve. Such patterns highlight that educational texts do more than convey knowledge—they transmit cultural expectations about gender.

After revising the materials with ChatGPT and Grammarly using GFL principles, the texts felt more inclusive. Terms like "mankind" were replaced with "humankind," occupational titles were neutralized, and male/female references were balanced. Students who read the revised texts reported that the content looked fairer and felt more representative. Teachers who used the AI-revised texts noticed the workload was lighter and felt confident that the materials would foster inclusive discussion.

The impact on students was visible in both performance and perception. Those using AI-revised texts scored higher in reading comprehension and appeared more engaged during lessons. They experienced a sense of recognition and respect, particularly female and

LGBTQ+ students. The materials sounded fairer and looked more balanced, which encouraged learners to interact with content more deeply. Survey responses showed a clear increase in perceived inclusivity, with students feeling that the texts avoided stereotypes and saw themselves represented.

These findings show that language in educational materials can subtly shape cognition and perception. By reading, hearing, and engaging with bias-free texts, students may internalize more inclusive ideas. AI-assisted revisions not only correct biased language but also support teaching, helping create classroom environments where learners feel respected, recognized, and motivated. Integrating inclusive, GFL can transform both instruction and learning experiences, helping students develop broader perspectives on gender and equity.

6. Conclusion

This study shows that language is 'alive,' meaning it carries the power to shape how people see themselves and others. It is not neutral; it can mirror, mold, or even distort social values, especially about gender. The results make it clear that AI, when used with care and responsibility, can help rewrite bias into fairness. AI served as a strong ally for teachers by identifying and correcting gender-biased words and patterns in English language teaching materials. With a 94.5% drop in biased terms, lessons became more inclusive and easier for students to understand. Students felt more seen, respected, and engaged when reading AI-revised materials. Teachers also appreciated how AI saved time and helped them produce texts that reflect equality and fairness. These results show that rewriting bias through AI not only helps improve language but also supports inclusive education, where all learners, regardless of gender, can feel valued.

The study also highlights that AI is not a substitute for human effort. Real change happens when educators, researchers, technologists, and policymakers work together. Curriculum developers should apply GFL principles early in the design process. Teacher training must include both AI literacy and gender sensitivity. Policymakers, in turn, should promote frameworks that guide the ethical and inclusive use of AI in education. Ethical concerns such as cultural sensitivity, algorithmic bias, and data privacy must also be managed carefully. AI can only be a force for inclusion when its use respects human values and social diversity. In the end, this study provides a reminder that every word matters. The way we teach language shapes how students think about equality. By integrating AI to rewrite bias, classrooms are more likely to speak the language of fairness—where every learner feels represented and empowered to learn without limits.

Acknowledgments

The authors would like to extend their sincerest appreciation to the officials of Mindanao State University-Iligan Institute of Technology (MSU-IIT) for their support, as well as to the College Dean and Department Chairperson for their guidance. They would also like to thank their colleagues for their comments and assistance in the conduct of the study. Thanks are also extended to those who assisted them in the preparation of the manuscript.

Authors' contributions

Dr. Adelfa C. Silor contributed to the conceptualization and design of the study, overall research supervision, analytical framework guidance, and critical revision of the manuscript for intellectual content. Faith Stephanny C. Silor contributed to data gathering, text analysis, and preparation of the first draft of the manuscript. Both authors contributed jointly to data analysis and interpretation, manuscript review and refinement, and approval of the final version for submission. The authors contributed jointly to the study with well-defined and complementary roles, and no special authorship arrangement beyond the above.

Funding

The authors received no external funding for this work.

Competing interests

The authors declare that there are no competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Informed consent

Obtained.

Ethics approval

The Publication Ethics Committee of the Sciedu Press.

The journal's policies adhere to the Core Practices established by the Committee on Publication Ethics (COPE).

Provenance and peer review

Not commissioned; externally double-blind peer reviewed.

Data availability statement

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

Data sharing statement

No additional data are available.

Artificial Intelligence (AI) Usage Disclosure

This study adheres to ethical standards to ensure integrity and transparency throughout the research process. Artificial Intelligence (AI) tools, such as ChatGPT, were used solely to assist in organizing the literature and refining language. All AI-generated content was carefully reviewed and verified by the researchers. The authors take full responsibility for the accuracy, originality, and ethical integrity of the final manuscript.

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