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Persuasive Writing Skills of Indonesian Students in the Ai Era: a Linguistic Analysis of Argumentation

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Abstract
This study analyzes how Indonesian students construct persuasive arguments in the context of the increasing use of artificial intelligence (AI) as a writing partner. The study employed an explanatory sequential mixed methods design involving linguistic analysis of 200 persuasive texts and in-depth interviews with 20 students. Quantitative findings indicate a dominance of inductive reasoning, a weak connection between claims and evidence, and a low use of warrants and backing. Style patterns exhibit high repetition, minimal metaphors, and homogenous sentence structures consistent with AI output. Qualitative findings reveal a reliance on AI that produces surface coherence but does not strengthen argumentative logic. Synthesis of the findings resulted in the AI-Assisted Persuasive Reasoning Framework, which explains how AI enhances the mechanical aspects of writing but tends to weaken rhetorical originality and depth of reasoning. The results emphasize the need to develop persuasive writing pedagogy based on critical digital literacy so that students can utilize AI without losing their academic identity.

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1. INTRODUCTION

The ecology of writing in the era of artificial intelligence (AI) has undergone substantial transformation, particularly in how students generate ideas, organize arguments, and process language. Writing technologies are no longer positioned merely as technical aids but function as epistemic actors that shape ways of thinking and composing texts. This perspective aligns with findings that AI systems can provide formative feedback that improves textual organization and expands lexical resources (Nazari et al., 2021). Observations of student–technology interaction further suggest that generative AI fosters new forms of collaboration between writers and machines, influencing revision strategies and patterns of text organization (Wang, 2024). While these developments highlight the constructive potential of AI in writing processes, they simultaneously raise concerns about the authenticity of student reasoning.

Concerns regarding overreliance on automated tools have intensified alongside the increasing sophistication of generative systems. Several scholars argue that excessive dependence on AI-generated suggestions may weaken students' critical thinking and argumentative autonomy (Song & Song, 2023). Empirical findings indicate that some learners prioritize sentence-level recommendations and structural templates provided by AI over the development of their own rhetorical strategies. This situation underscores the need

for careful pedagogical management to ensure that AI functions as cognitive support rather than a substitute for intellectual engagement.

Ethical considerations further complicate the integration of AI in academic writing. Research emphasizes that AI interventions should enhance human learning rather than displace it, requiring clear policy frameworks and pedagogical guidance (Kooli, 2023). This position resonates with earlier arguments that technology must not undermine educators' roles as facilitators of learning and sources of intellectual and emotional support (Popenici & Kerr, 2017). Studies on digital literacy also reveal that students often lack formal instruction on ethical writing practices involving AI, increasing the risk of integrity violations in higher education (Pan, 2024).

Concerns about argument authenticity are reinforced by evidence that AI-generated texts may appear linguistically polished while lacking depth of reasoning. Scholars stress that cognitive engagement should not diminish simply because aspects of writing can be automated (Liang et al., 2024). Consequently, AI should be positioned as an exploratory and reflective tool rather than a shortcut to text production. This approach aligns with educational perspectives emphasizing reflection, meaning negotiation, and intellectual risk-taking as essential components of learning (Stornaiuolo et al., 2023).

In the Indonesian context, these challenges are particularly pronounced. Students' persuasive writing often exhibits weaknesses in constructing coherent claims, integrating evidence, and managing multiple perspectives. Research indicates that many students struggle to establish systematic logical relationships in their texts (Tambunan et al., 2022; Ghanbari & Salari, 2022), a condition linked to educational traditions that prioritize memorization over dialogic and critical practices (Kim & Kim, 2022). Rhetorical competence, especially in deploying logos, ethos, and pathos, also remains limited. Although students may recognize rhetorical concepts, their application is often fragmented and strategically underdeveloped (Hikmah & Khoir, 2024), reflecting patterns observed in broader international contexts (Ting, 2018; Alexander et al., 2023).

The widespread use of generative tools such as ChatGPT further complicates these issues. Research on automated writing assistance shows that while tools like Grammarly improve mechanical accuracy, they may also promote stylistic homogenization and reduce opportunities for critical exploration (Dizon & Gayed, 2021). Excessive reliance on AI has been shown to hinder argumentative development, as students focus more on efficiency than on reflective reasoning (Tambunan et al., 2022; Imran & Almusharraf, 2023).

Despite growing interest in AI in education, research in Indonesia remains limited, particularly regarding the relationship between reasoning, language style, argument structure, and AI use. Existing studies tend to address these dimensions separately and rarely examine how AI shapes argumentation in student writing (Civaner et al., 2022; Wood et al., 2021; Rajkomar et al., 2018). Moreover, the absence of a digital rhetoric evaluation framework grounded in Indonesian linguistic and cultural contexts further constrains pedagogical development (Haetami, 2025).

Addressing these gaps, research in this area seeks to examine reasoning practices, stylistic patterns influenced by AI, and argument structures in persuasive writing. By analyzing students' use of rhetorical appeals such as ethos, logos, and pathos, this approach aims to develop a contextualized digital rhetoric framework that supports ethical, reflective, and independent writing practices (Ting, 2018; Mohamad, 2022; Marmoah et al., 2024). Such insights are expected to inform adaptive pedagogical strategies that balance technological affordances with the cultivation of critical and authentic reasoning in the evolving ecology of academic writing.

2. LITERATURE REVIEW

Persuasive Writing in Applied Linguistics

Persuasive writing skills hold a strategic position in applied linguistics studies because they serve as the primary means for students to convey ideas convincingly through coherent reasoning. A good persuasive text not only contains strong arguments but also demonstrates clarity of thought and linguistic precision, enabling readers to easily grasp the author's position. These basic principles stem from the understanding that persuasive writing requires a clear thesis, interconnected reasons, and explanations that lead readers to a logical conclusion. This idea is reinforced by research on scaffolding approaches and technology integration, which have been shown to help EFL learners develop argumentative skills gradually and reflectively (Roohani & Rad, 2022; Khojasteh et al., 2021). This approach provides students with the space to systematically process ideas while seeking a deeper understanding of their arguments.

The quality of reasoning is at the heart of a strong persuasive text. An argument cannot stand without a clearly formulated claim and relevant and credible evidence. Understanding the relationship between claims and evidence is essential for writing to have rhetorical power. Research on argumentative learning shows that a hybrid-flipped classroom model can facilitate this process through interactions that encourage students to explore evidence, engage in discussions, and practice critically assessing the validity of sources (Roohani & Rad, 2022). These findings suggest that a learning process that allows for exploration and dialogue can enhance students' critical thinking skills.

Generative artificial intelligence tools add a new dimension to the process of argument development and information gathering. Their ability to provide quick access to a variety of sources opens up opportunities for students to enrich their reasoning. Reflection on recent literature shows that the use of GenAI can improve the quality of academic writing, but caution is still needed to ensure that arguments do not lose their critical foundation (Zhang et al., 2025). This technology should be viewed as a tool that broadens understanding, not a substitute for the deep thinking processes that are at the heart of academic literacy.

Linguistic dimensions also play a significant role in constructing logical, persuasive texts. Strategies such as position-marking help writers emphasize their epistemic stance, allowing readers to more clearly grasp their perspective. Research shows that stance-taking serves to guide readers in how the writer views the claim and their level of confidence (Al-Zubeiry & Assaggaf, 2023). The choice of modal verbs also influences reader perception, as through modality, writers can express possibility, certainty, or caution. Analysis of modality shows that the appropriate use of modals can strengthen the authority of an argument or, conversely, provide the necessary nuance of consideration in academic writing (Sayah & Hashemi, 2014).

Successful persuasive writing is also influenced by a learning environment that supports the development of language and rhetorical skills. Recent research confirms that integrating technology into writing instruction not only provides access to learning resources but also strengthens the connection between rhetorical theory and everyday writing practice (Quispe & Castro, 2024). Technology opens opportunities for students to study authentic examples, receive automated feedback, and develop metalinguistic awareness through interactions with digital texts. A similar perspective emerges from studies showing that digital media increases participation and cognitive engagement, helping students understand persuasive elements more deeply (Xiang-feng & Yan-ping, 2023). This underscores the importance of a learning environment that emphasizes the reflective process, not just the final written product.

The overall idea suggests that persuasive writing is a multidimensional skill influenced by reasoning, linguistics, and technology. These three aspects support each other in constructing strong and authentic arguments. Strengthening academic literacy through an integrative and reflective approach provides opportunities for students to understand how arguments work, how evidence should be selected, and how logic can be formulated appropriately. A pedagogical approach that combines innovative strategies with the use of technology enables students to broaden their understanding of the art of argumentation. This understanding ultimately empowers them to produce writing that is not only clear and convincing but also grounded in mature critical thinking.

Argumentation Theory

The study of argumentation theory provides an important foundation for understanding how arguments are formed, maintained, and interpreted in various contexts, including the ever-changing digital space. Arguments, once centered on formal patterns, are now undergoing a shift in form as interactions on online platforms become spontaneous, multimodal, and heavily influenced by community dynamics. This shift demands theoretical tools capable of examining the internal structure of arguments more flexibly, especially when messages are conveyed through short texts, visuals, or a combination of both. Two frameworks often used to understand this phenomenon are the Toulmin Model and Aristotle's Rhetoric, each of which offers distinct but complementary perspectives on how persuasion works.

The Toulmin Model provides an analytical structure that helps map the relationship between claims, data, and warrants, as well as additional elements such as support and rebuttal. The use of this model in education has shown significant results, as students can learn how evidence supports claims and how arguments can be structured more reflectively (Erduran et al., 2004; Moon et al., 2017). This framework is relevant for learners who need to understand the nature of argument as a systematic reasoning process, not simply the presentation of opinions. This understanding is increasingly important in the digital age, which requires the ability to assess the validity of messages amidst the rapid flow of information.

Aristotle's rhetoric adds another dimension to the effectiveness of arguments through its emphasis on logos, ethos, and pathos. These three elements serve as a way for writers to build persuasive power, relying not only on logic but also on moral credibility and emotional appeal. Research shows that these three elements remain relevant in digital communication, particularly in social media spaces, where community dynamics and perceived authenticity shape message reception (Hale, 2022; Nelson et al., 2025). The emphasis on pathos, for example, is evident in users' tendency to form emotional bonds with online communities, making messages more readily accepted.

The role of digital influencers clearly illustrates the importance of ethos in building audience trust. The perceived authenticity of their digital identities can increase engagement and influence consumer behavioral preferences (Campaner, 2025; Ragab, 2022). This situation demonstrates how arguments in the digital context are not solely based on logic, but also on personal narratives and interpersonal relationships built through online interactions.

The structure of digital argumentation also exhibits distinct characteristics compared to traditional academic argumentation. Analysis of user content reveals a tendency for arguments to be fragmented and not always follow a linear structure, conveyed through interconnected comments, text snippets, or visual posts (Feddema et al., 2021; Hashmi et al., 2021). While not always meeting the standards of classical argumentation, this pattern

remains persuasive because it resonates with users' collective experiences and the emotional needs of the community.

Exploration of online argumentation styles reveals that messages often carry strong emotional content and are narrative in nature. Research shows that emotional appeals often outweigh logical evidence in influencer communications (Shafie et al., 2024). This phenomenon shifts the traditional understanding that persuasion is primarily driven by logic; in the digital space, emotional closeness and personal credibility are the primary drivers of message acceptance.

This overall description indicates that understanding of argumentation theory needs to be expanded when applied to digital contexts. Toulmin's model and Aristotle's rhetoric remain relevant in explaining logical structures and persuasive strategies, but they are insufficient to describe the complexities of online communication without considering the role of visuals, algorithms, and participatory culture. Effective messages in the digital age are the result of a combination of logical reasoning, strong credibility, and emotional resonance that resonates with the character of the community. This approach illustrates that modern argumentation depends not only on structure but also on the ability to adapt messages to the ever-changing ecology of digital communication.

Linguistic Features of Persuasive Writing

Linguistic features in persuasive writing play a fundamental role in determining the success of an argument. The effectiveness of a persuasive text is determined not only by the content of the ideas, but also by the writer's way of constructing language to influence, direct, and shape the reader's emotional and cognitive responses. Diction is the first element that receives considerable attention because word choice can create a specific image, atmosphere, or bias that reinforces the argumentative purpose. The use of emotionally nuanced words has been shown to create a spiritual connection between writer and reader, making the message more vivid and convincing. This understanding of the power of word choice is confirmed by research that found that persuasive texts often utilize emotional lexicons to penetrate the reader's affective layers (Liu et al., 2024). Careful diction demonstrates how language is used not only as a means of conveying information but also as an instrument that guides the audience's interpretation and reactions.

Metaphors function as cognitive tools that help connect abstract concepts with concrete experiences, enabling readers to grasp difficult ideas through familiar analogies. The use of metaphors in persuasive texts enriches the reading experience by cultivating mental images that clarify the connections between ideas. Observations in this regard indicate that metaphors can expand the persuasive reach of a text by evoking relevant associations and emotions (Alonso-Sánchez et al., 2024). The way metaphors work is not merely aesthetic; they also help guide the reader's understanding of the issue, organize their thinking, and strengthen the appeal of their argument. The appropriate use of metaphors often determines how well a writer achieves depth of meaning in their argument.

The use of intensifiers and hedging adds another dimension to argument construction. Intensifiers can strongly emphasize a particular idea, allowing readers to grasp the urgency or significance of the point being made. Linguistic analysis shows that these devices strengthen the writer's position and help build rhetorical pressure when an argument is deemed important to emphasize (Liu et al., 2024). Conversely, hedging is used as a strategy to convey a more cautious stance and openness to the possibility of alternative perspectives. Hedging demonstrates that the writer acknowledges uncertainty or the existence of alternative arguments, making the message appear more balanced and credible. The presence of these devices reflects the understanding that persuasion is not always built on absolute certainty, but rather through acknowledging the complexity of ideas.

Cohesion and coherence play a central role in ensuring that arguments are easily understood and followed. Cohesion refers to the interconnectedness of parts of a text through linguistic devices such as lexical repetition, references, substitutions, and conjunctions. The appropriate use of cohesive devices helps readers recognize the logical connections between sentences and paragraphs, making the text flow smoothly. Recent studies have confirmed that conjunctions and lexical links play a crucial role in guiding readers in understanding the direction of an argument and the interconnectedness of its ideas (Huang & Watzinger-Tharp, 2023). Coherence, distinct from cohesion, relates to how ideas are logically organized and how a sequence of arguments is developed. Research on academic discourse indicates that strong coherence requires a clear internal structure of the text so that readers can follow the progression of the argument from premise to conclusion (Huang & Watzinger-Tharp, 2023). The combination of cohesive devices and conceptual coherence creates a text that is not only well-structured but also powerfully persuasive.

The Indonesian context exhibits distinctive rhetorical patterns in persuasive texts. The generic structure frequently encountered consists of orientation, argumentation, and persuasion. The orientation stage is intended to establish the context, present the issue, or provide an introduction that allows the reader to understand the background of the situation. The argumentation stage generally presents reasons and evidence supporting the author's position, often complemented by relevant examples or illustrations. The final stage is a call to action or conclusion that ties the entire argument together in a strong persuasive message. This rhetorical pattern is documented in research on Indonesian text structure, which shows how the structure reflects local linguistic practices and plays a role in guiding readers toward a particular position (Akmaliah & Nadzir, 2024; Syafitri & Yulianeta, 2021). Understanding this pattern provides insight into how rhetorical strategies can be adapted to the discursive traditions of a language community to increase persuasive effectiveness.

Technological developments and the presence of digital platforms have transformed the way persuasive texts are structured. Online discourse tends to emphasize brevity, spontaneity, and immediacy between speakers. Interactions driven by the speed and design of digital platforms create more fluid argumentative structures that sometimes do not follow formal rhetorical patterns. Analysis of digital communication shows that multimodality—including text, images, emojis, hyperlinks, and engagement statistics—influences how arguments are constructed and received by audiences (Dascălu et al., 2015). Readers respond not only to linguistic content but also to the various visual and interactive elements that accompany the text. These changes indicate that persuasive strategies in the digital world require adaptations that take into account how messages are processed in a dynamic media environment.

These overall ideas demonstrate that linguistic features in persuasive texts are integral to the success of the argumentation process. Diction, metaphor, intensifiers, and hedging play a role in shaping the tone and depth of the message, while cohesion and coherence ensure that ideas are clearly grasped. In the Indonesian context, distinctive rhetorical patterns enhance understanding of how argument structures develop according to local culture. Changes brought about by digital media require updated persuasive strategies to remain relevant to the reading styles of the modern generation. A thorough understanding of these features provides the foundation for strong, adaptive, and contextual persuasive writing practices.

AI-Assisted Writing in Higher Education

The integration of artificial intelligence into academic writing practices has transformed the way students develop ideas and interact with language. AI devices, which initially served as technical aids, are now being positioned as writing partners, playing an

active role in the text-building process. The presence of this technology influences the form of academic expression through changes in style, word choice, and syntactic patterns. Direct interaction with AI systems opens up opportunities for students to expand their writing skills, but also carries the risk of diminishing sensitivity to deeper reasoning processes.

The collaborative role of AI is evident in its ability to provide real-time feedback, correct language structures, and offer alternative writing styles. These features provide support that encourages students to become more confident in attempting sentence structures they previously struggled with. This understanding aligns with findings showing that tools like ChatGPT have a positive impact on the motivation and writing quality of EFL learners (Song & Song, 2023). Generative technology is also considered capable of tailoring support to the unique needs of each student, creating a more personalized learning experience (Wang, 2024). This overview demonstrates a paradigm shift in the understanding that writing is no longer a solitary process but rather a collaborative effort between the writer and the AI system.

The influence of AI on lexicon selection and sentence structure is another aspect that has received much attention. AI systems often encourage the use of a more diverse vocabulary and more complex syntactic structures, resulting in more mature writing. Recent analysis shows that students who utilize these tools tend to use longer and more complex sentence constructions (An, 2025). This support enhances academic language skills, especially for second language learners. However, research also warns that reliance on automated recommendations can lead to shallow understanding because students accept suggestions without undergoing the necessary linguistic reflection (Luo, 2025). This observation underscores the importance of mentoring to ensure students continue to develop their personal style and a deep understanding of language structure.

The risk of over-reliance on automated tools is evident in students' tendency to prioritize efficiency over critical engagement. The use of AI without reflection can hinder the development of higher-order thinking skills. Findings on EFL learners indicate that the lightened cognitive load provided by AI often leads students to skip the process of internalizing key concepts in academic writing (Tuong & Trần, 2025). This situation is reinforced by other research showing that a number of students accept AI suggestions without critical verification, resulting in less analytically robust arguments (Llegado et al., 2025).

Expert recommendations emphasize that AI should be positioned as a complementary tool in the writing process, not as a primary support (Black & Tomlinson, 2025). The learning process still requires reflective engagement, requiring students to assess the relevance and appropriateness of AI suggestions before incorporating them into their text. An approach that emphasizes metacognitive awareness will help students maintain their academic identity without neglecting the benefits of technology.

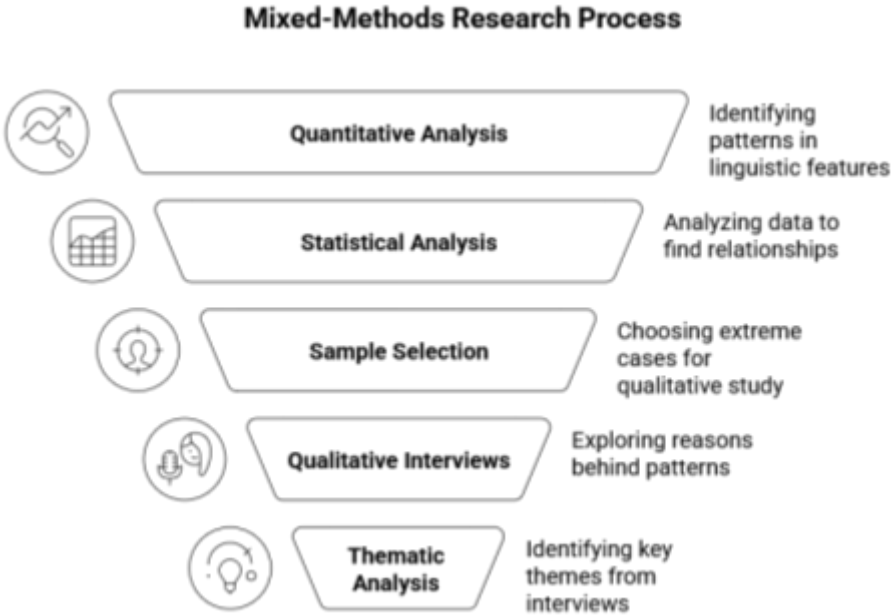
This overall description demonstrates that AI offers important opportunities for strengthening academic writing skills while also challenging depth of thought. The integration of technology in higher education requires a pedagogical design that emphasizes a balance between innovation and strengthening reasoning skills. Learning environments that foster reflective discussion, critical assessment, and the conscious use of AI will help students produce more mature, authentic, and academically responsible writing.

3. METHODS

Research Design

This research design employs the Explanatory Sequential Mixed Method, a two-stage approach that sequentially combines quantitative and qualitative analysis to gain a deeper understanding of linguistic and argumentative phenomena in Indonesian students' persuasive texts. This approach was chosen because reasoning patterns, argument structure, and the impact of artificial intelligence on writing performance cannot be fully explained with numbers or narrative alone. Creswell and Plano Clark (2018) strongly argue that an explanatory sequential design allows researchers to first identify trends from quantitative data and then expand that understanding through interviews or qualitative exploration. Experts such as Teddlie and Tashakkori also emphasize that this type of sequential design is effective when researchers are faced with complex phenomena that have both empirical and interpretive layers, allowing quantitative results to be complemented by participants' accounts of their experiences and thought patterns. In this study, the quantitative phase focused on analyzing 200 persuasive texts to identify linguistic features and argumentative structures, while the qualitative phase involved in-depth interviews to understand how students' experiences using AI shaped their rhetorical decisions. This design allowed for a comprehensive integration of findings and provided a strong foundation for constructing meta-inferences that balanced empirical data and participant voices.

The explanatory sequential mixed methods research design in this study can be visualized to clarify the relationship between the quantitative and qualitative phases, including the points of integration between the two in the meta-inference process.



This visualization emphasizes that quantitative data is the initial foundation for mapping linguistic and argumentative tendencies, while the qualitative stage serves to deepen the meaning of the findings before both are combined into a complete meta-inference framework.

Participants

The research participants consisted of approximately 120 Indonesian university students from both vocational and regular universities, aged 18 to 23. This group was selected because they are at a stage in their education that requires intensive development of academic writing skills, and they are also a generation highly familiar with the use of digital tools and artificial intelligence. The inclusion of students from both types of universities provided an opportunity to capture variations in writing abilities and differences in academic environments that may influence their argumentation patterns. All

participants participated voluntarily and provided written consent to submit original persuasive texts they wrote in the context of their studies. The inclusion of diverse institutional backgrounds provides a representative picture of Indonesian university students' writing practices amidst the increasing use of generative technologies.

Data Sources

The research data sources consist of three complementary types of documents. The primary corpus comprises 200 student persuasive texts with an average length of 300 to 500 words, composed within the context of academic assignments. This corpus serves as the basis for quantitative analysis to map linguistic characteristics, reasoning patterns, and argumentation components based on the Toulmin framework. The second source consists of recordings of in-depth interviews with 20 students selected as an extreme sample, demonstrating both very high and very low performance in the quantitative analysis. These recordings provide a comprehensive overview of their experiences interacting with AI, their revision strategies, and the rhetorical considerations underlying their writing decisions. The third source consists of documentation of AI usage, including prompts, output, and student revisions. These records allow researchers to trace how AI suggestions were interpreted and the extent to which they influenced argument construction and language choices.

Instruments

The research instruments were designed to capture the complexity of the phenomena studied. An argument structure coding scheme based on the Toulmin Model was developed to detect the presence of claims, data, warrants, supporting elements, and rebuttals in each text, allowing for systematic analysis of the relationships between argumentative elements. The stylistic analysis scheme focused on identifying metaphors, repetition, hyperbole, intensifiers, hedging, and other rhetorical elements commonly found in persuasive discourse. A reasoning checklist was used to determine whether the author used a deductive or inductive pattern in constructing the relationship between evidence and claims. The final instrument, a semi-structured interview guide, was developed to explore students' experiences with AI use, their thought processes when revising texts, and their perceptions of the quality of the resulting arguments. All instruments were tested for suitability before use to ensure consistency and clarity of analysis categories.

Procedures

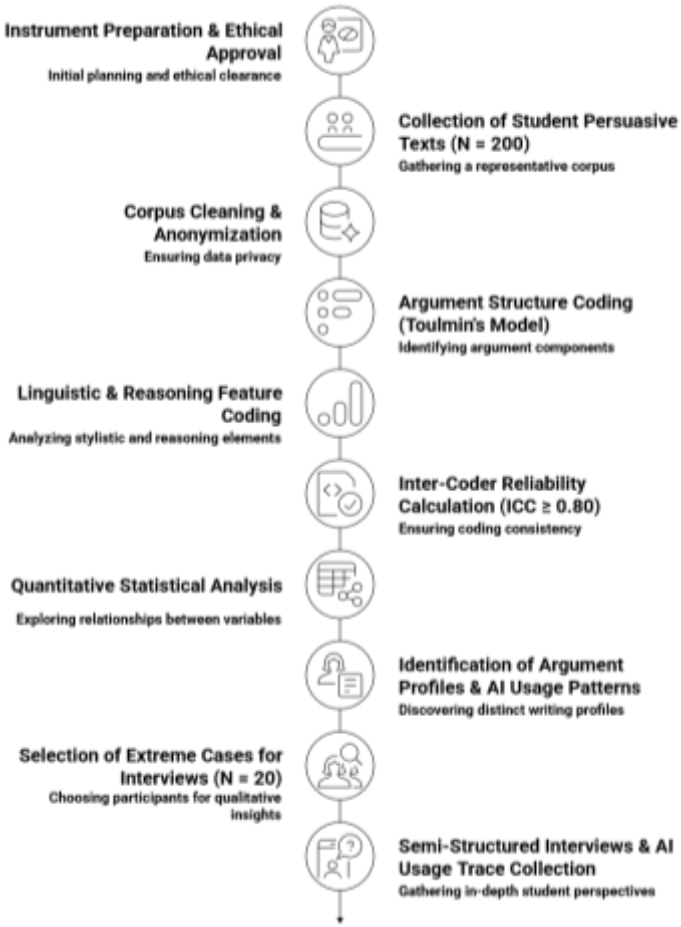
The research was conducted through a series of interrelated procedures. The initial stage involved collecting persuasive texts completed by students in the context of their lectures. The researchers ensured that the texts were original works and had not undergone intensive editing by the lecturers. The texts were then analyzed by two independent coders using previously developed linguistic and argumentative instruments. Coding consistency was maintained through checking the reliability of the intraclass correlation coefficient (ICC), with a minimum value of 0.80 as an indicator of appropriateness of interpretation categories.

Quantitative analysis was conducted after coding was completed. This process included testing the validity and reliability of the instrument, descriptive analysis to identify general patterns in the corpus, and regression analysis to determine the relationship between the level of AI use and variations in linguistic features and the quality of argument structure. Cluster analysis was also conducted to map writer profiles based on their argumentative and linguistic characteristics.

The next stage involved selecting an extreme sample for interviews, namely students with the highest and lowest scores on key indicators such as syntactic complexity, use of metaphor, or completeness of argument. The interviews were then analyzed using a

thematic approach to identify interpretive patterns regarding how students utilize AI, their strategies for selecting or rejecting AI suggestions, and their views on the writing process. The integration of both types of findings is carried out at the meta-inference stage to obtain conclusions that represent both empirical patterns and students' subjective experiences.

The series of research procedures involving corpus collection, linguistic coding, statistical analysis, interviews, and integration of findings can be described in more detail to make the methodological workflow appear transparent and systematic.



The visual description of the procedure shows that each step, from corpus management to the formulation of implications, is linked together in a consistent flow so that readers can assess the validity, reliability, and depth of interpretation of the research findings.

Data Analysis

The data analysis was conducted through three layers. The first layer was a quantitative analysis that focused on measuring lexical complexity, syntactic structure length, cohesive devices, and argumentative components, and tested the statistical relationship between AI use and these linguistic features. The second layer was a qualitative analysis of interviews conducted using the reflexive thematic analysis technique described by Braun and Clarke. This analysis explored students' experiences, examining the emotions, considerations, and conflicts that emerged when they used AI suggestions in the revision process. The third layer, a mixed integration, aimed to bring together the two findings so that statistical patterns could be clarified by students' narratives of their experiences. This stage yielded a more robust explanation of how AI influenced argumentation and language choices.

Trustworthiness and Reliability

The reliability of the research was maintained through various strategies. In the quantitative phase, inter-coder reliability was ensured through high ICC values, while internal reliability testing was conducted to check instrument stability. Qualitative analysis was ensured through member checking, where participants verified the interview summaries interpreted by the researcher. Dependability was maintained through the development of an audit trail that systematically recorded all analysis decisions. Confirmability was strengthened by triangulating sources: written texts, interviews, and AI usage logs.

Ethical Considerations

Ethical considerations were a crucial part of this research. All participants provided written informed consent before submitting data. Student identities were anonymized throughout the report, including persuasive texts, interview recordings, and AI usage logs. Transparency was maintained by explaining the research objectives, potential risks, and data usage limits to all participants. The data collection process was also conducted without pressure or obligation, allowing participants to withdraw at any time without academic consequences.

4. RESULTS

Quantitative Findings

A quantitative analysis of 200 persuasive texts revealed relatively consistent linguistic and argumentative patterns across the corpus, particularly regarding the type of reasoning, the completeness of argument structure, stylistic preferences, and the impact of the use of artificial intelligence on the quality of students' writing. The dominant reasoning pattern was inductive reasoning, used by approximately 68% of writers, while deductive reasoning appeared in only 32% of the texts. The strong tendency toward inductive reasoning indicates that students are more comfortable building arguments through examples or illustrations before drawing general conclusions, rather than starting from a theoretical proposition and then elaborating on it with supporting evidence. This pattern aligns with the characteristics of Indonesian students' academic rhetoric, which tends to be contextual, narrative, and step-by-step in building claims. However, the dominant use of induction suggests that some students still struggle to develop logically structured arguments, particularly in the generalization section, as conclusions are often not fully supported by sufficient evidence.

The Toulmin-based argument structure exhibited significant inequalities. Approximately 62% of the texts presented only simple claims and reasoning without explicit data, warrants, or backing. In many cases, students were able to formulate claims but did not dedicate sufficient space to demonstrating the relevance of the evidence or explaining the logical relationship between the data and the claim. Only approximately 18% of the texts presented factual evidence or verifiable empirical data, while fewer than 10% included warrants or backing that demonstrated the ability to connect the evidence to general principles. This inequity indicates that although students were able to express their opinions, they did not fully grasp the complexities of formal argumentative structures. The absence of supporting elements weakened the strength of the argument and made the writing appear more opinionated than evidence-based.

Linguistic analysis of the corpus revealed a tendency toward the use of certain stylistic devices. Repetition emerged as the most frequently used rhetorical device, present in approximately 72% of the texts. This repetition typically took the form of repeating key phrases to emphasize a position or persuasive appeal. Conversely, the use of metaphors was

relatively low, occurring in only 14% of the texts. This lack of metaphors reflects students' tendency to write in a literal and informative manner without utilizing cognitive tools that can enrich argumentative elaboration. Intensifiers (e.g., "very," "really," "truly") appeared in almost the entire corpus, but their use was often excessive, indicating a reliance on emotional emphasis rather than logical reinforcement. The use of hedging was relatively low (approximately 11%), indicating that the analyzed texts emphasized certainty over epistemic caution. This lack of hedging resulted in a lack of argumentative nuance necessary for academic writing.

The influence of AI was quite significant in several aspects. Texts tagged using generative tools exhibited higher levels of inter-sentence coherence than texts not tagged using AI, particularly in the use of logical connectors and paragraph structure. However, this increase in coherence was accompanied by a decrease in linguistic creativity. Approximately 41% of AI-generated texts exhibited homogeneous sentence patterns, including repetitive syntactic constructions, consistent diction, and paragraph structure that followed the thesis–evidence–restatement pattern typical of generative systems. This situation suggests that AI plays a role in improving order and readability, but simultaneously reduces the originality of students' personal styles. This phenomenon of language homogenization becomes even more apparent when the texts are compared with AI usage records, which show a repetition of the generative model's typical structure.

Quantitative results also indicate that the more intense the AI use, the less willing students are to explore stylistic variations. Students who used AI more than three times in the revision process tended to produce writing with neutral diction, a uniform tone, and minimal rhetorical devices. Conversely, students who used AI solely as an ideation tool tended to produce text with greater stylistic variation. These findings demonstrate that AI use has a complex relationship with argumentation quality improving mechanics and coherence but reducing creativity and expressive depth.

Qualitative Findings

Qualitative findings from in-depth interviews with 20 participants provide important context for the quantitative data and reveal the cognitive dynamics and emotional experiences of students using AI as a writing partner. One of the most prominent themes was students' reliance on the generative system. Most participants acknowledged that they felt safer writing when AI provided the initial paragraph structure or argument framework. Many described AI as a "path opener" in the writing process, especially when experiencing writer's block. This reliance was not merely technical but also psychological, as students perceived AI-generated text as "more academic," "more organized," or "more logical." This view suggests that AI has gained an epistemic position as a linguistic authority in the minds of some students.

Students' perceptions of argument logic revealed a gap between what they considered a good argument and what academically constitutes a complete argument structure. Many interviewees believed that a good argument was primarily determined by paragraph coherence, rather than by the strength of the relationship between claims, evidence, and warrants. When asked to explain the rationale for using a particular inductive pattern, most students struggled to draw logical connections from examples to a general conclusion. Their reasoning is more intuitive than structured, and they rely largely on a “sense of logic” that they believe is sufficient for persuasive purposes. This phenomenon supports quantitative findings that warrants and backing are often absent from texts.

Difficulties in developing warrants and backing were the most prominent qualitative themes. Students often understood data as explicit information such as statistics or examples, but were unaware that they needed to explain why the data was relevant to the

claims they were making. Many admitted to having never been explicitly taught the Toulmin structure, so the connection between claims and evidence was never consciously practiced. When AI provided evidence, students simply accepted it without verifying its relevance or validity. This gap highlights the need for more explicit argumentation pedagogy in linguistics education in Indonesia.

Interviews also revealed a phenomenon that can be called "AI-echoed style." Students who intensively used AI tended to produce sentences that resembled typical patterns of generative devices, such as the use of phrases such as "in the contemporary era," "it is important to note that," or "this highlights the need for...". This sentence style appeared not only in English but also in Indonesian writing, such as "in this modern era," "per perlu digarisahan bahwa," or "hal ini memberikan bahwa..." This phenomenon demonstrates that AI influences not only text structure but also students' linguistic aesthetics.

Furthermore, examples of syntactically complex but semantically flat sentences emerged, which some participants themselves referred to as “AI-typical sentences.” These sentences are typically long, formal, and seemingly sophisticated, but lack analytical depth. When asked about the reasons for using these structures, students stated they “copied them from AI because it looked academic.” This finding confirms that the generative system contributed to students’ perceptions of what constitutes “academic language,” which in turn influenced their rhetorical identities.

Integrated Findings

The integration of quantitative and qualitative findings yields a more comprehensive understanding of how students' reasoning, language style, and argumentative structure interact with each other in the era of AI. The dominant inductive reasoning pattern in the quantitative corpus aligns with students' view that a good argument is simply built from concrete examples without in-depth logical explanation. This situation confirms that the preference for inductive reasoning is not simply a linguistic choice, but a reflection of a mindset formed through learning experiences that prioritizes illustration over theoretical generalization.

The tendency of texts to present claims without supporting data was better understood after interviews revealed that students considered the internal coherence of paragraphs more important than the logical strength of the claim-evidence relationship. Thus, the absence of warrant and backing is not solely the result of technical incompetence, but rather a lack of rhetorical awareness of how academic arguments work. This integration clarifies that weaknesses in argumentative structure must be understood as pedagogical, not merely linguistic, issues.

The findings regarding style suggest that high repetition and a lack of metaphors reflect students' preference for direct and explicit persuasive strategies. However, interviews revealed that the lack of metaphors also stems from students' concerns that using figurative language will be deemed "unacademic." The influence of AI reinforces this phenomenon, as generative texts tend to avoid metaphors and prioritize formal clarity. This integration suggests that AI indirectly limits students' rhetorical flexibility.

The effect of AI on increasing coherence but decreasing creativity is more fully explained by qualitative results. Students used AI to ensure organized paragraph structure and more explicit connections between ideas through logical connectors. However, they also acknowledged that their style became more homogenous because it tended to follow AI patterns. Thus, increased coherence is not a result of increased linguistic ability, but rather the adoption of AI-generated rhetorical structures.

These integrative results led to the formulation of a conceptual model called the AI-Assisted Persuasive Reasoning Framework. This model illustrates how three key

dimensions—reasoning, style, and argumentation structure—are influenced by students' interactions with AI. This framework suggests that AI serves as scaffolding for the mechanical aspects of writing, but simultaneously encourages a homogenization of rhetoric that diminishes linguistic exploration. AI helps students build coherence, but it does not strengthen their ability to develop warrants, evaluate evidence, or organize arguments based on principles of formal logic. Therefore, this model emphasizes the need for learning strategies that make AI a reflective partner, not simply a provider of structure.

The following table presents the integration of quantitative and qualitative findings through a joint display approach, allowing for a unified reading of the relationships between reasoning, argument structure, style, and the influence of AI on students' persuasive writing.

Tabel 1. Joint Display of Integrated Findings

Component	Quantitative Findings (Quan)	Qualitative Findings (Qual)	Meta-Integration (Joint Interpretation)
Reasoning	68% inductive, 32% deductive	Inductive reasoning is perceived as "safer"	Preference for induction reflects a narrative mode of thinking.
	Weak generalization	Conclusions are drawn intuitively	Difficulties arise due to the absence of explicit warrants.
Argument Structure	62% of texts contain only claims	Students are confused about explaining data–claim relations	Weak argument structure is caused by the lack of explicit instruction on the Toulmin Model.
	<10% include warrant/backing	Limited understanding of warrant/backing concepts	
Language Style	High repetition (72%)	Students fear metaphors may be perceived as "non-academic"	AI reinforces literal writing styles and reduces rhetorical flexibility.
	Low metaphor use (14%) Low hedging	Students follow AI-generated language	
AI Influence	Increased coherence	AI-echoed style & AI-typical sentence patterns	AI enhances mechanics but weakens creativity and personal stylistic exploration.
	Reduced creativity Homogeneous structure	AI perceived as an academic authority	
Main Integrated Outcome	Reasoning, argument structure, and language style are interrelated and collectively shape students' digital argumentation characteristics.		

The integrated findings in this table confirm that students' digital argumentation patterns are formed through the interaction of inductive reasoning tendencies, weak argument structure support, the homogenization of language style by AI, and students' perceptions of AI as a linguistic authority. These results form the basis for the formulation of the AI-Assisted Persuasive Reasoning Framework.

DISCUSSION

This discussion integrates quantitative, qualitative, and meta-inferential findings to explain how Indonesian students construct persuasive arguments in the era of artificial intelligence dominance. Interpretation of the findings indicates that the quality of students' reasoning, argument structure, and linguistic style are influenced by a combination of cognitive factors, literacy culture, and new interaction patterns with generative AI tools. This section examines the sources of argumentative weaknesses, the transformation of linguistic style brought about by AI, and the theoretical implications for applied linguistics. Interpretation of Students' Argumentative Weaknesses

The tendency of students to produce shallow reasoning appears to be a phenomenon that does not stand alone but is closely related to the cultural roots of thinking, the history of literacy pedagogy, and academic practices that have developed in Indonesian educational environments. Quantitative findings show a dominance of inductive reasoning patterns (68%), accompanied by the absence of warrants and backing in most texts. This condition indicates that students rely more on narrative associations and intuition than on explicit reasoning guided by formal argumentation rules.

Indonesian literacy culture has a long history of oral traditions, storytelling, and socially transmitted, experience-based communication. These patterns often shape students' reasoning preferences, leading them to prefer intuitively connecting experiences or facts to systematically formulating cause-and-effect relationships. In an educational context that still emphasizes memorization and reproduction of material, students tend not to develop an epistemic awareness of how evidence and claims should be connected through explicit warrants.

Qualitative findings support this diagnosis. Many students claim that their reasoning is “obvious” or “naturally makes sense,” often leaving the logical explanation incomplete. This phenomenon aligns with the concept of implicit warranting, which is the tendency to assume that readers share the same background knowledge. However, in academic discourse, readers require a clear reasoning structure for arguments to be credible.

The use of AI also reinforces this tendency toward superficial reasoning. AI provides neat transitions between sentences and paragraphs, making arguments appear coherent on the surface, even though they lack strong internal logic. Students interpret the fluency of the text as an indicator of argumentative quality, failing to realize that the coherence is the result of an algorithm, not critical reasoning. This phenomenon creates an illusion of coherence—a convincing textual appearance without an adequate logical foundation.

A comprehensive interpretation suggests that students' argumentative weaknesses are the result of a culture of intuitive reasoning, a lack of explicit practice in academic argumentation, and the presence of AI that provides instant forms of coherence without any reasoning process. The pedagogical implication is the need to re-emphasize the epistemic foundations of argumentation, rather than solely the surface structure of the text.

Linguistic Style Changes Due to Interaction with AI

Research findings show that generative AI brings significant transformations to students' linguistic style. High levels of repetition, low metaphor density, and minimal use of hedging and evaluative expressions indicate that students' writing is increasingly standardized, homogenous, and far from rhetorical expressiveness.

AI is trained on a global academic corpus, so its style reflects the generic and secure patterns of academic English. When students use AI to initiate or refine texts, they tend to adopt repetitive patterns of phrases and sentence structures, weakening their personal style and becoming a uniform rhetorical voice. Sentence patterns such as "this issue plays an

important role" or "therefore, it is important to emphasize that" are typical examples of AI style embedded in student writing.

The influence of AI is also evident in syntactic development. Sentences become longer and more superficially complex, but students are unable to explain the reasons for using certain structures. This condition indicates syntactic inflation—increased structural complexity without increased linguistic competence. The complexity generated by AI does not always reflect students' thinking or comprehension abilities, creating a gap between form and meaning.

Interestingly, many students deliberately avoid using metaphors, rhetorical repetition, or figurative language because they are considered inappropriate for "academic language"—a perception reinforced by AI's tendency toward literalness and minimal figurative expression. This tendency erodes the power of emotional persuasion (pathos) and narrows the scope for linguistic creativity, which is crucial in persuasive texts.

These results suggest that interacting with AI shifts the definition of "academic" to simply "neat, literal, and structured," rather than "reflective, nuanced, and argumentative." This narrowing of style is worth considering in developing writing pedagogies that continue to value rhetorical diversity.

Implications for Applied Linguistics

The research findings provide significant theoretical and practical implications for the field of applied linguistics and English language teaching globally.

a. Designing a persuasive writing pedagogy that is responsive to AI
   The presence of AI demands new pedagogical responses. Writing learning models can no longer view AI as a threat or a secondary tool, but rather as part of the literacy ecology that must be managed critically. Students need to be trained to use AI as a diagnostic tool—for example, to examine sentence variation, evaluate clarity, or map arguments—without leaving the reasoning process to the machine. Approaches such as AI-augmented argument mapping, comparative reflection between AI and manual versions, or exercises critiquing AI output can be relevant strategies.
b. Strengthening critical digital literacy
   The need for critical digital literacy is now a key foundation in teaching writing. Students need to understand:

1) how AI constructs sentences,
2) what biases are inherent in AI language structures,
3) how to distinguish algorithmic coherence from real logic,
4) when to follow and when to reject AI.

This critical digital literacy enables students to become writers who are not only technically proficient but also aware of the cognitive and rhetorical processes involved.

c. Strengthening digital rhetoric in the global context
   Digital rhetoric is now a crucial domain in the global context. Rhetoric instruction can no longer simply rely on logos, ethos, and pathos in traditional contexts, but must also consider how AI constructs language, interprets user intentions, and shapes discourse dynamics.

1) Students need to learn how:
2) AI influences stance choices,
3) AI shapes academic self-image (ethos),
4) AI reduces rhetorical variation,
5) AI changes learners' interaction patterns with texts.

These implications underscore the importance of digital rhetoric instruction that integrates language analysis, technological awareness, and an understanding of argumentation.

d. Global relevance

Although the research was conducted in Indonesia, the dynamics found—such as decreased originality, stylistic homogenization, and shallow reasoning due to AI—have been reported in various countries. These findings have global relevance for developing academic writing curricula in the era of generative AI.

5. CONCLUSION

This study provides a comprehensive overview of how Indonesian students construct persuasive arguments in a literacy environment now dominated by artificial intelligence. Analysis of 200 student texts and in-depth interviews with 20 participants revealed a strong pattern of inductive reasoning, the use of incomplete argument structures, and a tendency toward an increasingly homogenous linguistic style due to intense interaction with generative AI tools. These findings reveal that students' argumentative abilities are determined not only by linguistic proficiency but also by their understanding of logic, organizing evidence, interpreting AI suggestions, and practicing rhetoric in academic contexts. This comprehensive overview confirms that the quality of persuasive writing in the AI era cannot be separated from the dynamic relationship between technology, literacy culture, and users' cognitive habits.

The theoretical contribution of this study lies in the cross-dimensional integration of reasoning, argument structure, and linguistic style with the influence of AI in the context of persuasive writing. The mixed methods approach provides the basis for the development of the AI-Assisted Persuasive Reasoning Framework, which explains that AI works as a mechanical scaffold—improving coherence, paragraph order, and textual clarity—but does not yet support in-depth reasoning processes such as warrant development, evidence evaluation, and rhetorical style exploration. This framework provides a novel contribution to the study of applied linguistics, particularly in examining how AI tools simultaneously strengthen and weaken the quality of students' arguments. This perspective also clarifies an epistemic shift in writing practices, where the presence of AI creates an illusion of coherence that is not always accompanied by logical clarity.

The practical contribution of this research is evident in the pedagogical recommendations that can be implemented in higher education. Teaching persuasive writing requires positioning AI as part of a literacy ecosystem that must be utilized critically. Students need guidance in understanding AI's function not as an argument provider, but as a diagnostic partner that helps evaluate paragraph structure, stylistic variation, and the appropriateness of evidence. Learning should strengthen the explicitness of reasoning through warranting exercises, Toulmin-based argument mapping, and comparative reflection between AI output and manual writing. Strengthening critical digital literacy is an urgent need so that students can identify biases, weaknesses, and homogenizing patterns in AI language. This understanding will help them maintain their personal voice and rhetorical identity amidst the pressures of language automation.

Recommendations for teaching persuasive writing in the AI era include several strategic steps. Instructors need to design learning activities that encourage students to analytically reassess AI output, rather than blindly accepting it. The use of argumentation models like Toulmin's needs to become a regular practice to strengthen the connection between claims, evidence, and warrants. Reflection-based revision activities for example, comparing AI-versioned and author-versioned paragraphs can help students understand the

difference between algorithmic coherence and academic logic. Digital rhetoric training needs to be expanded to enable students to recognize how AI shapes style, modifies structure, and influences perceptions of "academic language." This pedagogical effort is expected to guide students in producing persuasive texts that are not only well-structured but also rhetorically rich, reasoning-in-depth, and reflect authentic academic thought.

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