



Logical fallacies in EFL students' undergraduate argumentative writing

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Abstract

Argumentative essays were an important part of learning English as a foreign language (EFL) because this genre of writing not only developed language skills but also engaged students in critical thinking. Although grammar and structure was usually the main focus, students often overlooked the sense of logic in their arguments, especially the fallacies or reasoning errors. To address this gap, the researcher used qualitative research to identify the types of logical errors made by EFL students in their argumentative essays at a public university in Semarang and the underlying causes of those fallacies that occurred. A systematic content analysis method based on Mayfield's taxonomy was used to identify types of logical fallacies that categorized into four board categories, manipulation through language, emotion, distraction, and inductive fallacy. Students' argumentative writing was analyzed, and semi-structured interviews were conducted to understand the patterns that implied the causes of logical fallacies. The findings demonstrated that most of the EFL students' arguments in argumentative writing were influenced by the limitations in their thinking abilities, emotional reasoning, insufficient explicit instruction in critical thinking, and superficial peer feedback. Students also showed a tendency to simplify complex issues, which was evident from the consistent usage of hasty generalizations and false dilemmas in their essays. Based on these findings, it is essential to introduce the knowledge of logical reasoning and assess the credibility and reliability of reasons and evidences that are incorporated in English argumentative writing courses, which would significantly enhance students' critical thinking skills in learning about argumentation. As a result, these findings should be taken into account by educators who aim to equip EFL students with the critical thinking skills that are necessary for constructing a well-structured argument.

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INTRODUCTION

Over the past decades, education has been greatly reshaped by the influence of digital technology that seeps into many different and complex approaches, including learning language (Chen, 2020; Zeng, 2020). Online informations are now utilized by all students including English as a Foreign Language (EFL) students to enrich their proficiency in learning language (Wu et al., 2017). These changes create a new era, where digital literacy becomes crucial for academic success and career growth (Thaariq, 2020; Saleh, 2019).

However, despite the usefulness, the hype of online information also presents serious challenges. Many online informations share unverified content, which ultimately spreads misinformation (Khan & Idris, 2019). Gelfert (2018) refers to such information as “fake news,” which consists of fabricated statements that deliberately distort facts and contain inaccuracies. This issue causes concern in society that draws the attention of the academic community, which begins to emphasize the importance of critical thinking in digital literacy (Sharma et al., 2019) especially in higher education (Živkovic, 2016; Bekele et al., 2022). Students need to judge sources of information in order to recognize credible and reliable information and distinguish them from misinformation (Womack, 2019).

Writing is more than just the mechanical creation of words; it is also a form of mental exercise that allows students to actively express their ideas (Prihastuti et al., 2020). In the context of argumentation, the importance of argumentative writing cannot be overlooked. Argumentative writing are expected to present claims that are supported by valid reasoning that are critically built (Chen, 2020; Fiallos et al., 2025). Critical thinking techniques must be applied first in order to ensure that the argumentative the students make are as convincing as possible (Alsaleh, 2020). Therefore, compared to other writing genres, it is frequently noted that students find argumentative writing more challenging (Peng & Bao, 2023).

Along with difficulties and issues of word choice and grammar (Zainuddin & Rafik-galea, 2016), there is also difficulty with proper reasoning (Peloghitis, 2017; Hitchcock, 2017). Inadequate argumentative writing undermines the overall quality of writing because such writing unknowingly applies illogical reasoning which are considered fallacious (Widyastuti, 2018). These fallacious diminish logic within the argumentative writing. Without strong logic and well reasoning, students' claims become easily contestable and defenseless (Siregar et al., 2021; Safitri et al., 2024).

Writing instruction often emphasize structures of argumentative essays, yet lack recognition of explicit knowledge of critical thinking specifically in logical fallacies (Cullen et al., 2018; Widyastuti, 2018). Critical thinking covers how students identify an author's position, reasons, conclusions, and the overall line of reasoning (Cottrell, 2023). Hence why it is important to correlate logic reasoning to critical thinking (Vartiak et al., 2021).

Drawbacks of the fallacies in argumentation is that despite their seeming logical consistency, they are in fact false upon closer inspection (Boudry et al., 2015). Mercier (2017) also highlights that seemingly convincing arguments may have hidden weaknesses and fallacies. Furthermore, Seremeta et al. (2024) study regarding straw man fallacy states that capacity to identify fallacies in argumentation is different from consciousness which is aligned about the inadequacy of critical thinking skill. Therefore, it is a need to develop sensitivity to the logical fallacies that unknowingly appear in argumentative writing.

Although there is an awareness that logical fallacies impact argumentative writing, few have been studied, particularly in the context of EFL students. Most are concerned with linguistic and rhetorical issues (Vögelin et al., 2018; Chaleila & Garra-Alloush, 2019). Few prior studies that discuss logical fallacies are Indah & Kusuma (2015) and Khoiri & Widiati (2017). They investigate the logical fallacies occurred in students' writing found out about students' frequency in making reasoning based on emotional appeal. Their research, however, focused on exploring logical fallacies without investigating on the causes of the fallacies.

This study is distinctive as it investigates the logical fallacies and the causes in EFL students from Indonesia. Previously, most studies concentrated on classifying fallacies (Abdollahzadeh et al., 2017; Lismay, 2020) or identifying the appropriate teaching methods (Ong et al., 2018) without considering the underlying causes that lead to students' fallacies in argumentative writing. The current study aims to examine that issue by dive deep into the implications and explain it in more thorough.

As a fundamental theory, this research uses the logical fallacy taxonomy, which serves as an indicator of pinpoint the fallacies. Students' essays are systematically evaluated, and fallacies are categorized into four board categories, such as manipulation through language, emotion, distraction,

and inductive fallacy with each representative type (Khoiri & Widiati, 2017). Thus, the students' writing is not only used in assessing students' fallacies in writing argumentation, but it also supplemented with diagnostic measure to explain how the fallacies establish. The classification of the fallacies can be seen below.

Table 1. The Type of Fallacy Classification

Types of Fallacies	Definition
Manipulation through language	
Word ambiguity	Uses vague or undefined words
Misleading euphemism	Masks negativity with positive words.
Prejudicial language	Uses loaded words that convey bias
Manipulation through emotion	
Appeal to fear	Seeks to persuade by arousing fear
Appeal to pity	Seeks to persuade by arousing pity
Appeal to false authority	Cites false authority to persuade
Appeal to bandwagon	Uses popular opinion as persuasion
Appeal to prejudice (personal attack)	Attacks irrelevant personal traits
Appeal to prejudice (poisoning the well)	Bias's opinion to silence opposing views
Manipulation through distraction	
Red herring	Diverts attention to other issues
Pointing to another wrong	Excuses behavior by referencing past neglect
Straw man	Undermines argument through trivial attack
Circular reasoning	Repeats the same conclusion in different words
Inductive Fallacy	
Hasty generalization	Draws conclusion from insufficient sampling
False dilemma	Limits choice to two extremes
Questionable statistics	Presents unknown or unsound statistics
Inconsistencies and contradictions	Uses claims that contradict one another
Loaded questions	Uses a biased question
False analogy	Overlooks key differences in comparison
False cause	Presents unreasonable claim of causal connection
Slippery slope	Unjustly claims one event causes a chain reaction

This research aims to offer narrative explanation to the EFL teaching especially to educators who wish to help their students improve their writing skills. By making logical fallacies a recognizable knowledge, this approach expects to improve the quality of teaching of writing, especially argumentation. Educators develop better teaching strategies when they understand the reasons why students make fallacies in argumentative writing. In this way, writing skill, critical thinking skill, and logic fallacies are three key matters that this research addresses. There are two research questions of the study which are: (1) What types of logical fallacies exist in students' argumentative essays? and (2) What might be the underlying causes for those fallacies in students' argumentative essays?

METHODS

This research adopted a qualitative approach that used content analysis as a method in exploring logical fallacies in students' argumentative essays. Qualitative research was used to establish a comprehensive set of themes by working back and forth between the themes and the database (Creswell, 2009). Through content analysis, the textual communication were identified and systematically classified (Krippendorff, 2004). Students' patterns of logical fallacies in their argumentative writing were examined using Mayfield taxonomy which also helped to clarify and deduct patterns or themes in how fallacies arose in the first place.

The primary data came from the students' essays and semi-structured interviews. Carter et al. (2014) proved that the used of triangulation improved the accuracy of findings obtained through students' opinions and writing examples. In order to identify different kinds of logical fallacies, the researcher referred to Khoiri & Widiati (2017) study for using Mayfield taxonomy. There were four board classifications with representative types that already provided definition in it. Additionally, the interviews were utilized to examine how students building the reasoning, choosing sources and

evidences, applying counterarguments, and managing time limits to discern the cause of fallacies. Thematic analysis was used for interpreting the interview data (Braun & Clarke, 2006).

This research took place at a public university in Semarang, in English Education Study Program of the Faculty of Languages and Arts. The main focus was on the fourth-semester students who were enrolled in the "Factual and Critical Writing" course for the 2024–2025 academic year. Purposive sampling was used to choose them, taking into account the research study strategies to use specific phenomena and participants (Campbell et al., 2020). However, because the data were collected from a selected classed and a small group, the conclusions of this study had limited versatility (Tajik et al., 2024).

Argumentative essay assignment and semi-structured interviews were the two primary instruments used in this study. The students were required to create essay for the writing assignment on prompt of situations that had been discussed with the lecturer beforehand. The situation used were made relevant as possible for the students. Education, health, politics, technology and so on were among the issues that were brought up. The students had around 12 days to finish their essays after completing the first draft and getting peer feedback. The Mayfield taxonomy was employed to assess the essay, with indicators that was utilized to identify types of logical fallacies.

A semi-structured interviews were carried out to collect the data by formulating questions that excluding the term of "logical fallacy." This inhibited technical terms from influencing participants' replies. Several important aspects were involved and formed the interview guides that consisted of thirteen open-ended questions with psychological (Pennycook & Rand, 2019), emotional (Lerner et al., 2015), social (Seeme et al., 2025), and rhetorical (Schumann et al., 2021) factors. Participants were asked using the provided questions. The researcher invited nine students with a different range of situation selected.

The research was performed in accordance with research ethics (Grady et al., 2017). The researcher explained the participants as to what the study objectives and methods, and the participants understood that they had the right to withdraw at any time. The written and oral consent was obtained after that. The participant's data were kept and regarded as confidential by the researcher until reporting the research results.

In the process of analyzing data, the researcher conducted two phases of data analysis. Utilizing Mayfield's taxonomy, in the first stage, the researcher reviewed the argumentative essay in order to identify and classify types of logical fallacies (Khoiri & Widiati, 2017). Using open, axial, and selective coding procedures, the interview transcripts were thematically operated (Nowell et al., 2017) in the second stage. This process allowed the researcher to identify the key themes that relating to causes of logical fallacies that were occurred.

FINDINGS AND DISCUSSION

This section contains the results on the types of logical fallacies in students' argumentative writings along with the potential causes of their occurrence. It is further expanded with a discussion of the research results based on current literature. The first and second research questions are addressed by the two primary findings of this study.

Types of logical fallacy in students' argumentative essay

The results of this research revealed significant knowledge about the various types and numbers of logical fallacies in the argumentative essays of fourth-semester students. The study found a large number of various logical fallacies, which the researcher has classified into three general categories along Mayfield's taxonomy: manipulation through emotion, manipulation through distraction, and inductive fallacy with each types. The results are shown in the table below.

Table 2. Types of logical fallacy found in students' argumentative essay

Types of Fallacy	Total
Manipulation through emotion	
Appeal to fear	5
Appeal to false authority	19
Appeal to bandwagon	3
Appeal to emotion	16
Manipulation through distraction	
Straw man	16

Circular reasoning	16
Inductive fallacy	
Hasty generalization	42
False dilemma	30
Questionable statistics	1
False cause	20
Slippery slope	16

According to the findings above, the most common logical fallacy in students' argumentative essays was *hasty generalization*, classified as an inductive fallacy, with a total of 42 examples observed. Below were several generalizations in the students' argumentative essays from several different prompt from several different Situation.

"In my opinion, working from home is more beneficial than office work because it saves time, increases productivity, and improves work-life balance." (S2)

As we seen in Situation 2, the students determined that working from home was more advantageous based on a handful of selected benefits and not considering the negative aspects of working from home or the variation in individual preferences or job requirements. This generalization assumed that the stated benefits were applicable to all situations despite the fact that there could have been situations in which working from home wasn't possible, and also that working in an office may have offered benefits in that environment that could not be obtained working from home.

"Some employees, especially late at night, feel under pressure to respond to messages promptly. Maybe they're worried that their supervisor will think they're lazy." (S11)

In this Situation 11, the statement mentioned that some workers felt pressure, which many workers may not have experienced. Assuming that pressure was experienced by the general workforce without sufficient evidence contributed to a broad conclusion about the experience of the entire workforce.

"If children know what constitutes healthy food, they are better equipped to make choices in the future." (S4)

In this case of Situation 4, there was a pointing out of a *hasty generalization*, which made the assumption that knowing healthy food meant better choices were inevitably made in the future. Although there was a correlation, the article generalized the conclusion, without any respect to other factors that could impact choices, including; socio-economic status, accessibility to healthy food, preference, and psychological factors.

"A feeling of anxiety, low self-esteem, and even depression is increasingly becoming a common occurrence for teenagers who are heavy social media users." (S6)

The assertion of Situation 6 above sought to present a cause-and-effect scenario between teenager's mental problems and their overuse of social media. To conclude that overuse of social media was responsible for mental disorders, without factoring in other factors, was an unfounded supposition, despite earlier research possibly advancing a correlation. The quoted testimony failed to control for additional variables that could have influenced such sentiments, including economic situation, home life, or previous mental health assessments.

In addition to *hasty generalizations*, several other kinds of inductive fallacies were also found to be extensively present, for instance, *false dilemmas* with 30 cases found, *false causes* with 20 cases found, *slippery slopes* with 16 instances found, and *questionable statistics* with 1 case found. The occurrence of *false dilemma*, *false cause*, and *slippery slope* fallacies could be found in the students' argumentative essays as explained below.

"If the government over-regulates the use of social media, it means that the government has violated the freedom of an individual." (S9)

This remark had been deceiving in its assumption that current options at hand were complete freedom or freedom but in a form of restriction by the government intervention. It failed to take into account the possibility of enacting good legislation that would protect individual freedoms and remove the unwanted consequences related to social media. Laws could have been implemented to uphold individual rights while simultaneously responding to societal issues, thereby avoiding the extreme *false dilemma* such the one presented in Situation 9.

"Productivity is also frequent to be found in the office, because of its environment." (S2)

This assertion in Situation 2 suggested a causal link between the work environment and productivity, yet there was no empirical data for the correlation. *False cause* fallacies occurred when one assumed that because two events or conditions occurred together, one must have been caused by the other. Productivity could have been influenced by numerous factors beyond the physical work environment, such as management practices, employee motivation, and individual work styles.

"...long working hours led to over 745,000 deaths from stroke and heart disease in a single year." (S9)

A *slippery slope* fallacy suggested that a relatively small first step would inevitably lead to a chain of related (usually negative) events. In this case of Situation 9 above, the argument implied that without regulating work hours, it would directly result in a massive number of deaths due to health issues. Although long hours were associated with health issues, the jump from long hours to hundreds of thousands of deaths overemphasized how immediate and inevitable such extreme outcomes were to occur without establishing other potential confounding variables.

The number of fallacies around emotional appeals had also run rampant. These included *appeal to false authority* with 19 cases found, *appeal to emotion* with 16 cases found, *appeal to fear* with 5 cases found, and *appeal to bandwagon* with 3 cases found. The considerable presence of these fallacies demonstrated that many students frequently relied on emotional triggers or unverified authorities rather than substantiating their claims through logical reasoning and evidence-based arguments. Those fallacies that occurred in the students' argumentative essays could be seen below.

"Some policies that can be implemented include limiting communication outside of working hours, providing sufficient and easily accessible annual or paternity leave, providing flexible work options where hybrid or online work can be done, and also providing access to free or subsidized counseling services for employee mental health." (S11)

The essay in Situation 11 did not formally commit a fallacy, though it implicitly relied on the validity of assumed best practices without considering the effectiveness of those practices across different sets of circumstances, as such it was something like an *appeal to false authority*, with policy suggestions based on assumed authority or popularity, rather than on evidence of efficacy under particular circumstances.

"When a corporation claims it must reduce employment but the top executives continue to get large bonuses or drive fancy automobiles, it is difficult to accept." (S3)

The argument in Situation 3 above was crafted to instill a sense of injustice and anger against rich executives by contrasting their lavish lifestyles with the large-scale job losses. The emotional appeal attempted to influence the audience by arousing sympathy for the victims of job loss and contempt for those perceived to be unconcerned, rather than on rational argument or factual data which is a symptom of *appeal to emotion*.

"Strict regulation can affect the rise of censorship, blocking open discussion and the exchange of ideas... This can cause a 'chilling effect' because users avoid expressing critical speech due to the fear of regulation." (S9)

The argument in Situation 9 used fear to justify the idea that regulation would lead to censorship and discourage open discussion. By framing the argument with the "chilling effect" it

attempted to induce stress around the idea of losing free speech instead of providing an objective perspective of evidence of regulation. This argument distracted from the considerations associated with regulation, providing emotional outcomes that were negative and a symptom of *appeal to fear*.

In the category of manipulation through distraction, two fallacies stood out predominately: *straw man* with 16 cases found and *circular reasoning* with 16 cases found. The *straw man* fallacies pointed to students that repeatedly misrepresenting or oversimplifying opposing viewpoints for the sake of argument and dismissal, indicating issues with recognizing, interpreting, and responding to opposition. The provision of *circular reasoning* likewise indicated the students that struggled to build an argument that progressed logically, and restated the premise or position with no new or independent reasoning or point of evidence. These were logical fallacies reflected in the students' argumentative essays, as follows.

"Some critics argue that employees should manage their own schedules. They claimed that flexible hours can make people work when they are most productive. While flexibility can be beneficial, it often leads to overwork when companies fail to set clear expectations." (S11)

This argument in Situation 11 inaccurately characterized the critics' viewpoint by arguing that flexibility meant more work, when critics advocating for flexible work hours usually emphasized agency and work-life balance, not that flexibility led to longer hours. By distorting the critics' position to make it easier to rebut, the author committed a *straw man* fallacy.

"In-person learning is the best way to support students' overall development." (S1)

This claim in Situation 1 operated under the assumption that in-person learning supports all pieces of student development without any evidence. The conclusion (in-person learning is best) was taken as a premise, which is circular reasoning.

The potential causes of logical fallacies in students' argumentative essay

The interview data obtained from eight participants provided important insights into the underlying conditions and tendencies that might have led to the occurrence of logical fallacies in undergraduate EFL students' argumentative essays. Although direct term of "logical fallacies" was not evident within the participants' spoken responses and the guide of interviewer, their descriptions of their writing processes, decision-making, and attitudes revealed several key implications that were closely related to the likelihood of logical fallacies emerging in their written arguments. These implications aligned with common logical fallacies such as *hasty generalizations*, *strawman fallacies*, and *appeal to emotion*.

Selection of arguments based on personal bias, subjective experience, and familiarity

One of the most prominent tendencies identified was the students' reliance on personal opinions, experiences, and emotional perspectives as a primary foundation for constructing arguments. Personal experience might give argumentation writing more authenticity and significance, but relying too heavily on these subjective sources without sufficient backing from reliable, objective data might greatly raise the possibility of logical fallacies, especially hasty generalization. There were a number of individuals who freely acknowledged drawing their arguments from their own experiences. As an illustration, Participant 1 stated,

"I take the argument from various sources, either from my own internal, or from existing sources, like on blogs or social media". (P1)

Personal preference was also a major factor in the arguments made by Participants 4, 6, and 7, as they argued,

"I see it there; how close I am to this topic. So, it's easier for me to give my opinion". (P4)

"I actually wanted a personal experience, but I also tried to look for the data. But I think it's too focused on what I like, not what my friends like". (P6)

"I feel like I'm still too dependent on my own opinion compared to other people's opinions". (P7)

These claims demonstrated how students might have reached *hasty generalization* by applying their personal experiences or viewpoints to extend statements without enough empirical support. Furthermore, it exposed a critical gap between the student's biases and their argumentative reasoning, creating room for logical fallacies conditioned on limited or purposefully subjective data. Furthermore, one of the concerning things was that students evaluated source credibility primarily in terms of how it aligned with their opinions rather than based on objective criteria. In lieu of criteria such as the author's identity, the publishing organization, the degree of expert review, participants relied on agreement with the participant's preferred opinion to establish source credibility. Participant 1 admitted,

"If what I want to say is not in line with the content I want to convey, then I don't use it", (P1)

An intentional rejection of contradicting evidence was disclosed by the participant. This pattern was in line with other participants' statements that the evaluation of source credibility was centered on whether the source bolstered their planned argument rather than on objective academic standards. Logical fallacy was also more likely when students unknowingly create arguments that are based on selectively available or biased evidence.

In addition, as opposed to critically weighing multiple perspectives of an argument, the interviews revealed students' tendency to take a position was as often governed by the level of confidence, familiarity, or level of assurance, of access to supporting data. While pragmatic, this method might have limited analysis depth and resulted in biased thinking or *false dilemmas*, in which complex issues were reduced to simple, unbalanced perspectives. The following quote from the interview is how Participant 5 explained her line of reasoning,

"I see it there; how close I am to this topic. So, it's easier for me to give my opinion" (P5).

These results show that rather than letting students make quick judgments based on comfort or familiarity, more attention should be paid to teaching them to critically analyze opposing views.

The oversimplification and absence of counterarguments

In writing arguments, counterarguments become an essential component of well-construct argumentative writing to show a knowledge of opposing viewpoints and increase the argument's overall persuasiveness by countering the opposing view. However, according to the data acquired, most of the participants either neglected or only cited counterarguments briefly in their writings. This absence suggested a tendency for biased judgment and the possibility of *straw man* fallacies, in which opposing views were either completely ignored or oversimplified. Participants 2 and 3 in particular confessed outwardly by stating,

"Counter-argument? Maybe, no. I don't include it." (P3)

"Counter-argument honestly not added." (P2)

"I wrote about it but I didn't explicitly explain it. I just told a little bit about the disadvantages of working from the office." (P7)

In contrast, some participants, such as Participant 5, demonstrated awareness by incorporating limited opposing views, yet even this was not consistently applied thoroughly by the participant. This limited engagement with opposing perspectives implied that students presented unbalanced arguments, thereby weakening the critical integrity of their essays and increasing susceptibility to logical fallacies patterns.

The lack of focus of peer feedback in argument reasoning

Peer feedback was consistently highlighted as an important component of the writing process for its effectiveness in building the writing of the students. However, the data implied that peer feedback primarily focused on surface-level elements, such as grammar, vocabulary, or formatting, rather than on the logical arguments, strength of reasoning, or potential presence of fallacies in the argument. This limited the opportunity to identify and correct the logical fallacies. Participant 3 expressed that peer

feedback he got focused on “grammar and vocabulary,” while admitting that there was no feedback concerning the “main sentence or logic oh his argumentative writing.”

“From the peer feedback, I got a lot of mistakes, such as grammar and vocabulary... but from my friends, no [feedback on the main sentence or logic]” (P3)

Similarly, Participants 6 and 7 confirmed that peer feedback they got primarily targeted grammatical concerns, stating,

“For the feedback... it was more focused on helping me with my grammar rather than telling me that the argument wasn't strong enough” (P6)

“The peer feedback I got was mostly on grammar, not much on argument structure” (P7)

This finding implied that students revised their essays to improve linguistic accuracy while leaving logical flaws, fallacious patterns, or weaknesses in reasoning unaddressed, ultimately undermining the quality of their argumentative writing. This superficial focus limited students' opportunities to identify and correct potential logical fallacies in their writing.

However, despite expressing uncertainty or minimal critical evaluation of reasoning, some participants remained overly confident in their writing, potentially obscuring gaps of logical fallacies in their writing. Participant 3 expressed high confidence in their argument despite relying heavily on peer feedback focused on grammar rather than reasoning in his argumentative writing.

The use of repetition for emphasis the argument

Interestingly, the interviews revealed that students sometimes employed repetitive phrasing or statements as a deliberate strategy to emphasize their stance. While repetition could serve rhetorical purposes, overuse or misuse might have inadvertently led to *circular reasoning*, where an argument's conclusion was simply restated as evidence without further development or support. Participant 4 reflected on this issue, stating,

“I often repeat words... because I want to emphasize, but my friends underlined it as wrong because it's too repetitive” (P4)

Such writing practices, if left unchecked, might have compromised the logical argument of students' essays and obscured the argumentative structure, making it vulnerable to logical fallacies.

The use of artificial intelligent

A notable finding was the frequent use of AI tools to assist with information gathering, source recommendations, or drafting. While AI could be a helpful tool, some participants displayed limited critical verification of AI-generated content, potentially introducing unreliable or fallacious information into their essays. Participant 8 stated,

“The AI was made to look for the website...” (P8)

Without adequate source evaluation, overreliance on AI might have inadvertently propagated misinformation or logical fallacies. This implied the minimal critical assessment of source validity.

Discussion

According to Mayfield taxonomy in Khoiri & Widiati (2017), which categorizes logical fallacies into four board categorizations, the findings found three categorizations in students' argumentative essays, which are manipulation through emotion, manipulation through distraction, and inductive fallacy. *Appeal to false authority* is the most found fallacies, followed by *appeal to emotion, fear, and bandwagon*. These findings show how students still lack critical thinking skill. A critical thinker must be able to distinguish between trustworthy and untrustworthy sources since not all the authority is created equal. It is in line with Battersby (2019) since the things we know come from testimony from others rather than our own direct experience, so we need to figure out whose “authority” to trust.

Furthermore, using emotion to divert the arguments can make argumentation flawed in reasoning, inability to explore logical reasoning, exaggerating in irrelevant details, weakening arguments's credibility, and misleading the audience which is in line with Indah & Kusuma (2015). Furthermore, the findings find that fallacies that manipulate through emotion in students' argumentative inevitability construct arguments based on subjective experience that are lenient to personal biases which is aligned with Lantz (2021) study. Furthermore, not only is it bad for the writer, it is also bad for the other parties because abusing fallacies that are rooted from emotional elements often leading into attacking opponents with a personal attack (Hitchcock, 2017).

The second manipulation which is through distraction, find two fallacies in students' argumentative essays, which are *straw man* and *circular reasoning* fallacies. The number of fallacies found are concerning because finding many *straw men* and *circular reasoning* frequently implies that there is distortion in students' argumentativeness. *Straw man* fallacies distort the argumentation by attacking minor point then maneuvering the point by invalidating the whole argument. It is also seen in Seremeta et al. (2024) that *straw man* fallacies significantly shape how political arguments are processed with each other point of parties open in the air. Furthermore, *straw man* exploits pragmatic interpretation and social cognition and corrupts argumentation by presenting rhetorical manipulation over rational soundness (Saussure, 2018). When facing a certain issue, it is safe to set aside the distraction of personal belief and bias and focus on the issue at hand. It is aligned with how Zhou (2018) also noted to remain impartial when analyzing debate to avoid overlooking fallacies used by one's preferred side.

For *circular reasoning* fallacies, it implies how students' poor reasoning, unclear and unconvincing arguments, and lack of critical thinking development (Indah & Kusuma, 2015). It violates the rules of critical discussion because it is repeatedly stating a claim circularly that it will eventually distort the cognitive process which made the argumentative inaccurate (Talbot, 2020). It is aligned with Eemeren (2020) that *circular reasoning* is viewed as a strategic blunder. This fallacy will inevitably obstruct the conclusion of the argumentation. Beside that, the failure to prove a claim will also follow inability to convince a claim to the audience because the arguments lack what has been called a probative function (Bex & Walton, 2016).

Hasty generalization, *false dilemma*, *questionable statistics*, *false cause*, and *slippery slope* are the inductive fallacies that are found in the findings. With *hasty generalization* taking the first place, followed by *false dilemma*, *false cause*, *slippery slope*, and *questionable statistics*, it reflects students' tendency to oversimplify complex arguments and draw broad conclusions from insufficient or unrepresentative evidence. Similar findings are also reported by (Khoiri & Widiati (2017) and Seif (2023), who find many *hasty generalizations* in students' writing. The use of subjective experience, personal bias, and familiarity that are found in the findings are rooted from the lack of knowledge and insufficient data size (Muniz, 2019) that the students unconsciously oversimplify their argument by drawing broad conclusions. Inductive fallacies arise from inferring general principles from specific instances (Miller & Miller, 2016) that resulting in unreliable conclusion. It implies students' lack of alternative perspective to draw the conclusion.

Unlike the previous studies, this research not only maps the types of logical fallacies but also delves deeper into the cognitive, emotional, and educational factors that drive the emergence of logical fallacies in students' reasoning of argumentation. Through interviews, it is revealed that many students rely too much on personal experiences and subjective opinions to build arguments. Personal experiences, however, can give writing a sense of authenticity, but they are also prone to mistakes like *hasty generalizations*, *false cause*, and *false dilemma* if they are not supported by substantial data. Mercier (2017) asserts that humans frequently create arguments that appear compelling but lack logic, particularly when their personal prejudices take priority over critical thinking.

Additionally, students' incapacity to attempt to counter or address counterarguments reveals a lack of exposure to alternative ideas (Safitri et al., 2024). Thus, the quality of the arguments becomes shallow and susceptible to fallacies like the *straw man* or in some cases, serve further the flawed conclusions into inductive fallacy (Finocchiaro, 2015). As Chen (2020) and Fiallos et al. (2025) stated, writing must be rational and appealing in order to address opposing viewpoints. However, as both Widyastuti (2018) and Saleh (2019) point out that the absence of critical thinking exercises in the curriculum makes the problem worse in the EFL environment.

Peer feedback conducted in a learning environment that emphasizes grammar and vocabulary while paying less attention to the argument logicalness and consistency of reasoning also contribute to this issue. Language proficiency is necessary, but without a thorough understanding of logical

reasoning, students are unable to identify and correct their own fallacies. This supports the findings of Chaleila & Garra-Alloush (2019) and Siregar et al. (2021) that assert that EFL instruction tends to focus on surface language features rather than cultivating critical thinking skills.

Furthermore, this study emphasizes that the negative impact of over-repetition in writing leads to circular reasoning. Without providing further new evidence, the conclusion merely restates the initial premise. Yet it will look normal and logic when critical thinking skill is not included. This depicts the limited knowledge students have of an effective argument structure. This is aligned with Ansari et al. (2021), indicating that logical fallacies seem coherent but collapse under critical and intense examination.

In addition, students' ability to utilize AI tools for content generation and search for information without critically verifying the reliability of the information they uncover also poses an important issue they encounter. Due to this dependability, they are inclined to spread and grow inaccurate information or construct illogical arguments. Critical thinking skills are still irreplaceable, even though such technology might be a vital and beneficial aid in academic writing (Chen, 2020), particularly in this age of information overload.

Considering all the variables involved, the results of this study show that logical fallacies arise in EFL students' writing due to more deeply rooted problems with cognitive, emotional, and instructional techniques rather than just insufficient language skills. The prevalence of logical fallacies may be attributed to a number of issues, including reliance on personal experience, avoiding opposing viewpoints, neglecting content revision, and failing to critically evaluate material acquired. According to Dowden (2020) and Bekele et al. (2022), teaching critical thinking techniques, logical reasoning, and the construction of strong arguments must be given special attention in EFL writing training.

Contributing to expanding the data, this research indicates that critical thinking does not imply a born-gifted trait, but an authentic and learnable ability as it explains by Živkovic (2016) and (Pennycook & Rand, 2019). Along with the systematic identification of forms and sources of logical fallacies in EFL students' argumentative writing, the research has implications for curriculum developers and educators to improve students' critical thinking skills, the quality of academic

CONCLUSION

Based on the findings, several conclusions can be drawn in line with the research objectives. An examination of logical fallacies in EFL students' writing revealed that a combination of cognitive limitations, lack of critical thinking training, and teaching practices that prioritize language construction over reasoning quality, generally contribute to recurrent logical fallacies in students' argumentative writing. It was also found that the tendency to over-rely on personal experience, inadequate analysis of evidence, and lack of ability to explore opposing views often led students to use emotional approaches that led to fallacies that manipulated through emotion such as *appeal to false authority*, *emotion*, *fear*, and *bandwagon*, distraction to the statement such as *straw man* and *circular reasoning*, and swift generalizations that arise inductive fallacy such as *hasty generalization*, *false dilemma*, *false cause*, *slippery slope*, and *questionable statistics*. In addition, in the EFL students' environment, it is highlighted that peer feedback tends to focus on grammatical correctness rather than the deep logic of argumentation, so that logical fallacies arise and tend to be overlooked. All of the above factors clearly explain that the limitations in evaluating the material and content of student writing require a more thorough pedagogical structure, which includes argumentation, critical thinking, and logical fallacy in the EFL writing curriculum.

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