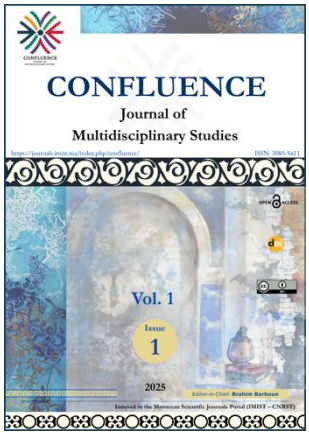


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The Impact of AI on University Students' Academic Assertiveness: The Case of Academic Writing

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ABSTRACT

This study investigates the impact of artificial intelligence (AI) tools on Moroccan university students' academic assertiveness within the context of academic writing. Drawing on the theoretical framework of cognitive and emotional assertiveness, as well as behavioral autonomy in academic tasks, this research examines how AI tools (grammar checkers and sophisticated writing assistants (HemingwayEditor, ProWritingAid, WordLift, AIWriter, CopyScape, WorldTune, Smodin, QuillBot)) affect students' capacity for independent thought, argumentation, and the expression of their academic voice. Academic assertiveness is operationalized across three dimensions: cognitive assertiveness (confidence in generating original arguments), emotional assertiveness (confidence in presenting ideas despite potential critique), and behavioral assertiveness (engagement in the writing process without undue reliance on external aids). The study adopts a correlational quantitative design, using a structured questionnaire that measures both the frequency and type of AI tool usage along with academic assertiveness self-reported inventories across the cognitive and emotional dimensions and a writing rubric for behavioral dimension. The results of the multivariate multiple regression analysis revealed that AI tool usage significantly predicted writing confidence ($\beta = 0.42$, $p < 0.01$), indicating that more frequent use of AI tools was associated with higher levels of confidence in academic writing. However, the degree of dependence on AI for idea generation negatively predicted academic independence ($\beta = -0.28$, $p < 0.05$), suggesting that over-reliance on AI may reduce students' ability to engage independently with writing tasks. The findings suggest that moderate use of AI tools tends to foster cognitive and emotional assertiveness by alleviating the mechanical burdens of writing and boosting students' confidence. However, excessive reliance on AI, particularly for content generation or structural organization, undermines behavioral assertiveness, leading to restricted academic independence and critical engagement.

KEYWORDS

Academic Assertiveness

Critical Thinking Disposition

Artificial Intelligence (AI)

Academic Writing

Higher Education

Introduction

The swift progress of artificial intelligence (AI) technologies has pointedly altered several aspects of modern education, especially within higher education. This change calls for a reevaluation of conventional teaching and learning practices and a recalibration of pedagogical frameworks that support the assessment of existing educational models. While innovative and revolutionary technologies have gained momentum in the educational scene, consideration of the way they impact the teaching and the learning processes has become a necessity.

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Given the range of possibilities AI offers in managing numerous aspects of education it could be conducive to raising the quality of education if well exploited. In the same vein, educators are required to understand and successfully use AI in classrooms to keep up with the pace of academic success.

AI, as a tool used in the academic context, has demonstrated a degree of effectiveness in many areas specifically in higher education, and academic writing is no exception. AI-driven tools aimed at supporting academic writing have attracted considerable interest for their ability to improve students' learning experiences and outcomes (Bisen et al. 2021). These tools include everything from grammar checkers and plagiarism detection software to advanced writing assistants that can generate, reorganize, and polish written productions (HemingwayEditor, ProWritingAid, WordLift, AIWriter, CopyScape, WorldTune, Smodin, QuillBot). As AI becomes more embedded in academic settings, it is crucial to understand how it affects students' academic behaviors, particularly their capacity to express themselves both intellectually and cogently in their writing assignments. This ability is referred to as "academic assertiveness", the confidence and ability to express one's own intellectual and creative voice in academic work, which is essential for academic success (Moon, 2008). There is much that centers around the idea that this construct is one of the core elements that higher education institutions aim at fostering. However, its importance in practical terms, and specifically in a pedagogy that has been redefined by the shift from Industry 4.0 to Industry 5.0 that is being propelled by technology and innovation, is not accredited the magnitude it deserves. Hence, a question is to be raised at this point about whether current educational strategies are truly aligned with the deeper goals of student development in a tech-driven era.

Assertiveness, which includes cognitive, emotional, and behavioral aspects according to Vagos and Periera (2016), is an essential part of successful personal life and scholarly participation. In academia this complex construct stands for a student's ability for independent thought, critical analysis, and genuine expression; traits that are crucial for academic achievement and ethical conduct. Furthermore, this attribute could also be related to critical thinking disposition as defined by Facione (1990) in the Delphi report. He advances that a critical thinker should have the disposition to think critically about issues and problems presented. In other words, it is having the ability to engage willingly in the cognitive process of thinking critically and using all the skills of the construct required in a specific situation. This notion of disposition for criticality has been also proffered by Moon (2008). Her definition of academic assertiveness is strongly tied to traits of the character of a critical thinker having a "voice" which stands for personal confidence and ability to process, use and communicate in a critical manner. As much as academic assertiveness and criticality are essential criteria for both academic and professional success, it would be much of a leap to blindly assume that the integration of AI in academic settings does not present a threat to nurturing this ability. A more logical assumption would be that AI could both nurture academic assertiveness and critical thinking if used in a well-orchestrated manner and hinder it if used excessively.

The integration of AI tools in academic writing offers both advantages and challenges in promoting assertiveness. AI can reduce mechanical tasks such as correcting grammar and organizing structure, which can enhance students' confidence and stimulate more profound cognitive engagement. Research conducted by Pereira et al. (2024) discusses the impact of generative AI on academic writing and indicates that AI writing assistants can improve students' self-efficacy and motivation through immediate feedback and tailored assistance. This could potentially result in better writing skills and enhanced perseverance in academic endeavors. A case in point are tools like Grammarly, Wordtune, and ChatGPT which have been reported to support not only grammatical accuracy but also the development and clarity of ideas (Pereira

et al., 2024). Therefore, this could make the writing experience more approachable and less intimidating for students, including those whose first language is not English.

Similarly, there are concerns regarding the potential risk of overreliance on AI tools, which could weaken students' assertiveness and independence. An excessive reliance on AI-created/generated content or organizational suggestions may impede students' involvement in the writing process. Hence, it could lead to fewer chances for critical thinking and original reasoning. This prompts noteworthy ethical and educational inquiries about the proper integration of AI in academic settings and automatically triggers the urge for clear guidelines to prevent misuse and maintain academic integrity.

In the context of Moroccan university students, who encounter distinct linguistic, cultural, and educational obstacles, investigating the effect of AI tools on academic assertiveness is largely relevant. Moroccan students frequently struggle with academic writing because of language challenges and insufficient experience with critical writing techniques. Consequently, AI tools might prove to be useful resources for them to address these challenges. However, these tools impact on students' independence and genuine expression has yet to be fully explored and investigated.

This study aims to bridge this gap by investigating how AI tools affect Moroccan university students' academic assertiveness in academic writing. Based on Vagos & Preira's theoretical framework that integrates cognitive and emotional assertiveness with behavioral assertiveness (Vagos & Preira, 2016), the research employs a correlational quantitative approach to gauge the intricate effects of AI usage on academic assertiveness and academic writing. The present pilot study seeks to clarify the tradeoff between the benefits and drawbacks of AI integration in academic writing. The findings contribute to developing insights on balanced AI use and its potential to enhance confidence and cognitive engagement, while highlighting the way excessive reliance and its potential in compromising independent academic thought and expression. Thus, this study provides insightful information for students, educators, and legislators who seek to maximize AI's potential while preserving the fundamental principles of academic learning.

Research Questions

This study aims to explore the complex relationship between AI tool usage and academic assertiveness in the context of academic writing by addressing the following research questions:

1. How does the use of AI tools influence students' self-confidence in academic writing?
2. Does the use of AI tools affect students' capacity for critical thinking and argumentation?
3. To what extent does the use of AI tools impact students' academic independence and reliance on external aids?

Hypotheses

- **H 1**: AI tool usage positively influences students' cognitive and emotional assertiveness as it improves their writing quality.
- **H 2**: Excessive reliance on AI tools negatively affects behavioral assertiveness as it diminishes students' engagement with complex academic writing tasks and weakens their intellectual independence.
- **H 3**: The use of AI tools leads to higher levels of emotional assertiveness, especially in students who use AI tools to support and refine their ideas, but not to replace them.

Literature Review

AI in Higher Education

The use of AI has triggered a lot of interest in the context of higher education, which is a sector that has been much impacted by the advancement of information and communication technology. To this end, universities and educational institutions are constantly exploring and assessing the integration of AI into pedagogical practices and research for a fair optimization (Hwang, et al., 2020). AI is a tool used in many academic fields, such as medical education, engineering education, mathematics education, and language education. In the same vein, scholars report on the benefits of AI for HE instructors and students (Chen et al. 2020; Crompton et al., 2020). These advantages include the use of AI to help develop assessments (Baykasoğlu et al. 2018), provide personalized prompt feedback (Dever et al. 2020), predict academic success (Çağataylı & Çelebi, 2022), and tailor instruction to meet the needs of various learner types (Verdú et al., 2017). These studies could assist educators in understanding the potential applications of artificial intelligence in higher education.

AI also provides several systems through which these advantages could be channeled. A first example would be Adaptive learning Systems (ALS) that can analyze extensive amounts of data, the thing that facilitates the development of tailored learning pathways corresponding to each student's learning styles, preferences, and abilities. In so doing, they enhance their educational experience (Taneri, 2020). Another example is AI-driven intelligent tutoring systems that offer real-time feedback and assistance. Considering their cognitive approach and functioning mechanisms, they can help students understand complex concepts and achieve better learning outcomes. A last example is AI-powered virtual learning assistants which represent an innovation that can enhance student engagement via providing immediate support and improving communication between students and teachers.

However, there are numerous challenges to AI usage in universities related mostly to technical aspects such as data privacy and security, ethical concerns, potential biases in generative AI systems, and inclusivity in AI-driven education (Taneri, 2020). The most pertinent challenge is the threat to the intellectual ability of learners. The widespread use of AI in higher education risks tapering off students' critical thinking and academic assertiveness by fostering over-reliance on automated systems. When students delegate complex tasks such as problem-solving, analysis, and idea generation to AI tools, they may lose essential cognitive skills necessary for independent thought and innovation (Holmes & Tuomi 2022). This overdependence can lead to passive learning, where students accept AI-generated information without questioning or engaging in deeper inquiry, critical evaluation, or questioning the validity of sources; skills that are crucial in an era rife with misinformation and bias (Onder, 2025).

Moreover, the integration of AI threatens to wane traditional educational practices that nurture curiosity, debate, and research skills (Gerlich, 2025). Suppose AI intermediates academic tasks like essay writing or assignment completion. In that case, students' ability to think critically and creatively may deteriorate and result in academic indolence and what some scholars call "AIgiarism" that is machine-mediated plagiarism (Agbor et al., 2024). This phenomenon not only compromises academic integrity but also stifles the development of intellectual rigor and assertiveness in scholarly work.

Empirical studies corroborate these concerns and show that students who rely heavily on AI tools often exhibit lower critical-thinking scores and reduced motivation for self-reflection and critical evaluation (Agbor et al., 2024; Gerlich, 2016 ; Royce & Bennett, 2025). As a result, the

educational scene will witness a severe decline in human-led problem solving and critical engagement, giving birth to a workforce less prepared for complex decision-making and innovation (Onder, 2025). It is true that AI offers significant pedagogical benefits; nevertheless, its unbalanced use sets a paradoxical risk: it can enhance learning efficiency but at the same time hinder the very intellectual capacities higher education seeks to cultivate. To this end, educators must carefully balance AI integration to warrant it complements rather than replaces critical thinking and academic assertiveness. It should also be used in a way that nurtures active engagement and deep cognitive involvement rather than passive consumption of AI-generated content (Royce & Bennett, 2025).

The Use of Artificial Intelligence in Academic Writing: Opportunities and Challenges

Academic writing is much more than a mere vehicle for sharing knowledge. It is a vital cognitive and developmental process that shapes how students and researchers organize their thoughts, engage critically with information, and communicate complex ideas effectively and cogently. Writing academically requires essential skills such as logical reasoning, argument construction, and intellectual assertiveness, which are fundamental to scholarly inquiry and lifelong learning (Floridi & Chiriatti, 2020; Zhang et al., 2022). This formative aspect of academic writing is often overlooked in discussions which focus solely on the product, yet it remains central to education's mission.

In recent years, the impressive evolution of artificial intelligence (AI) technologies has introduced powerful tools that are rewiring the very DNA of academic writing. AI applications ranging from grammar checkers and style enhancers to sophisticated text generators and summarizers-can transform how writers approach both the task and the process of writing (Aljuaid, 2024). These tools can ease the burden of routine tasks, such as correcting grammar, organizing ideas, and managing references, allowing writers to focus more on content development (Li et al., 2024). Accordingly, the power of AI to bolster the writing process should not be ignored. AI's role in academic writing can be understood as complex and dynamic at the same time. During the early stages of writing, AI can assist writers in brainstorming and generating ideas as it provides relevant content suggestions or summarizing key points from large bodies of literature (Floridi and Chiriatti, 2024). This is beneficial for students and researchers who may struggle with organizing vast amounts of information or articulating their thoughts clearly.

In the drafting and revision phases, AI-powered tools offer immediate feedback on grammar, coherence, and style, which advances continuous improvements and self-regulated learning (Li et al. 2024). Such instant feedback loops can enhance learners' autonomy, providing room to develop a more critical eye toward their own work. In addition, AI-driven translation and paraphrasing tools support non-native English speakers, leveling the playing field and promoting inclusivity in global academic discourse (Zhang et al., 2024).

Despite these promising benefits, integrating AI into academic writing is not risk free. One of the foremost concerns is the attrition of critical thinking and intellectual assertiveness (Gerlich, 2025). When students rely excessively on AI-generated content, they may diverge from the deep cognitive work of analysis, synthesis, and original argumentation that academic writing requires (Royce and Bennett, 2025). Overdependence may turn writing into a mechanical exercise, where AI produces polished text but the underlying thought process remains underdeveloped.

Moreover, AI-generated writing often lacks the distinction, creativity, and contextual understanding that human authors bring to their work. While AI can mimic language patterns and produce grammatically correct sentences, it struggles with generating genuinely novel insights or critically engaging ideas (Marcus and Davis, 2020). This limitation highlights that

AI should be viewed as a complementary tool rather than a replacement for human intellect. Hence, artificial intelligence is reshaping academic writing entirely as it offers tools that can enhance efficiency, accessibility, and collaboration. Nonetheless, this technological revolution also challenges scholarly practice: originality, critical inquiry, and ethical responsibility. A human-centered integration of AI, one that respects and nurtures the intellectual growth of writers, is then required.

Academic Assertiveness

Academic assertiveness is a critical construct in educational psychology and pedagogy. It reflects a student's capacity to confidently and independently engage with academic content, express original ideas, and cope with intellectual challenges (Moon, 2008, 2009; Barnett and Coate, 2005). Unlike general assertiveness, which broadly refers to the ability to express one's rights and opinions in social contexts (Vagos and Periera, 2016), academic assertiveness is specifically situated within the scholarly domain, encompassing cognitive, emotional, and behavioral dimensions along with the dispositional dimension, which collectively foster intellectual autonomy and scholarly engagement. This proposed framework conceptualizes academic assertiveness as a multidimensional, dynamic construct that integrates cognitive, emotional, and behavioral components, each influenced by internal psychological processes and external social contexts. It also considers the evolving academic scene, particularly the implications of artificial intelligence (AI) tools on students' assertive capacities. The multidimensional nature of academic assertiveness greatly influences how it is conceptualized and addressed. Nevertheless, there is broad consensus that academic assertiveness and critical thinking are intrinsically interconnected as two sides of the same coin.

Before detailing how these two constructs are related, it is appropriate to provide a theoretical framework of what constitutes academic assertiveness. There are three main perspectives that guide the definition of academic assertiveness in this study, all of which have a meeting point. The first one considers it as a complex and mutable psychological skill, and practicing it implies congruence between what one thinks, how one feels, and what one does accordingly. This perspective has been generated from the work of Vagos & Periera (2016) on assertiveness. However, a closer look at this simple definition reveals that the ability to be academically assertive requires that the learner engages in a cycle of behavior, emotion, and cognition (feel, think, do). The second perspective, contended by Moon (2008), conceptualizes academic assertiveness as a complex constellation of emotional and psychological attitudes and behaviors. These internal orientations enable learners to cope with and withstand the personal challenges and self-doubts that arise throughout their journey of intellectual growth and confidence in critical inquiry. The third perspective frames academic assertiveness as an integral component of critical thinking disposition. It views it as a set of character traits that inherently predispose learners to engage effectively in independent thought and intellectual rigor. These qualities serve as enablers that foster the competence necessary for confident and reflective academic engagement.

From a cognitive-behavioral standpoint, Vagos and Pereira (2016) propose that assertiveness arises through the activation of interpersonal schemas-core beliefs about the self and others-that influence how social cues are processed and how assertive behaviors are enacted. Positive interpersonal exchanges reinforce these schemas, creating a feedback loop that strengthens assertive tendencies over time. However, maladaptive schemas such as fear of rejection, negative self-evaluation, or perfectionism can inhibit assertiveness. This means that targeted training and interventions are essential to cultivate this skill.

Academic Assertiveness: A Foundation for Critical Thinking

The term *academic assertiveness*, coined by Moon (2008), captures a broad range of attitudes, emotions, and behaviors that enable learners to confidently and effectively engage with their academic journey. It is a concept deeply connected tocritical thinking, as it brings together many of the dispositions necessary for thoughtful, independent learning and intellectual growth. Academic assertiveness is not just about speaking up; it involves discovering one's authentic "voice", a way of expressing ideas clearly and confidently within academic discussions and critical inquiry. It means having the willingness to challenge established viewpoints, engage in constructive debate, and actively seek out intellectual challenges rather than shy away from them (Moon, 2008).

The notion of 'voice' occupies a central role within academic literature, embodying diverse interpretations that enrich understanding of academic assertiveness. Barnett and Coate (2005) acknowledge the broad and varied usage of the term, reflecting its complexity and significance in educational contexts. At its core, "voice" represents the capacity to possess and articulate one's viewpoint, a concept deeply rooted in developmental epistemology. Belenky, Clinchy, Goldberger, and Tarule (1986) defined voice as an expression of selfhood and intellectual agency, giving room for the emergence of a coherent sense of self and mind that enables individuals to claim their perspectives authentically. This conceptualization was further explored by Gilligan (1993), who emphasized the importance of feeling recognized and comfortable while expressing one's opinions, highlighting the relational and emotional dimensions of voice.

Within the realm of critical thinking, voice' entails an attuned sensitivity to argumentation and critique. Educators committed to enhancing critical thinking consider the development of this sensitivity as essential, fostering environments where students learn not only to articulate their ideas but also to engage respectfully and thoughtfully with differing viewpoints (Meyers, 1986; Young, 1980).

Voice also manifests in written academic expression when it is shaped by disciplinary conventions and the evolving identity of the learner within their field. Ford et al. (2006) illustrate how experiential learning, such as professional placements, can enable students to develop the distinctive 'voice' of their chosen discipline, which is in their case social work, reflecting both personal growth and enculturation into academic discourse communities.

A key part of academic assertiveness is the ability to accept the possibility of being wrong. This includes managing mistakes or failures with resilience, being open to revising one's opinions, and welcoming feedback as a tool for growth. Equally important is cultivating a genuine willingness to listen to others, consider different perspectives, and recognize that everyone, including oneself, is prone to error. This fosters a respectful and reflective learning environment.

Autonomy is central to academic assertiveness. It involves proactively making independent judgments, justifying them thoughtfully, and taking responsibility for one's learning decisions. Alongside, developing healthy academic self-esteem, a confident belief in one's own academic abilities, supports learners in coping with the challenges of higher education with assurance and persistence (Belenky et al., 1986). Together, these behaviors and dispositions form a dynamic, multidimensional framework that empowers students to meet the intellectual demands of their studies. They help learners move beyond passive reception of information toward active, critical engagement with knowledge. This framework also acknowledges the evolving educational scene, where new challenges and opportunities, such as the integration of artificial intelligence tools, influence how students develop and express their academic assertiveness.

The discussion about academic assertiveness and critical thinking disposition could be further related to the conceptualization of Vagos and Preira (2016) proffering that assertiveness

in social skills is divided into three levels, namely behavioral, cognitive, and emotional. This division into three subdimensions seems more logically and practically appropriate in educational contexts. It highlights the cognitive structures and dynamics of academic assertiveness and the way they could be impacted by personal emotion and self-concept, in addition to the manifestation of these dimensions in terms of behavior. Looking at these dimensions both separately and as part of a cycle allows for more depth in providing insights on how academic assertiveness functions, the way it could be enhanced, and the manner in which it could be assessed. Originally, this division of academic assertiveness is rooted in the one advanced by Vagos and Preira (2016) about general assertiveness as a psychological trait. Insights on how to perceive and train general assertiveness are not different from academia, especially in academic writing. The cognitive dynamics underlying assertiveness could be applied to any context. In their research on assertiveness, the way it functions and, hence, guidelines on how it could be trained, Vagos and Preira (2016) offer a cognitivist perspective to look at the construct. They explore assertiveness as a social skill, emphasizing its cognitive aspects. The authors propose a cognitive model explaining how assertiveness is enacted and maintained, considering individual schemas, social cue processing, and the interaction between cognitive, emotional, and behavioral assertive responses. This model could be considered as a cycle that includes five stages (cognitive processes), and they are as follows: (1) Activation of core beliefs when an individual faces a social event, their interpersonal core beliefs are activated. These beliefs relate to how they perceive themselves (self-concept), others, and prior social interactions (2). Processing of social cues from the environment is interpreted based on both objective observations and subjective perceptions influenced by core beliefs. (3) Interaction between cognition, emotions, and behavior: Based on the interpretation of social cues, individuals activate positive or negative self-statements. These self-statements influence emotional responses (confidence vs. anxiety), which then shape observable assertive behaviors. (4) Feedback from the interaction partner: Once assertive behavior is enacted, the reaction from the interaction partner plays a crucial role. If a person's assertive response is received positively (respectful acknowledgment), their core beliefs about their social competence are reinforced. (5) Sustained reinforcement and long-term assertiveness: Over time, repeated successful assertive interactions solidify confidence and assertiveness as a behavioral pattern.

This cycle involves assertiveness and the way it reflects critical thinking disposition. A more practical approach to conceptualizing "academic assertiveness" would be to look at it in terms of dimensions. Academic assertiveness needs to be categorized into types of assertiveness following the framework posited by Vagos and Preira (2016) to allow a better understanding of the processes underlying it in terms of depth and breadth. In the absence of a similar framework in the existing literature, which accounts for academic assertiveness as involving different contexts or clues (stimuli), it is necessary to create one that is based on the previously explained model but that accounts for the intricacies of operating in academia. In the same line of thought, this framework provides a basis for the assessment of this construct.

Academic "Behavioral, Emotional, and Cognitive" Assertiveness and Their Connection to Critical Thinking Dispositions in Academic Writing: A Proposed Systematic Model

Behavioral Academic Assertiveness and Critical Thinking

In the light of the previously discussed model, behavioral academic assertiveness encompasses the concrete actions writers take to express their ideas, challenge existing knowledge, and actively participate in academic debates through explicit claims, evidence-based reasoning, and

engagement with scholarly sources. This dimension reflects critical thinking dispositions such as open-mindedness, truth-seeking, and confidence, motivating learners to question assumptions and present well-reasoned arguments, thereby fostering both clarity and the intellectual rigor essential for critical inquiry (Moon, 2009; Hyland, 2005). AI writing assistants can support this assertiveness by enhancing clarity, coherence, and adherence to academic conventions, enabling writers to articulate their ideas more confidently. However, overreliance on AI-generated suggestions risks restricting opportunities for independent critical engagement, as writers may passively adopt AI outputs instead of actively shaping their academic voice. Consequently, deliberate and reflective use of AI is necessary to ensure that behavioral assertiveness is strengthened rather than undermined.

Emotional Academic Assertiveness and Critical Thinking Dispositions

Emotional academic assertiveness involves the regulation and expression of feelings related to academic challenges, such as managing fear of negative evaluation, coping with uncertainty, and maintaining resilience after setbacks. These emotional orientations are closely connected to critical thinking dispositions like intellectual humility, confidence in reasoning, and perseverance, reflecting a willingness to embrace challenges, accept the possibility of error, and remain open to revising one's views (Facione, 2015; Vagos & Preira 2016). AI tools can help alleviate anxiety related to language proficiency or formatting for example, thereby boosting writers' confidence and lowering emotional barriers to academic participation (Bisen et al., 2021). However, dependence on AI may also introduce new emotional challenges, including reduced self-efficacy or fears of losing one's authentic "voice", which could deter the development of emotional resilience if writers avoid confronting complex writing challenges independently (Pereira et al., 2024). To promote emotional assertiveness in AI-augmented writing environments, it is crucial to foster a balanced engagement where AI supports but does not replace personal effort, thus enabling writers to maintain a critical mindset and engage with complex ideas despite affective barriers.

Cognitive Academic Assertiveness as a Reflection of Critical Thinking

Cognitive academic assertiveness involves the intellectual processes of analyzing, synthesizing, and evaluating information to construct coherent and persuasive academic arguments (Facione, 2015; Vagos & Preira, 2016). This dimension encapsulates critical thinking skills and dispositions such as analytical skills, systematic thinking, and curiosity, with writers actively seeking evidence, weighing alternative perspectives, and applying logical reasoning to justify their claims. This builds a mental space where writers exercise the cognitive skills essential for critical thinking and producing scholarly work that is both credible and innovative. AI-powered research assistants can enhance cognitive assertiveness when they provide access to relevant literature, suggest logical structures, and help identifying gaps in reasoning. This underlying cognitive process supports intellectual rigor (Moon, 2009). However, uncritical acceptance of AI-generated content risks weakening critical thinking dispositions such as curiosity and analytical rigor (Gerlich, 2023). To account for this, AI use should be embedded within pedagogical frameworks where critical reflection is valued and emphasized and writers are encouraged to actively question and refine AI outputs.

Interconnection and Mutual Reinforcement

The three dimensions of academic assertiveness do not operate in isolation but mutually reinforce one another to cultivate a holistic critical thinking disposition. Behavioral

assertiveness provides the outward expression of critical engagement; emotional assertiveness sustains the psychological readiness to participate in academic discourse; and cognitive assertiveness ensures the intellectual rigor of arguments. Together, they create an academic environment where learners are vested in expressing their 'voice,' challenging ideas constructively, and embracing intellectual autonomy.

Moreover, academic assertiveness serves as both a manifestation and a facilitator of critical thinking dispositions. Higher levels of assertiveness correlate with greater confidence, openness, and willingness to engage in constructive debate-dispositions that are precursors to meaningful critical thinking and effective problem-solving (Facione, 2015). Educational interventions that nurture academic assertiveness consequently instill the development of critical thinking dispositions; they allow students to become more reflective, independent, and proactive learners.

This interconnection forms a cycle that could be considered in the enhancement of the different levels of academic assertiveness. It aligns closely with critical thinking dispositions such as open-mindedness, intellectual humility, confidence, perseverance, and reflective judgment (Facione, 2015; Moon, 2009).

Synergistic Effects and Pedagogical Implications

The interaction between AI and academic assertiveness dimensions is intricate and requires careful consideration. Thoughtful use of AI can scaffold behavioral, emotional, and cognitive assertiveness, thus facilitating clearer expression, emotional confidence, and deeper intellectual engagement. Alternatively, excessive dependence may inhibit dispositions such as intellectual autonomy and perseverance that are essential for critical academic writing (Pereira et al., 2024). Educators should therefore promote ethical, reflective AI use through explicit instruction on critical engagement with AI outputs, fostering metacognitive awareness and iterative cycles of writing and feedback. This approach ensures AI acts as a medium for enhancing academic assertiveness and critical thinking rather than a barrier.

Methodology

This study employs a quantitative methodology to investigate the impact of AI tools on Moroccan university students' academic assertiveness in academic writing. It emphasizes the systematic measurement of the frequency and nature of AI tool usage and its relationship with students' cognitive, emotional, and behavioral assertiveness, as reflected in self-reported data.

Research Design

The research adopts a quantitative correlational design aimed at identifying and analyzing relationships between variables related to AI tool usage and academic assertiveness. This design allows for the collection of numerical data that can be statistically analyzed to determine the extent to which different dimensions of AI engagement predict variations in students' academic assertiveness dimensions.

Study Context and Participants

The study was conducted in two Moroccan higher education institutions selected to represent distinct academic disciplines and student populations. The first institution is the Faculty of Letters and Humanities at Abdelmalek Essaadi University in Tetouan, where students engage in humanities-focused academic writing that emphasizes critical thinking and original

argumentation. The second institution is a private Business and Administration College in Tangier, where academic writing primarily involves research reports and business-oriented projects. These contrasting settings provide a comprehensive view of AI tool usage across two different academic contexts and writing requirements.

The participant sample consisted of 55 Moroccan university students, with 15 students from the Faculty of Letters and Humanities and 40 students from the Business College. Participants were purposively selected based on their enrollment in courses with considerable academic writing requirements, including Research Methods, Academic Writing, Advanced Composition, and End-of-Study Research Project Seminars. The purposive sampling ensured that all participants had relevant experience with academic writing tasks and potential exposure to AI tools.

Data Collection Methods

Data collection for the present pilot study involved four main components. First, participants completed an online questionnaire that was designed to include detailed items on AI tool usage frequency, types, and dependence. The questionnaire is structured and is divided into two main parts that are significant to the study, namely, AI usage and perceptions and concerns. These two sections included questions that helped investigate the sub-variables of both AI usage and perceptions and concerns. AI usage comprised questions about frequency, types, tasks, and degree of reliance that would generate data to be used in quantitative correlational analysis. The same applies to the other section of the questionnaire which encompassed questions about AI tools improving the quality of academic writing and questions about the ethical implications of using AI tools in academic work.

The second type of tools used in this study are two self-report inventories measuring cognitive and emotional assertiveness in academic writing. These instruments were carefully designed and pre-tested to ensure clarity and reliability. Participants were asked to complete them online. The design of these two inventories revolved mainly around uncovering students' self-perceptions of their academic assertiveness as represented in academic writing. These inventories were designed according to the theoretical framework previously discussed in the section of literature review and which considers academic assertiveness as multidimensional encompassing cognitive, emotional and behavioral levers.

The cognitive assertiveness inventory is self-reporting, 27 item confidence-based Likert scale. The performance bands for this inventory are percentile based, and categories varied between High assertiveness, moderate assertiveness, and low assertiveness with an internal consistency of $\alpha \geq 0.70$. This inventory measures confidence in generating original ideas and constructing coherent arguments which stand for intellectual autonomy and critical thinking confidence. The third instrument is the "The emotional assertiveness" and Idea "Confidence in Academic Writing Inventory" (EAIC-AWI) which is also a self-reporting, 25 item agreement-based Likert scale. It was designed to assess the extent to which university students assertively express their own ideas in academic writing, especially when dealing with self-doubt, fear of judgment, or critical feedback. Accordingly, the inventory was conceptually divided into five sections: confidence in expressing original ideas, emotional response to feedback and evaluation, fear of rejection and self-censorship, emotional regulation and self-advocacy in writing, writing identity, and emotional resilience. Thresholds were based on percentiles, and the full scale has 25 items, each rated from 1–5. The categories ranged between high emotional assertiveness and idea confidence, moderate (typical) levels, low confidence/assertiveness, possible academic hesitation, and very low with an internal consistency of $\alpha \geq 0.80$.

The fourth instrument is the Behavioral Assertiveness Assessment Rubric for Academic Writing. It is an assessor rubric designed to evaluate assertiveness in written expression through

cognitive engagement, originality, depth of argumentation, and critical thinking. It consists of four levels of measurement across the five sub-dimensions or key indicators of academic assertiveness, such as originality, depth of argumentation, coherence, and critical engagement, providing a standardized and objective measure of students' writing performance under different conditions.

Therefore, participants submitted two academic writing samples: one created independently, and another produced with the support of AI tools. These samples were collected during classroom activities and as part of formal research report submissions. They were systematically evaluated and scored using the behavioral assertiveness rubric.

Procedure

The data collection process was organized into three sequential phases. In the first phase, participants completed the AI usage questionnaire and academic assertiveness inventories online, establishing quantitative baseline data on their AI engagement and self-perceived assertiveness levels. In the second phase, students submitted their writing samples, with clear instructions to produce one text independently and another with AI assistance. This dual submission allowed for direct comparison of writing quality and assertiveness across different modes of production. In the third phase, the writing samples were evaluated and scored using the behavioral assertiveness rubric. The scores were then compiled and prepared for statistical analysis alongside the questionnaire data.

Data Analysis

Quantitative data analysis starts with descriptive statistics to summarize patterns of AI tool usage and levels of cognitive and emotional assertiveness among participants. They provide an overview of frequency and engagement with AI tools, as well as self-reported confidence and emotional readiness in academic writing contexts. Subsequently, inferential statistics were applied to examine the relationships between AI tool usage and academic assertiveness. Multivariate multiple regression analyses were conducted to explore how different dimensions of AI engagement-frequency, type, and degree of dependence predict variations in cognitive, emotional, and behavioral assertiveness. The behavioral assertiveness scores derived from rubric evaluations of writing samples were integrated into the regression models as indicators of students' writing performance. This quantitative methodology provides a systematic framework for investigating the impact of AI tools on academic assertiveness among Moroccan university students.

Results

This section presents a detailed analysis of the data collected to assess different dimensions of assertiveness in academic writing, alongside students' patterns of AI tool usage. The results are structured into four key areas: Emotional Assertiveness and Idea Confidence (EAIC-AWI), Cognitive Assertiveness, Behavioral Assertiveness, and AI Usage. For each area, descriptive statistics and categorical distributions are provided, based on responses from 55 university students. The last part of this section provides results of the Multivariate multiple regressions, encompassing the results of the four instruments in a correlational manner

Emotional Assertiveness and Idea Confidence in Academic Writing Inventory (EAIC-AWI) Results

Table 1

Descriptive Statistics for Emotional Assertiveness Scores (N = 55)

Variable	N	Min	Max	M	SD
Emotional Assertiveness Score	55	69	125	100.6	18.3

Table 2

Distribution of Emotional Assertiveness Levels

Category	Frequency	Percentage
Low (≤74)	5	9.1%
Moderate	20	36.4%
High (≥100)	30	54.5%

Descriptive statistics were calculated for the Emotional Assertiveness & Idea Confidence in Academic Writing Inventory (EAIC-AWI), completed by 55 university students. Scores ranged from 69 to 125 (M = 100.6, SD = 18.3), with most students (54.5%) categorized as high in emotional assertiveness. Moderate assertiveness was observed in 36.4% of the sample, and 9.1% scored in the low range. This positively skewed distribution aligns with the hypothesis that students who frequently use AI writing tools demonstrate higher emotional assertiveness in academic writing.

Cognitive Assertiveness Inventory Descriptive Statistics

Table 3

Descriptive Statistics for Cognitive Assertiveness Inventory

Variable	N	Min	Max	M	SD
Cognitive Assertiveness Score	55	59	135	101.9	27.3

Table 4

Frequency Distribution of cognitive Assertiveness Categories

Category	Frequency	Percentage

Low	10	18.2%
Moderate	14	25.5%
High	31	56.4%

Descriptive analysis of the Cognitive Assertiveness Inventory Score revealed that among a total of 55 students who completed the Inventory, scores ranged from 59 to 135 (M = 101.9, SD = 27.3). Most students (56.4%) were classified as having high cognitive assertiveness, with 25.5% in the moderate range and 18.2% in the low range (see Tables 1 and 2).

Behavioral Assertiveness Assessment Rubric for Academic Writing

Table 5
Descriptive Statistics for Behavioral Assertiveness Scores

Variable	N	Min	Max	M	SD
Behavioral Assertiveness Score	55	7	15	11.3	2.1

Table 6
Categorical Distribution of Behavioral Assertiveness

Category	Frequency	Percentage
Needs significant improvement (≤9)	13	23.6%
Developing assertiveness and depth (10–13)	33	60.0%
Competent assertive writing (14–17)	9	16.4%
Highly assertive (18–20)	0	0.0%

Descriptive statistics were calculated for behavioral assertiveness in academic writing, assessed through a rubric applied to student-written research samples that were completed without the use of AI. Scores ranged from 7 to 15 (M = 11.3, SD = 2.1). Most students (60.0%) were rated as "developing assertiveness and depth," while 23.6% scored in the "needs significant improvement" category. Only 16.4% achieved "competent assertive writing" and no students reached the "highly assertive" level. These results suggest that students may exhibit lower behavioral assertiveness when composing academic texts independently, particularly if they are accustomed to relying on AI tools.

AI Usage Questionnaire Results

Table 6

Descriptive Statistics of AI Usage

Variable	M	SD	Mode / %
Ever Used AI Tools	0.93	0.26	93%
Frequency of AI Use	4.0	1.12	39%

Level of AI Dependence	3.9	0.88	55%
Inform Instructors of AI Use	1.9	0.84	35%
Belief AI Improves Quality	4.1	0.88	53%
Concern About Ethics	2.2	0.82	45%
Belief AI Use Should Be Regulated	2.0	0.75	45%
Types of Tools Used	—	—	90%
Tasks Done Using AI	—	—	84%

The table presents a clear depiction of students' engagement with AI tools across various academic backgrounds and years of study. Most respondents are from business fields (73%). AI tool adoption is significantly high, with 93% having used such tools and 39% reporting daily use. This frequent engagement is matched by a significant level of dependence (mean = 3.9/5), with over half (55%) describing themselves as heavily reliant on AI. Writing assistants dominate the types of tools used (90%), and editing/proofreading is the most common application (84%), highlighting the practical, productivity-focused use of AI in academic work. Most students believe that AI enhances the quality of their work (mean = 4.1/5; 53% agree), yet ethical concerns remain prevalent (mean = 2.2/3; 45% are concerned). There is also a notable desire for transparency, with nearly half (45%) supporting mandatory disclosure of AI use to instructors, though only 35% inform instructors sometimes or always. Overall, the data indicate that, while AI technologies are thoroughly embedded into students' academic routines and seen as advantageous, there is still major concern about their ethical implications and the need for regulation. This hints to an emerging situation in which clear guidelines and open discussion may become more vital.

Multivariate Multiple Regression Analysis

Table 8

Multiple Regression Coefficients for Predicting Assertiveness from AI Usage Behaviors (N = 55)

Dependent Variable	Predictor	B	SE B	β	t-value	p-value
Cognitive Assertiveness	Frequency of AI Use	3.10	0.85	.35	3.65	.001
	Level of AI Dependence	4.75	1.02	.41	4.66	<.001
	Tool Type (Writing = 1)	2.20	1.10	.14	2.00	.051
	$R^2 = .49$, $F(3, 51) = 16.3$, $p < .001$					
Emotional Assertiveness	Frequency of AI Use	2.45	0.94	.27	2.61	.012
	Level of AI Dependence	3.90	1.11	.36	3.51	.001

	Tool Type (Writing = 1)	1.80	1.12	.11	1.61	.113
	$R^2 = .38$, $F(3, 51) = 10.4$, $p < .001$					
Behavioral Assertiveness	Frequency of AI Use	–0.28	0.19	–.22	–2.04	.046
	Level of AI Dependence	–0.35	0.21	–.26	–2.14	.037
	Tool Type (Writing = 1)	–0.14	0.24	–.08	–0.59	.558
	$R^2 = .21$, $F(3, 51) = 4.53$, $p = .007$					

A multivariate multiple regression analysis was conducted to examine whether students' frequency of AI use, level of dependence on AI tools, and type of AI tools used (e.g., writing assistants) could significantly predict their levels of cognitive, emotional, and behavioral assertiveness. The overall model was statistically significant, Wilks' $\Lambda = 0.39$, $F(9, 133.4) = 5.82$, $p < .001$, indicating that the combination of AI usage behaviors significantly accounted for variation in assertiveness outcomes.

Cognitive Assertiveness

The model predicting cognitive assertiveness was significant, $F(3, 51) = 16.3$, $p < .001$, accounting for approximately 49% of the variance ($R^2 = .49$). Frequency of AI use ($\beta = .35$, $p = .001$) and level of AI dependence ($\beta = .41$, $p < .001$) were both significant positive predictors. The type of AI tool (i.e., use of writing assistants) approached significance ($\beta = .14$, $p = .051$). Students who reported more frequent AI use and higher dependence on AI tools scored significantly higher in cognitive assertiveness. This suggests a possible link between comfort with AI and enhanced self-perceived ability to reason, analyze, and process academic content independently, even when technology is involved.

Emotional Assertiveness

The model predicting emotional assertiveness was also significant, $F(3, 51) = 10.4$, $p < .001$, with an R^2 of .38. Frequency of AI use ($\beta = .27$, $p = .012$) and dependence on AI tools ($\beta = .36$, $p = .001$) were significant positive predictors, while tool type was not a significant predictor ($\beta = .11$, $p = .113$). Similar to cognitive assertiveness, both frequency and dependence were significant positive predictors of emotional assertiveness. This implies that students who rely more on AI tools may feel more emotionally secure or confident when expressing themselves academically, potentially due to perceived support or scaffolding provided by the tools.

Behavioral Assertiveness

The model predicting behavioral assertiveness was significant, $F(3, 51) = 4.53$, $p = .007$, though it accounted for a smaller portion of the variance ($R^2 = .21$). Both frequency ($\beta = –.22$, $p = .046$) and dependence ($\beta = –.26$, $p = .037$) were significant negative predictors, indicating that students with higher AI usage tended to report lower behavioral assertiveness. Tool type was not a significant predictor in this model ($\beta = –.08$, $p = .558$). Both frequency and dependence were significant negative predictors of behavioral assertiveness. This suggests that students who use AI more often or depend on it heavily may show less initiative or willingness to act independently in academic writing, possibly deferring too much to AI suggestions or outputs.

Discussion

The purpose of this study was to explore how specific patterns of AI usage, particularly frequency, dependence, and tool type, predict different dimensions of student assertiveness in academic writing. The findings revealed a complex relationship, suggesting that while higher AI use is positively associated with cognitive and emotional assertiveness, it appears to negatively affect behavioral assertiveness.

AI Usage and Cognitive and Emotional Assertiveness

According to Hypotheses 1 and 3, the findings demonstrate that students who frequently use AI tools, and who report higher levels of dependence, exhibit greater cognitive assertiveness and emotional confidence in their academic writing. This suggests that AI can serve as a cognitive scaffold that enhances students' ability to generate, organize, and articulate ideas. Recent studies on AI-powered writing assistants have reported this effect (Nazari et al., 2021). These tools provide rapid, personalized feedback that reduces cognitive load and promotes mastery and self-efficacy (Pereira et al., 2024).

AI has a positive impact on emotional assertiveness as well. Students reported feeling less apprehensive and more comfortable expressing their thoughts when assisted by AI, which supports research linking social and emotional competence to higher academic performance and well-being (Taylor et al., 2017). Social and emotional learning (SEL) programs have been found to improve resilience, self-regulation, and emotional expressiveness (Taylor et al., 2017) These outcomes appear to be reflected in the context of AI-supported academic writing. The findings from the present study support the notion that technological scaffolding, when used cautiously, can enhance both cognitive and emotional assertiveness, giving students the opportunity to take intellectual risks and engage more deeply with academic content.

Another piece of evidence corroborating the abovementioned is a large-scale survey that found that nearly half of university students utilize AI on a daily basis, with the majority reporting benefits in both engagement and academic achievement. These findings imply that incorporating AI can significantly improve students' academic self-confidence and persistence (Thenmozhi & Bharathy, 2019).

Behavioral Assertiveness and Academic Independence

Regarding behavioral assertiveness, the study found a negative correlation between AI degree of reliance and behavioral assertiveness, which supports Hypothesis 2. It is true that AI tools can enhance students' intellectual and emotional confidence; however, they could also hinder critical engagement and autonomy in academic writing. In that case, students develop "AI induced passivity" as a result of overreliance on external aids. Consequently, their sense of ownership, initiative and willingness to engage in critical thought and tackle complex writing challenges is shaken (Holmes and Tuomi, 2022). In the same vein, the fact that there are no students in the "highly assertive" behavioral category is concerning. It suggests that, despite feeling confident and emotionally supported, students may be less likely to engage in the recurring, self-directed processes that characterize academic writing.

Implications for Educational practice

The findings of the present study have important implications for educators, curriculum designers, and academic institutions as they investigate how AI tools are integrated into higher education, particularly in academic writing. AI technologies provide considerable benefits in

improving students' cognitive and emotional assertiveness; nonetheless, the current study's findings highlight the critical need to address the potential unintended consequences on behavioral assertiveness and academic independence.

First, educators should recognize that AI tools function as cognitive and emotional support in the sense that they provide immediate feedback, reduce anxiety, and boost students' confidence in expressing their thoughts and generating ideas. However, this support must be matched appropriately with pedagogical practices that encourage students' behavioral assertiveness. That is, students' ability to take initiative, engage autonomously, and persist through complex academic challenges. Without such balance, there is a permanent and persistent risk that students may become overly reliant on AI, which would automatically result in reduced motivation to develop essential writing habits such as drafting, revising, and critical self-assessment.

In this regard, instructional design ought to include systematically channelled opportunities for autonomous writing before using AI tools. For instance, assignments could ask students to create first drafts or outlines independently to promote a sense of ownership and enhance cognitive engagement. The ongoing use of AI tools might be regarded as an additional asset for enhancement instead of the main creator of content. This approach corresponds with scaffolding principles in educational psychology, where assistance is slowly reduced to encourage learner independence (Vygotsky, 1978). Furthermore, awareness of and explicit critical reflection on AI-generated content is crucial. Educators need to develop a habit of guiding students to evaluate critically AI-made suggestions. Learners need to actively engage in questioning the relevance, accuracy, and academic integrity of these suggestions. This metacognitive practice creates room for dynamic learning and helps preserve intellectual independence, and at the same time, it neutralizes the passivity of uncritically accepting AI outputs (Holmes & Tuomi, 2022; Onder, 2025; Royce & Bennett, 2025). Implementing reflective prompts that emphasize generating AI-assisted drafts can reinforce these skills.

Ethical considerations require deliberate attention. The results of the current pilot study show that a significant proportion of students are concerned about the ethics of AI use and express a need for transparency regarding AI embedding in their work. As a result, institutions should establish explicit ethical rules and procedures governing the use of AI in academic writing, including disclosure requirements and academic integrity. Such policies promote not only fairness, but also responsible and informed AI use, instilling a culture of trust and accountability.

Finally, these pedagogical implications are consistent with the salutogenic model of education (Antonovsky, 1996). It emphasizes empowerment, sense of coherence, and the development of lifelong skills (Antonovsky, 1996). In this regard, educators can nurture academic growth if they manage to create environments where students feel competent, connected, and especially intellectually autonomous so they can be academically assertive; a skill and an aptitude needed in an era increasingly influenced by AI technologies

To sum up, educators must adopt a holistic approach that maximizes AI's cognitive and emotional benefits while actively cultivating behavioral assertiveness and ethical awareness. Such balanced pedagogical strategies will be critical to preparing students not only to excel academically but also to thrive as independent, responsible learners in an evolving digital world.

Directions for Future Research

Longitudinal studies are needed to examine the long-term effects of AI use on the development of cognitive, emotional, and behavioral assertiveness. Research should explore diverse populations and disciplines to identify contextual moderators. In addition, investigating the differential impacts of specific AI functionalities will refine pedagogical strategies. Integrating

salutogenic and SEL frameworks can enrich understanding of AI's influence on students' holistic well-being and agency in academic contexts.

Conclusion

Building on the analysis of AI's dual impact on Moroccan university students' academic assertiveness in writing, it is essential to focus on the interplay between empowerment and dependency that AI tools introduce in higher education. This study reveals that AI's integration is neither essentially beneficial nor detrimental. Its influence centers critically on how it is employed within academic contexts.

AI tools serve as powerful enablers of cognitive and emotional assertiveness as they can reduce mechanical burdens and enhance students' confidence to articulate their ideas. For students struggling with linguistic and cultural challenges, AI can democratize access to quality academic writing support, which allows for a more inclusive learning environment and a supported intellectual expression that might otherwise be restrained. This facilitation goes hand in glove with the evolving pedagogical requirements of Industry 5.0, which prioritize human-centered, technology-enhanced learning that nurtures creativity and critical engagement.

However, this study also brings to light a cautionary dimension: excessive reliance on AI for content generation and structural organization can erode behavioral assertiveness. Consequently, students will experience weak engagement with the writing process, and their academic independence will be jeopardized. Overdependence may foster passive learning habits, reduce critical thinking disposition, and lead to ethical quandaries such as "AIgiarism," which threaten the integrity and rigor of scholarly work. This paradox highlights the need for educational frameworks that do not merely integrate AI tools but strategically regulate their use to preserve and cultivate the core intellectual capacities that define academic assertiveness.

Therefore, the future of AI in academic writing must be projected as a balanced interaction where AI acts as a scaffold rather than a substitute for independent thought. Educators, policymakers, and institutions must collaboratively develop clear ethical guidelines, pedagogical strategies, and assessment models that promote moderate, purposeful AI use. This approach should emphasize AI's role in increasing students' critical agency and emotional resilience while protecting against intellectual complacency.

Finally, this study contributes to the perception that the promise of AI in higher education lies not in its mere presence but in its thoughtful orchestration. If universities manage to foster a culture of responsible AI use, academic assertiveness as an educational requirement could be better enhanced. Therefore, students will develop not only as proficient writers but as autonomous, critical thinkers capable of shaping the pathways of a rapidly transforming world.

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