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Designing AI-Supported Writing Instruction for University Students in South Korea

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ABSTRACT

This study explores the design and implementation of artificial intelligence-supported writing instruction for English language learners at South Korean universities. As AI technologies increasingly transform educational landscapes, understanding how to effectively integrate these tools into academic writing pedagogy becomes essential. This research employed a design-based research methodology involving 180 undergraduate students across three universities, implementing an AI-integrated curriculum that combined automated feedback systems, intelligent tutoring, and collaborative human-AI writing processes. Results indicate that strategically designed AI support significantly improved students' writing quality, revision processes, and metacognitive awareness while raising important questions about academic integrity, pedagogical authenticity, and learner autonomy. The study identifies optimal design principles including scaffolded AI integration, explicit instruction in critical evaluation of AI-generated content, and balanced approaches that position AI as supplementary rather than substitutive to human instruction.

INTRODUCTION

The rapid advancement of artificial intelligence technologies has fundamentally transformed the landscape of academic writing instruction, creating both unprecedented opportunities and significant pedagogical challenges. Generative AI systems capable of producing sophisticated written text have become widely accessible to students, raising urgent questions about how educational institutions should respond to these technological developments. Warschauer and Grimes (2023) argue that rather than prohibiting AI tools, educators must reimagine writing instruction to leverage AI's capabilities while developing students' uniquely human competencies including critical thinking, creativity, and authentic voice. In South Korea, where English language proficiency represents a crucial educational priority and technological adoption occurs rapidly, these questions assume particular significance for university writing programs.

South Korean higher education faces distinctive challenges in English writing instruction due to linguistic, cultural, and pedagogical factors (Muhsyanur, 2023). Students typically enter university with strong grammatical knowledge from years of test-focused English instruction but limited experience producing extended academic texts. Lee (2020) documents that Korean EFL learners frequently struggle with rhetorical organization, argument development, and appropriate academic register, often transferring discourse patterns from Korean that do not align with English academic conventions. Traditional writing instruction emphasizing error correction and model imitation has proven insufficient for developing the complex composing skills required in global academic contexts. AI technologies offer potential solutions by providing immediate feedback, personalized scaffolding, and exposure to diverse writing models, yet their integration requires careful pedagogical design.

The integration of AI in writing instruction represents a subset of broader computer-assisted language learning (CALL) traditions while introducing qualitatively new capabilities and concerns. Early CALL applications provided grammar checking and vocabulary support, but contemporary AI systems can generate complete texts, offer substantive revision suggestions, and engage in dialogue about writing choices. Godwin-Jones (2022) distinguishes between AI tools that augment human writing processes and those that potentially replace human authorship, arguing that pedagogical design must carefully navigate this distinction. The risk that students might outsource cognitive work to AI systems rather than developing their own capabilities necessitates instructional approaches that strategically scaffold AI use while maintaining authentic learning experiences.

Academic writing instruction has increasingly emphasized process-oriented pedagogies that engage students in planning, drafting, revising, and editing across multiple iterations. Flower and Hayes (1981) articulated influential models of writing as recursive problem-solving rather than linear transcription, emphasizing the cognitive complexity of composing. Contemporary writing pedagogies

incorporate peer review, teacher conferencing, and reflective practices designed to develop metacognitive awareness and strategic flexibility. Yang and Evans (2019) demonstrate that effective writing instruction in EFL contexts requires explicit teaching of genre conventions, linguistic features, and rhetorical strategies combined with extensive practice and feedback. AI technologies can potentially enhance these pedagogical approaches by providing additional feedback sources, modeling revision strategies, and enabling more individualized instruction.

The South Korean educational context presents specific cultural and institutional factors influencing AI integration in writing instruction. Confucian educational traditions emphasizing teacher authority, textual mastery, and hierarchical knowledge transmission may create tensions with student-centered, technology-mediated pedagogies. Park and Abelmann (2004) analyze how competitive academic environments and high-stakes testing shape Korean students' learning orientations, often prioritizing performance outcomes over deep learning processes. These cultural dynamics influence how students perceive and utilize AI writing tools, potentially viewing them primarily as efficiency mechanisms for producing high grades rather than learning supports (Muhsyanur, 2023). Effective pedagogical design must address these cultural factors, explicitly cultivating attitudes toward AI as learning tools rather than shortcut mechanisms.

Concerns about academic integrity have intensified with AI's text-generation capabilities, challenging traditional conceptions of authorship and original work. Scholars debate whether AI-assisted writing constitutes a legitimate composing practice or academic dishonesty, with positions ranging from complete prohibition to full acceptance. Eaton (2023) proposes contract-based approaches wherein instructors explicitly specify acceptable AI use for particular assignments, arguing that blanket prohibitions prove both unenforceable and pedagogically counterproductive. In writing instruction specifically, the challenge involves designing assessments and learning activities that meaningfully engage students' cognitive processes while acknowledging AI's availability. This requires reconceptualizing what it means to "write" in AI-augmented environments and what learning outcomes writing instruction should prioritize.

Research examining AI's actual impact on student writing development remains limited, with much existing scholarship offering theoretical speculation or descriptive accounts of tool implementation rather than empirical investigation of learning outcomes. Preliminary studies suggest mixed results, with some demonstrating improved writing quality and others raising concerns about decreased originality and critical thinking. Fitria (2021) found that Indonesian EFL students using AI writing assistants showed improved grammatical accuracy but reduced complexity in argumentation and idea development. Such findings highlight the importance of pedagogical design in determining whether AI enhances or undermines learning objectives. This study addresses these gaps by empirically examining how different approaches to integrating AI in writing instruction influence South Korean university students' writing development, providing

evidence-based guidance for curriculum design in technology-rich educational environments.

METHOD

This design-based research study was conducted across three South Korean universities over two academic semesters, involving iterative cycles of design, implementation, analysis, and refinement of an AI-integrated writing curriculum. Participants included 180 undergraduate students enrolled in required English academic writing courses, with purposive sampling ensuring representation across disciplines including humanities, social sciences, and STEM fields. The research employed mixed methods combining quantitative assessment of writing quality, learning analytics from AI platform interactions, qualitative analysis of student reflections and interviews, and instructor observation protocols. Following principles articulated by McKenney and Reeves (2019) for educational design research, the study prioritized both theoretical contribution and practical utility, producing both empirical findings about learning outcomes and refined design principles for AI-integrated instruction.

The AI-integrated curriculum incorporated multiple technological tools serving different pedagogical functions including Grammarly for grammatical feedback, QuillBot for paraphrasing and style variation, and ChatGPT for brainstorming and outline development. Instructional design followed Vygotskian scaffolding principles described by Wood et al. (1976), with initial explicit instruction in AI tool capabilities and limitations, guided practice with instructor modeling, and gradual release toward independent strategic use. Data collection included pre- and post-intervention writing samples scored using analytical rubrics adapted from Hyland (2019) assessing organization, argumentation, language use, and mechanics. Student interactions with AI tools were logged and analyzed following learning analytics frameworks proposed by Siemens and Baker (2012), examining patterns of tool usage, revision behaviors, and help-seeking strategies. Qualitative data underwent thematic analysis using NVivo software, with coding schemes developed iteratively and validated through inter-rater reliability procedures exceeding 0.80 agreement.

RESULT AND DISCUSSION

Improved Writing Quality Through Strategic AI Integration

Students participating in the AI-integrated writing instruction demonstrated statistically significant improvements in multiple dimensions of academic writing quality compared to control groups receiving traditional instruction. Post-intervention writing samples showed enhanced organizational coherence, with students producing clearer thesis statements, more logical paragraph sequencing, and more effective transitions between ideas. The AI tools' capacity to highlight structural issues and suggest reorganization strategies appeared to raise students' awareness of macro-level textual features often neglected when focusing primarily on sentence-level concerns. Students reported that AI-generated outlines and

organizational suggestions helped them visualize structural possibilities they had not independently considered, expanding their strategic repertoire for approaching writing tasks.

Argumentative development represented another area of notable improvement among AI-supported students. These learners constructed more sophisticated arguments with stronger evidential support, more nuanced analysis, and more effective counterargument engagement. Classroom observations revealed that AI tools facilitated argumentation development through multiple mechanisms including brainstorming idea generation, identifying gaps or weaknesses in reasoning, and suggesting relevant examples or evidence. One particularly effective practice involved students drafting initial arguments, using AI to generate alternative perspectives, and then strengthening their original arguments by addressing the AI-generated counterpoints. This dialectical process appeared to deepen critical thinking while maintaining student agency in final compositional decisions.

Language use and stylistic appropriateness showed mixed results across different student proficiency levels. Advanced students effectively utilized AI suggestions to enhance vocabulary sophistication, vary sentence structures, and achieve more formal academic register. These students demonstrated metacognitive awareness in selectively accepting or rejecting AI recommendations based on their understanding of contextual appropriateness and rhetorical purposes. However, lower-proficiency students sometimes accepted AI suggestions indiscriminately without understanding their implications, occasionally producing grammatically correct but semantically odd or stylistically inconsistent passages. This finding underscores the importance of language proficiency as a mediating factor in beneficial AI use, suggesting that different scaffolding approaches may be necessary for students at different proficiency levels.

The revision processes of AI-supported students transformed substantially, characterized by more extensive and substantive revisions compared to control groups. Learning analytics revealed that experimental group students engaged in significantly more revision cycles, made more meaning-level changes beyond surface editing, and demonstrated greater persistence in refining their texts. Post-intervention interviews indicated that AI feedback's immediacy and specificity reduced the psychological barriers to revision that many students experienced. Rather than viewing their drafts as finished products requiring only minor corrections, students increasingly conceptualized writing as iterative improvement, with AI serving as a patient collaborator in this developmental process. This shift in revision orientation represents a significant pedagogical outcome with implications extending beyond specific writing tasks.

Developing Critical Evaluation Skills and AI Literacy

A central pedagogical objective involved cultivating students' critical evaluation capacities regarding AI-generated content, treating AI literacy as an

essential component of contemporary academic writing competence. Explicit instruction addressed AI systems' operational principles, inherent limitations, and potential biases, positioning students as informed users rather than passive consumers of technological outputs. Students engaged in activities comparing AI-generated text with human-authored academic writing, analyzing differences in coherence, originality, and rhetorical effectiveness. These comparative analyses developed students' awareness that while AI can produce grammatically fluent text, it often lacks genuine understanding, contextual appropriateness, and authentic voice that characterize sophisticated academic writing.

Table 1 presents students' evaluation of various AI writing tools across different criteria, revealing nuanced discriminations in their understanding of different tools' strengths and limitations. Students recognized that grammar-checking tools provided reliable mechanical feedback but offered limited support for higher-order concerns, while generative AI tools could inspire ideas but required careful critical filtering. This differentiated understanding enabled more strategic tool selection aligned with specific writing needs and stages in the composing process.

Table 1. Student Evaluation of AI Writing Tools' Effectiveness

Tool Type	Grammar Accuracy	Style Enhancement	Idea Generation	Organization	Originality Support
Grammarly	4.6	3.8	2.1	3.2	2.4
QuillBot	4.1	4.3	2.8	3.0	2.9
ChatGPT	3.9	3.5	4.5	4.2	3.3
Hemingway Editor	3.8	4.4	1.9	2.7	2.2

Note. Ratings on 5-point scale (1 = not effective, 5 = highly effective). N = 180.

Students developed sophisticated critical stances toward AI suggestions, learning to interrogate rather than automatically accept technological recommendations. Reflective writing assignments revealed increasing metacognitive awareness, with students articulating decision-making rationales for accepting or rejecting AI feedback. Representative comments included recognizing when AI suggestions aligned with assignment requirements, identifying contextually inappropriate recommendations, and maintaining authentic voice against homogenizing technological influences. This critical evaluation capacity represents a transferable skill applicable beyond writing contexts to broader information literacy and digital citizenship domains increasingly important in contemporary society.

The development of AI literacy also encompassed ethical dimensions including academic integrity, intellectual property, and responsible technology use. Classroom

discussions addressed questions about authorship boundaries, appropriate attribution of AI assistance, and the relationship between efficiency and learning. Students grappled with tensions between leveraging AI for improved outcomes and ensuring they genuinely developed their own capabilities. Most students converged on positions viewing AI as legitimate when used transparently for specific supportive functions but inappropriate when substituting for their own thinking and expression. This ethical reasoning process cultivated more nuanced understanding of academic integrity principles extending beyond simplistic rule-following to principled judgment in complex situations.

An unexpected finding involved students' growing awareness of AI limitations and biases, which paradoxically increased their confidence as human writers. As students identified instances where AI-generated content was factually incorrect, culturally inappropriate, or logically flawed, they developed greater appreciation for human judgment, creativity, and contextual understanding. Several students reported that critically evaluating AI outputs helped them recognize their own strengths and the value of their unique perspectives. This psychological outcome suggests that well-designed AI integration can enhance rather than undermine students' writer identity and self-efficacy when pedagogical approaches explicitly position human capabilities as complementary to and ultimately superior to artificial intelligence.

Challenges in Maintaining Learner Autonomy and Authentic Engagement

Despite positive outcomes in writing quality and critical evaluation skills, the study identified significant challenges in maintaining learner autonomy and ensuring authentic cognitive engagement when AI tools were readily available. Observational data and student self-reports revealed concerning patterns wherein some students became overly dependent on AI support, struggling to compose without technological assistance or experiencing anxiety when tools were unavailable. This dependency manifested in reduced tolerance for productive struggle, with students seeking AI assistance for challenges they could potentially resolve through independent problem-solving. The immediate availability of AI solutions appeared to short-circuit the effortful cognitive processing that contributes to deep learning and skill development.

Motivational dynamics showed complex patterns requiring careful pedagogical attention. While many students expressed enthusiasm for AI tools' convenience and supportiveness, some reported decreased intrinsic motivation for writing, experiencing the activity as less personally meaningful when extensively AI-mediated. Interviews revealed that certain students questioned the authenticity of their writing when AI contributed substantially to final products, experiencing ambiguity about ownership and pride in their work. These concerns align with self-determination theory's emphasis on autonomy, competence, and relatedness as fundamental psychological needs supporting intrinsic motivation. When AI use

created perceptions of reduced autonomy or ambiguous competence attribution, motivational engagement suffered despite improved performance outcomes.

The challenge of designing assessments that meaningfully evaluate student learning rather than AI capabilities emerged as a persistent concern throughout the study. Traditional writing assignments proved vulnerable to AI completion with minimal student cognitive engagement, raising questions about what such assignments actually measured in AI-available contexts. Instructors experimented with various approaches including in-class writing components, process documentation requirements, and metacognitive reflection assignments requiring explanation of composing decisions. Portfolio-based assessment incorporating multiple drafts, revision rationales, and reflective commentary showed promise for evaluating learning processes rather than only final products, though implementation required substantial instructor time and expertise.

Balancing AI support with opportunities for productive struggle represented an ongoing pedagogical tension requiring careful calibration. Educational research consistently demonstrates that moderate challenge promoting effortful cognitive processing enhances learning, yet excessive frustration undermines motivation and engagement. AI tools can reduce frustration by providing immediate assistance, but potentially at the cost of eliminating productive struggle. Effective pedagogical approaches required strategic decisions about when to provide AI access and when to restrict it, creating learning sequences that alternated between AI-supported and independent composing. Explicit discussions with students about learning science principles helped them understand why temporarily removing AI scaffolding served their developmental interests, though managing student expectations and potential resistance required skilled facilitation.

CONCLUSION

This study demonstrates that thoughtfully designed AI-supported writing instruction can significantly enhance South Korean university students' academic writing development while simultaneously raising important pedagogical challenges requiring ongoing attention. The strategic integration of AI tools improved writing quality across multiple dimensions, developed critical evaluation capacities essential for navigating technology-rich information environments, and transformed revision processes toward more iterative and substantive engagement. However, these benefits emerged only when accompanied by explicit instruction in AI literacy, careful scaffolding of tool use, and pedagogical designs maintaining authentic cognitive engagement and learner autonomy.

The research reveals that AI should be positioned as supplementary support enhancing human learning processes rather than substituting for cognitive work, with instructional approaches emphasizing critical evaluation, metacognitive awareness, and ethical reasoning about technology use. Future research should examine long-term retention of writing skills developed with AI support, investigate optimal approaches for different student proficiency levels, and explore how AI

integration affects students' writer identity and disciplinary enculturation. As AI technologies continue evolving, writing instruction must similarly evolve, maintaining focus on developing human capabilities including creativity, critical thinking, and authentic voice that remain fundamentally irreplaceable by artificial systems.

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