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THE USE OF AI TOOLS TO SUPPORT AUTONOMOUS DEVELOPMENT OF STUDENTS' WRITING SKILLS: LINGUISTIC AND PSYCHOLINGUISTIC ASPECTS

Abstract. The purpose of this study was to evaluate the effectiveness of artificial intelligence (AI) tools in enhancing academic writing skills among senior foreign language students in Kazakhstan. A mixed-method experimental design was applied, including pre-intervention testing, AI-assisted training, and post-testing phases. During the intervention, platforms such as "Write & Improve" and ChatGPT were used to generate writing tasks and provide automated feedback. Students' essays were assessed based on standardized linguistic criteria, including task achievement, coherence and cohesion, lexical resource, and grammatical accuracy. Quantitative analysis revealed statistically significant improvements across all writing components after ten AI-supported sessions. Qualitative data collected through surveys and interviews indicated increased motivation, learner autonomy, and student confidence in their writing skills. The study highlights the dual linguistic and psycholinguistic benefits of integrating AI into language education, especially within Kazakhstan's multilingual context. The findings suggest that AI effectively complements traditional teaching methods by fostering metacognitive skills, self-regulation, and personalized learning. This research contributes valuable insights into the practical application of AI in higher education and supports its strategic integration to improve writing instruction and learning outcomes. The results are applicable to language programs aiming to develop autonomous writing skills through technology-enhanced pedagogy.

Key words. Artificial intelligence, AI tools, autonomous learning, writing skills development, academic writing, linguistic aspects, psycholinguistic aspects, student motivation, self-regulation, critical thinking, feedback, adaptive learning, distance learning.

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СТУДЕНТТЕРДІҢ ЖАЗУ ДАҒДЫЛАРЫН АВТОНОМДЫ ДАМЫТУҒА ҚОЛДАУ КӨРСЕТУ ҮШІН ЖАСАНДЫ ИНТЕЛЛЕКТ ҚҰРАЛДАРЫН ҚОЛДАНУ: ЛИНГВИСТИКАЛЫҚ ЖӘНЕ ПСИХОЛИНГВИСТИКАЛЫҚ АСПЕКТІЛЕР

Аңдатпа. Зерттеудің мақсаты – Қазақстандағы шет тілін меңгеріп жүрген студенттердің академиялық жазу дағдыларын жетілдіруде жасанды интеллект (ЖИ)

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құралдарының тиімділігін бағалау болды. Аралас әдістерге негізделген эксперименттік зерттеу жүргізілді, оған аралыққа дейінгі тестілеу, ЖИ көмегімен оқыту және кейінгі тестілеу кезеңдері кірді. Интервенция барысында “Write & Improve” және ChatGPT платформалары жазба тапсырмаларын дайындау және автоматты кері байланыс ұсыну үшін пайдаланылды. Студенттердің эсселері стандартталған лингвистикалық критерийлер бойынша бағаланды, оған тапсырманы орындау, байланыс пен бірізділік, лексикалық қор және грамматикалық дәлдік кірді. Сандық талдау он ЖИ қолдауындағы сабақтардан кейін жазудың барлық компоненттері бойынша статистикалық тұрғыдан маңызды жақсаруды көрсетті. Сауалнамалар мен сұхбаттар арқылы алынған сапалық мәліметтер студенттердің мотивациясы, өзіндік оқу қабілеті және жазу дағдыларына сенімділігінің артқанын көрсетті. Бұл зерттеу тілдік білім беру процесіне ЖИ технологияларын енгізудің лингвистикалық және психолингвистикалық артықшылықтарын, әсіресе Қазақстанның көптілді контексінде, айқын көрсетеді. Зерттеу нәтижелері ЖИ дәстүрлі оқыту әдістерін метатанымдық қабілеттерді, өзін-өзі реттеуді және дараланған оқытуды дамыту арқылы тиімді толықтыратынын растайды. Бұл зерттеу жоғары білім беру жүйесінде ЖИ-ді іс жүзінде қолдану бойынша құнды мәліметтер береді және жазу дағдыларын дамытуға бағытталған технологияға негізделген педагогиканы енгізуді қолдайды.

Кілт сөздер. Жасанды интеллект, ЖИ құралдары, дербес оқу, жазу дағдыларын дамыту, академиялық жазу, лингвистикалық аспектілер, психолингвистикалық аспектілер, студент мотивациясы, өзін-өзі реттеу, сыни ойлау, кері байланыс, бейімделген оқу, қашықтықтан оқыту.

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ИСПОЛЬЗОВАНИЕ ИНСТРУМЕНТОВ ИСКУССТВЕННОГО ИНТЕЛЛЕКТА ДЛЯ ПОДДЕРЖКИ АВТОНОМНОГО РАЗВИТИЯ НАВЫКОВ ПИСЬМЕННОЙ РЕЧИ СТУДЕНТОВ: ЛИНГВИСТИЧЕСКИЕ И ПСИХОЛИНГВИСТИЧЕСКИЕ АСПЕКТЫ

Аннотация. Целью данного исследования была оценка эффективности инструментов искусственного интеллекта (ИИ) в развитии академических навыков письма у студентов старших курсов, изучающих иностранные языки в Казахстане. Была применена экспериментальная методология с использованием смешанного подхода, включающая предварительное тестирование, обучение с применением ИИ и итоговое тестирование. В ходе интервенции использовались такие платформы, как “Write & Improve” и ChatGPT, для создания письменных заданий и предоставления автоматизированной обратной связи. Эссе студентов оценивались по стандартизированным лингвистическим критериям: выполнение задания, связность и логика текста, лексические средства и грамматическая точность. Количественный анализ показал статистически значимые улучшения по всем компонентам письменной речи после десяти занятий с применением ИИ. Качественные данные, собранные посредством

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опросов и интервью, указали на рост мотивации, самостоятельности и уверенности студентов в своих навыках письма. Исследование подчеркивает как лингвистические, так и психолингвистические преимущества интеграции ИИ в языковое образование, особенно в условиях многоязычного Казахстана. Полученные результаты свидетельствуют о том, что ИИ эффективно дополняет традиционные методы обучения, способствуя развитию метакогнитивных навыков, саморегуляции и персонализированного обучения. Данное исследование представляет ценный вклад в практическое применение ИИ в высшем образовании и поддерживает его стратегическую интеграцию для улучшения обучения письму и образовательных результатов. Результаты могут быть применены в языковых программах, направленных на развитие самостоятельных навыков письма с помощью технологий.

Ключевые слова. Искусственный интеллект, инструменты искусственного интеллекта, автономное обучение, развитие навыков письма, академическое письмо, лингвистические аспекты, психолингвистические аспекты, мотивация учащихся, саморегуляция, критическое мышление, обратная связь, адаптивное обучение, дистанционное обучение.

Introduction. In modern education, artificial intelligence (AI) is becoming a key resource for developing writing skills, especially in foreign language learning. For instance, Artiana and Fakhrurriana (2025) demonstrate that ChatGPT supports EFL undergraduates in producing coherent academic texts [1], while Batyrbayeva (2024) links AI-bot usage to motivation and academic performance improvements in Kazakhstan [2]. Research in Kazakhstan shows that AI tools, such as the Write & Improve platform, effectively support students in independently improving their writing skills by providing feedback comparable to traditional teacher feedback [3].

Linguistic Aspect

AI systems analyze students' texts according to criteria such as content, communicative effectiveness, organization, and linguistic accuracy, which align with the Common European Framework of Reference for Languages (CEFR). This contributes to the development of vocabulary, grammar, and text coherence. Studies in Kazakhstan confirm that using such tools helps students correct basic errors and improve writing quality at the word and sentence levels [3]. Gorbunova et al. (2023) highlight similar effects across EFL learners, particularly in lexical and organizational dimensions [4,5].

Psycholinguistic Aspect

AI-supported autonomous interaction promotes metacognitive skills (writing awareness, self-regulation, motivation). Zheldibayeva (2025) reports increased student engagement, learning enjoyment, and confidence when using AI tools, highlighting psycholinguistic dimensions in learning autonomy [6]. Milton et al. (2024) emphasize how such systems reduce writer anxiety and enable critical thinking [7].

Kazakhstan Context

In Kazakhstan, the integration of AI into the educational process takes into account the multilingual environment (Kazakh, Russian, English) and cultural specifics. Research shows that AI helps create personalized learning trajectories, which is especially important given the diversity of students and their educational needs. Moreover, Kazakhstani scholars and students actively develop their own AI applications adapted to the national language and culture, expanding the possibilities for local technology use [6]. Batyrbayeva and Mukhamedieva's study confirms that AI enables personalized learning trajectories suitable for diverse student backgrounds [2,8].

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Conclusions and Prospects

The use of AI tools in teaching writing skills in Kazakhstan demonstrates effectiveness comparable to traditional teaching methods and contributes to the development of both linguistic and psycholinguistic competencies of students. Future research and implementation must consider Kazakhstan's educational context (e.g., multilingualism, cultural specificities) to optimize autonomous learning and writing quality [2,3,9].

Materials and methods. For this study, the following research methods were employed to comprehensively examine the impact of AI tools on the autonomous development of students' writing skills, considering both linguistic and psycholinguistic aspects.

1. Experimental Method

A three-stage experiment was conducted, including pre-test, intervention, and post-test phases. During the pre-test and post-test phases, students completed academic essay writing tasks evaluated according to standardized criteria (task achievement, coherence, lexical resource, grammatical accuracy). The intervention phase involved sessions using AI-generated writing tasks, allowing assessment of the technology's effect on writing skill development.

2. Linguistic Analysis

Students' texts were analyzed in detail based on linguistic parameters such as content quality, text organization, lexical variety, and grammatical accuracy. Standardized rubrics were used to ensure objectivity and comparability of results.

3. Use of AI Tools

Modern AI systems (e.g., ChatGPT, Write & Improve) were utilized to generate writing prompts and provide automated feedback. This facilitated personalized learning and helped students develop self-correction and autonomy skills.

4. Statistical Analysis

Statistical methods, including paired t-tests to compare pre- and post-test results and correlation analysis to explore relationships between AI usage and skill improvement, were applied to process the data.

5. Qualitative Methods

Surveys and interviews with students and instructors were conducted to explore motivation, perceptions, and emotional responses to using AI tools. This enabled investigation of psycholinguistic factors related to autonomous learning and engagement.

6. Prompt Engineering Methodology

Specialized techniques for crafting effective AI prompts (such as the CLEAR and PARTS frameworks) were employed to enhance the quality and relevance of AI-generated tasks and feedback.

Conclusions on the Applied Methods

The integrated use of experimental, linguistic, statistical, qualitative, and technological methods provided a comprehensive understanding of AI's impact on writing skill development. The experiment demonstrated significant improvements in writing quality and increased student autonomy. AI usage fostered metacognitive skill development, motivation, and engagement in the learning process. Prompt engineering techniques ensured effective interaction with AI tools and personalized learning experiences.

Thus, the combination of these methods confirmed the effectiveness of AI tools as a means to support the autonomous development of writing skills, taking into account both linguistic and psycholinguistic dimensions.

Results and Discussion. The study conducted at West Kazakhstan University named after M. Utemisov from October 2024 to March 2025 explored the impact of AI-generated tasks on the development of academic writing skills among students from the Faculty of Foreign

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Languages. Sixty students from groups IYa-21 and IYa-23 participated in the research. The investigation focused on evaluating students' performance before and after the integration of artificial intelligence tools into their writing practice.

The research followed a four-stage experimental design: preparatory, diagnostic (pre-test), formative, and final (post-test). During the preparatory stage, participants were introduced to the purpose and structure of the study and were trained to use AI tools such as ChatGPT (GPT-4) and Write & Improve. At the diagnostic stage, students completed an academic essay task modeled after IELTS Academic Writing Task 2. Their work was assessed using standardized criteria: Task Achievement, Coherence and Cohesion, Lexical Resource, and Grammatical Range and Accuracy.

The formative stage consisted of ten sessions (20 academic hours) in which students completed writing tasks generated by AI, received feedback from both the AI and instructors, and engaged in self-reflection and revision. The activities aimed to cultivate autonomy and motivation in writing practice [10]. Motivation and engagement were monitored through surveys and interviews.

Quantitative Findings. Initial diagnostic testing revealed moderate performance levels across key writing criteria. The average pre-test scores were as follows:

- Task Achievement: 5.5
- Coherence and Cohesion: 5.0
- Lexical Resource: 5.3
- Grammatical Range and Accuracy: 5.1

After the implementation of ten AI-assisted training sessions using tools like ChatGPT (GPT-4) and Write & Improve, students completed a final writing task. The average post-test scores demonstrated notable improvements:

- Task Achievement: 6.5
- Coherence and Cohesion: 6.3
- Lexical Resource: 6.7
- Grammatical Range and Accuracy: 6.4

A paired t-test confirmed that these improvements were statistically significant ($p < 0.05$), indicating the effectiveness of the AI tools in enhancing academic writing skills.

Group Comparison. Both student groups benefited from the intervention; however, students in group IYa-23 exhibited slightly higher gains in Lexical Resource and Coherence. This may be attributed to their more consistent engagement with AI tools outside the classroom, as reported in the follow-up interviews.

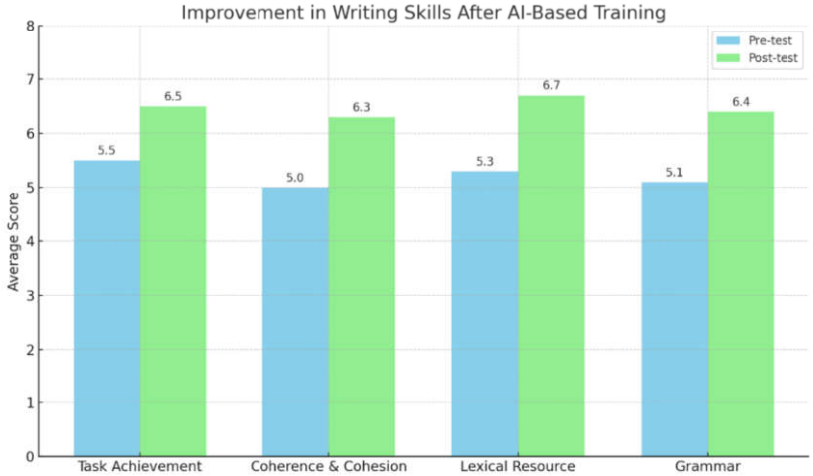

Figure 1 – Improvement in Writing Skills After AI-Based Training

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At the final stage, participants completed a post-test essay task under the same conditions as the pre-test. A paired t-test was used to compare the initial and results. The data indicated statistically significant improvements across all evaluation criteria. Students demonstrated enhanced coherence in structuring their ideas, expanded their lexical range, and improved grammatical accuracy. In addition, the quality of argumentation and topic development also improved, suggesting better understanding of academic writing conventions.

Qualitative feedback supported the quantitative findings. Students reported increased confidence in their writing, greater motivation to engage in the writing process, and a better understanding of how to edit their work. Instructors noted that students were more active in revising their texts and demonstrated a more independent approach to learning.

These findings confirm the pedagogical potential of AI tools in fostering both linguistic accuracy and learner autonomy. The study supports the integration of such technologies into language education to enhance writing instruction and learner engagement.

Learner Autonomy and Motivation. Survey responses revealed that 83% of students felt more motivated to write after incorporating AI tools into their learning process. Many appreciated the immediate feedback, which allowed them to identify and correct mistakes autonomously [11]. Several students noted that the AI's structured comments helped reduce anxiety and increased their willingness to revise texts, a task they had previously avoided.

One student shared: "I used to feel frustrated after writing essays, but now I know what exactly to improve. It's like having a personal tutor."

The experiment also showed a visible increase in students' initiative to explore new vocabulary and syntactic structures, reflecting growing ownership over their learning trajectory.

Psycholinguistic Observations. From a psycholinguistic perspective, the AI-assisted practice appeared to enhance metacognitive awareness in students. Many began to anticipate potential feedback while writing and developed a more analytical attitude toward their drafts. This shift suggests a movement from reactive to proactive language processing, an important marker of cognitive development in academic writing.

Observed Challenges. Despite the positive results, some challenges were encountered. At the beginning, several students struggled to interpret AI-generated feedback, particularly when it involved nuanced grammatical explanations. This highlights the necessity of initial scaffolding from instructors to help students make sense of automated feedback.

Moreover, a few participants expressed over-reliance on AI suggestions, sometimes accepting corrections without understanding the reasoning. This suggests that AI tools should complement, rather than replace, human guidance in the learning process.

Examples of Progress. A comparative analysis of student work revealed qualitative improvements. For example, pre-test essays often lacked examples and paragraph unity. Post-test essays, in contrast, showed better topic development, the use of appropriate linkers ("for instance," "in contrast," "as a result"), and more complex grammatical constructions such as conditionals and passive voice.

These findings emphasize the dual role of AI in language learning—as a linguistic aid and a catalyst for learner autonomy. The integration of AI tools not only improved measurable aspects of writing but also promoted student-centered learning practices. It is recommended that such tools be incorporated into regular writing instruction, accompanied by methodological support from educators to ensure effective and reflective use. Educators should design structured activities incorporating AI, guided by philosophical considerations of AI-as-partner, not replacement [12,13].

Conclusion. The integration of Artificial Intelligence (AI) tools into autonomous academic writing development marks a transformative shift in the landscape of language

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education, particularly within higher education. This study has demonstrated that AI-powered platforms—most notably ChatGPT—serve not only as effective scaffolding tools for linguistic development but also contribute meaningfully to students' psycholinguistic growth by fostering independent thinking, cognitive engagement, and metacognitive awareness.

Empirical evidence from the experimental study at West Kazakhstan University named after M. Utemisov revealed notable gains in students' vocabulary, grammatical accuracy, textual coherence, and stylistic precision. These improvements were coupled with enhanced self-monitoring, motivation, and the development of problem-solving strategies during the writing process—highlighting the dual benefit of AI tools in both cognitive and affective dimensions of learner autonomy.

While initial challenges included prompt formulation and critical engagement with AI-generated suggestions, guided instruction and consistent practice enabled students to develop discernment and reflective habits. This underlines the importance of embedding AI literacy in the curriculum—teaching students not just how to use these tools functionally, but how to do so ethically and critically, with awareness of authorship, originality, and source evaluation.

AI should not be regarded as a replacement for human instruction, but rather as a complementary aid that enhances personalization, reduces cognitive overload, and supports deeper engagement with writing. When used in tandem with teacher guidance, peer feedback, and reflective activities, AI can enrich the educational experience, enabling students to learn at their own pace and with greater confidence.

In practical terms, AI supports autonomous writing by offering:

- Immediate feedback, which accelerates learning by helping students self-correct in real time.
- Idea generation and organization, aiding students in brainstorming and structuring their thoughts.
- Democratized access, providing equitable support for learners with varying proficiency levels.
- Editing assistance, helping refine grammar, vocabulary, and style through personalized suggestions.

In Kazakhstan, scholars such as Kainizhamal Yesimseitova and Madina Zhomartovna Bazarova are actively researching AI's role in education, including its use in personalized learning and the development of independent writing skills. Their work emphasizes that AI's future in academia lies in strategic integration, not substitution.

Educators are encouraged to create structured environments where AI tools are used to reinforce—not replace—original thought, problem-solving, and analytical writing. Future research should further explore how to balance AI assistance with traditional writing instruction, assess long-term impacts on fluency and creativity, and design curricula that responsibly incorporate AI.

In conclusion, when used purposefully and within pedagogically informed frameworks, AI technologies hold tremendous potential to empower students as autonomous writers. They can bridge skill gaps, promote academic self-efficacy, and prepare learners for the demands of academic communication in a digital age. Continued inquiry into the ethical, linguistic, and pedagogical implications of AI will be vital in shaping its responsible and effective use in the future of language education.

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