Rakhimgaliyeva Pakizat Sarmanovna – PhD, Lecturer of the Department of molecular biology and medical genetics named after the Academician of the NAS RK Raissov T.K., Semey Medical University, Republic of Kazakhstan, 070000, Semey, 103 Abai Str., tel.: +77475450562, e-mail: pakizat-88@mail.ru.

Yermekova Moldir Altynbekkyzy – 3rd-year PhD student, "8D01103-Pedagogy and Psychology" educational program, L.N. Gumilyov Eurasian National University, Republic of Kazakhstan, 010000, Astana, 6 Yanushkevich Str., tel.: +7010381808, e-mail: ermekova_moldir@inbox.ru.

IRSTI 14.85.09
UDC 378.147.004.04
https://doi.org/10.52269/NTDG254217

FEATURES OF ADOPTING A DIGITAL ASSISTANT FOR THE DEVELOPMENT OF STUDENTS' ACADEMIC WRITING COMPETENCE

Abildinova G.M. – Candidate of Pedagogical Sciences, Associate Professor*, *L.N. Gumilyov Eurasian National University, Astana*, *Republic of Kazakhstan.*

Kultenova M.T. – PhD student, *L.N. Gumilyov Eurasian National University, Astana*, *Republic of Kazakhstan.*

The integration of digital assistants into the educational process requires new methodological and didactic approaches that involve preliminary research and comprehensive teacher training. To fully benefit from the opportunities offered by artificial intelligence and interactive digital tools, the development of academic writing competence should be approached from the perspective of personalized and adaptive learning. In higher education, digital assistants are increasingly adopted as part of digital transformation initiatives; however, their pedagogical potential often remains underutilized. The article presents practical examples of using digital assistants to support the academic writing process through interactive feedback, individualized assistance, and real-time automated text correction. In addition, the role of digital assistants in structuring learning materials, shaping writing strategies, and enhancing students' written language skills is examined in detail. The need to develop specialized functions of digital assistants aimed at fostering academic literacy is emphasized. A digital assistant is viewed as a tool for organizing ideas, a resource for improving written communication, and a means of developing learners' reflection and self-assessment skills. Moreover, the use of a digital assistant enhances the level of personalization within the learning process.

Key words: *digital assistant, academic writing competence, artificial intelligence, didactic integration, adaptive learning, intelligent text recognition, metacognitive skills.*

БІЛІМ АЛУШЫЛАРДЫҢ АКАДЕМИЯЛЫҚ ЖАЗБАША ҚҰЗЫРЕТТІЛІГІН ДАМЫТУ ҮШІН ЦИФРЛЫҚ АССИСТЕНТТІ ЕНГІЗУДІҢ ЕРЕКШЕЛІКТЕРІ

Абильдинова Г.М. – педагогика ғылымдарының кандидаты, қауымдастырылған профессор, Л.Н. Гумилев атындағы Еуразия ұлттық университеті, Астана қ., Қазақстан Республикасы.*

Культенова М.Т. – PhD докторант, Л.Н. Гумилев атындағы Еуразия ұлттық университеті, Астана қ., Қазақстан Республикасы.

Білім беру процесіне цифрлық ассистенттерді енгізу алдын ала зерттеулер мен оқытушыларды даярлауды талап ететін жаңа әдістемелік және дидактикалық тәсілдерді көздейді. Жасанды интеллект пен интерактивті цифрлық құралдармен қамтамасыз етілген мүмкіндіктерді тиімді пайдалану үшін академиялық жазбаша құзыреттілікті дамыту дербестендірілген және бейімделген оқыту тұрғысынан қарастырылуы керек. Жоғары білім беру жүйесінде цифрлық ассистенттер цифрлық трансформация шеңберінде барған сайын белсенді енгізілуде, алайда олардың педагогикалық әлеуеті жиі іске асырылмай қалады. Мақалада интерактивті кері байланыс, жеке көмек және мәтінді нақты уақыт режимінде автоматты түрде түзету арқылы академиялық жазу процесін қолдауда цифрлық ассистенттерді қолданудың практикалық мысалдары келтірілген. Сонымен қатар, цифрлық ассистенттердің оқу материалдарын құрылымдау, жазба стратегияларын қалыптастыру және білім алушылардың жазбаша тілін дамытудағы рөлі кеңінен талданады. Академиялық сауаттылықты қалыптастыру мақсаттарына бағытталған цифрлық ассистенттердің мамандандырылған функцияларын әзірлеу қажеттілігі атап өтілді. Цифрлық ассистент идеяларды ұйымдастыру құралы, жазбаша сөйлеуді жетілдіру ресурсы және білім алушылардың рефлексиясы мен өзін-өзі бағалауын дамыту мүмкіндігі ретінде қарастырылады. Цифрлық ассистент идеяларды ұйымдастыру құралы, жазбаша сөйлеуді жетілдіру ресурсы және білім алушылардың рефлексиясы мен өзін-өзі бағалауын дамыту мүмкіндігі ретінде қарастырылады, сонымен бірге оқу процесін жекелендіру деңгейін арттыруға мүмкіндік береді.

Түйінді сөздер: *цифрлық ассистент, академиялық жазу құзыреттілігі, жасанды интеллект, дидактикалық интеграция, бейімделген оқыту, интеллектуалды мәтінді тану, метатанымдық дағдылар.*

ОСОБЕННОСТИ ВНЕДРЕНИЯ ЦИФРОВОГО АССИСТЕНТА ДЛЯ РАЗВИТИЯ АКАДЕМИЧЕСКОЙ ПИСЬМЕННОЙ КОМПЕТЕНЦИИ ОБУЧАЮЩИХСЯ

Абильдинова Г.М. – кандидат педагогических наук, ассоциированный профессор, Евразийский национальный университет им. Л.Н. Гумилева, г. Астана, Республика Казахстан.*

Культенова М.Т. – PhD докторант, Евразийский национальный университет им. Л.Н. Гумилева, г. Астана, Республика Казахстан.

Внедрение цифровых ассистентов в образовательный процесс предполагает новые методические и дидактические подходы, требующие предварительных исследований и подготовки преподавателей. Для эффективного использования возможностей, предоставляемых искусственным интеллектом и интерактивными цифровыми инструментами, развитие академической письменной компетенции должно рассматриваться с позиции персонализированного и адаптивного обучения. В системе высшего образования цифровые ассистенты все активнее внедряются в рамках цифровой трансформации, однако их педагогический потенциал нередко остаётся нереализованным. В статье представлены практические примеры применения цифровых ассистентов для поддержки процесса академического письма посредством интерактивной обратной связи, индивидуальной помощи и автоматической корректировки текста в режиме реального времени. Кроме того, подробно анализируется роль цифровых ассистентов в структурировании учебных материалов, формировании стратегий письма и развитии письменной речи обучающихся. Подчеркивается необходимость разработки специализированных функций цифровых ассистентов, ориентированных на цели формирования академической грамотности. Цифровой ассистент рассматривается как инструмент для организации идей, ресурс для совершенствования письменной речи и средство развития рефлексии и самооценки студентов. Цифровой ассистент выступает инструментом для организации идей, улучшения письменной речи и формирования рефлексивных навыков, а также позволяет повысить уровень персонализации образовательного процесса.

Ключевые слова: *цифровой ассистент, академическая письменная компетенция, искусственный интеллект, дидактическая интеграция, адаптивное обучение, интеллектуальное распознавание текста, метакогнитивные навыки.*

Introduction. The rapid development of technology and artificial intelligence leads to the emergence of new digital tools that significantly change the educational process. Among such innovations, digital assistants occupy a special place, which are becoming a promising means of supporting students in the development of academic writing competence. Their integration into the educational environment opens up opportunities for personalized learning, constant feedback and improvement of students' language skills. The advantages of using digital assistants in education are related to their ability to provide adaptive assistance, automate routine writing processes, promote self-regulation and develop students' reflection during the writing process. However, these advantages can be realized only if teachers are sufficiently trained and the digital assistant is included in the educational process in a didactic manner. At the same time, certain problems and challenges remain. Effective implementation of digital assistants requires a thorough methodological assessment of their pedagogical potential, compliance with educational goals, as well as the ethically correct use of feedback systems based on artificial intelligence. In this regard, teachers are faced with the task of finding new didactic approaches or adapting existing ones so that the use of a digital assistant really contributes to the formation of students' academic writing competence.

Traditional approaches to teaching academic writing – such as printed manuals, static online courses, and pre-recorded lectures – are gradually losing their effectiveness compared to the dynamic opportunities provided by artificial intelligence technologies and digital educational tools. Among these innovations, a special place is occupied by the digital assistant, which has become one of the most promising means of supporting students in the process of forming academic writing competence. Many teachers view digital assistants as valuable tools that can provide personalized support and interactive feedback when teaching writing. Previously, such technologies performed mainly the functions of spell checking or grammar, but modern digital assistants integrate elements of natural language processing, adaptive learning, and learning data analytics. These opportunities make it possible to more effectively integrate digital assistants into the educational process. However, the rapid introduction of digital assistants into the education system poses a number of methodological challenges for teachers. Teachers are forced to master new technologies and adjust their learning strategies in order to integrate artificial intelligence-based support in a meaningful and pedagogically appropriate way. In this context, the digital assistant becomes not just an auxiliary tool, but an element that influences the structure of the educational environment, the nature of interaction and the

didactic organization of the academic writing learning process. In recent years, universities and educational organizations have been actively introducing digital assistants using artificial intelligence technologies into digital platforms and training courses as part of digital transformation programs. Despite the growing popularity of such solutions, the issues of effective pedagogical integration of digital assistants remain open and require further study of their didactic features and potential in the development of academic written competence of students.

However, given the large-scale investments that the introduction of digital assistants and artificial intelligence into the educational process implies, it is important to determine exactly what advantages they provide and what didactic approaches are being formed in connection with their use. There is some discussion in the scientific community regarding the pedagogical expediency of using digital assistants, since many universal programs are positioned as tools for the development of academic writing, although they can also be used in other types of educational activities. Even recognizing the digital assistant as an innovative and promising technology, it is necessary to determine exactly what its contribution to the learning process and the development of academic writing competence is. A number of researchers agree that the effectiveness of such tools directly depends on their pedagogical implementation and methodological meaningfulness. Thus, it is noted that the effective use of a digital assistant should not only automate the writing process, but also expand the range of pedagogical strategies, promote reflection and the formation of students' metacognitive skills [1]. At the same time, a number of studies emphasize that when used unconsciously, digital assistants often turn into only a technical support tool – a kind of "digital manual" that does not contribute to the development of critical and creative thinking of students [2]. This leads to a decrease in learning motivation and a loss of potential for the transformation of the pedagogical approach. Other authors express concern that the use of digital assistants without a clear didactic concept turns them into just another "presentation tool" that is not able to fully support the process of academic writing [3].

In recent years, a number of studies have been carried out aimed at determining the most effective didactic models for using digital assistants in the educational process. One of these studies, "Digital Assistant as a means of developing students' academic writing competence," was conducted by the authors and involved about 100 students from various educational organizations. The results showed that the use of a digital assistant helps to increase the concentration of attention, educational motivation and involvement of students in the process of writing academic texts. More than 96% of students noted that completing academic writing assignments using AI tools is more convenient and productive for them than traditional forms of work. The majority of teachers (over 90%) also recognized the high didactic potential of the digital assistant in the formation of academic writing competence, however, they pointed out the need for additional time to prepare and adapt educational materials to new technologies. Based on the data obtained, the authors emphasized the need to develop teacher training programs aimed at mastering digital didactics and the effective use of AI assistants in the development of students' academic writing competence.

Increasing student engagement is one of the key effects identified when using a digital assistant in the process of forming academic writing competence. The main reason for this is the interactive and adaptive nature of the digital assistant, which provides personalized support throughout the writing process, from text planning to editing. The results of pedagogical observations show that the use of a digital assistant contributes to the growth of learning motivation, the development of self-reflection and metacognitive skills, as students receive visual, linguistic and semantic cues, as well as automatic feedback on the structure, style and argumentation of the text. In addition, the digital assistant helps to keep students' attention, makes the academic writing process more meaningful and manageable, and improves the quality of written work through constant error analysis and recommendations for correcting them. However, the effectiveness of using digital assistants largely depends on the professional readiness of the teacher, his digital competence and the ability to integrate AI tools into the didactic model of teaching writing. Therefore, one of the urgent tasks is to identify the most effective methods and forms of working with digital assistants, as well as to develop approaches to their integration into the process of developing students' academic writing competence.

The purpose of the article is to analyze the didactic and methodological foundations for the use of digital assistants in developing students' academic writing competence within higher education. The study aims to identify effective pedagogical strategies for integrating artificial intelligence (AI)-based tools into the writing process, evaluate the level of students' readiness to work with digital assistants, and determine the impact of such technologies on the formation of reflection, self-assessment, and self-regulation skills.

Based on the purpose of the study, the following **research objectives** were formulated:

1. To analyze the didactic and methodological foundations of integrating digital assistants into the process of developing academic writing competence in higher education.
2. To identify students' initial academic writing challenges and their readiness to use AI-based digital assistants.
3. To determine the pedagogical effectiveness of digital assistants in supporting various stages of academic writing: planning, drafting, revising, and editing.
4. To evaluate the impact of AI-powered feedback on students' reflection, self-regulation, and metacognitive writing strategies.

5. To compare the dynamics of student performance before and after the introduction of the digital assistant using rubric-based assessment.

6. To examine teachers' perceptions of the pedagogical value, limitations, and methodological challenges of digital assistants.

7. To develop recommendations and a pedagogical model for the effective integration of AI-based digital assistants into academic writing instruction.

Literature review

Modern research [4-8] shows that the use of a digital assistant in teaching academic writing has both significant advantages and certain limitations.

In contrast to the earlier descriptive overview, the theoretical foundation has been strengthened by integrating comparative analysis between Kazakhstan and international practices. While higher education institutions in Kazakhstan typically use digital assistants as supplementary technical tools, international research demonstrates deeper pedagogical integration guided by established models such as TPACK, SAMR, and the Technology Acceptance Model (TAM). These models conceptualize digital assistants not merely as automated writing helpers but as elements of a structured instructional system designed to enhance academic writing performance.

Western studies [9-10] emphasize the development of metacognitive strategies, argumentation skills, and AI-mediated formative feedback. In contrast, Kazakhstani research often focuses on improving technical aspects of writing, such as grammar and coherence, without embedding AI tools into a pedagogical methodology. This highlights a methodological gap that necessitates a more systematic approach to integrating digital assistants into the academic writing curriculum.

The main advantages include:

1. the possibility of personalized support for students at all stages of writing a text – from idea generation to editing and stylistic refinement;

2. Developing self-reflection, language awareness, and metacognitive writing strategies through instant feedback and prompts;

3. Increasing students' motivation and engagement through an interactive format of interaction with AI;

4. formation of self-regulation and self-editing skills, which is especially important for students with difficulties in writing;

5. The ability to save and analyze previous versions of texts, which helps to track individual progress and develop reflection skills;

6. Expanding the possibilities of visual support for writing (color markup, highlighting of key text elements, structural diagrams, etc.).

The main success factor of a digital assistant is the motivational effect it has on students [9]. The opportunity to receive immediate recommendations and see improvements in your own texts creates a sense of "interactive dialogue" and supports interest in learning activities. However, like any innovation, the digital assistant has a number of disadvantages. Among them:

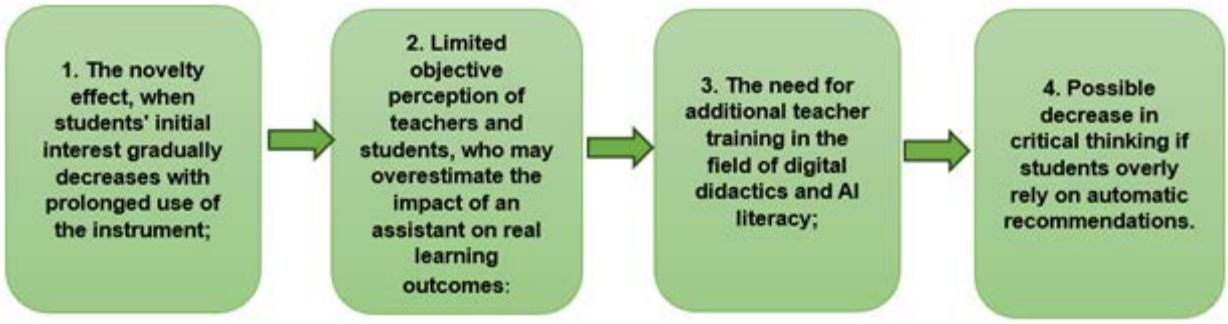

Figure 1 – Key challenges in implementingdigital assistants in academic writing instruction

The question of the extent to which the development of students' academic writing competence is related specifically to the introduction of a digital assistant, and not only to effective teaching methods, remains debatable. Research shows that the success of using AI tools largely depends on the professional training of a teacher, his ability to integrate digital technologies into the didactic process and build active interaction with students. Teachers note that using a digital assistant helps to increase students' concentration, facilitates text analysis, and helps identify logical and stylistic errors. At the same time, students confirm that it is easier for them to focus and improve their texts when they work in a digital environment with the support of an assistant than with traditional written training.

According to modern pedagogical research, there are four main advantages of using a digital assistant:

• improving the effectiveness of demonstrating and modeling examples of academic writing;

• improving the quality of interaction between the teacher and the student through timely digital feedback;

• optimization of training preparation and planning, thanks to automated analysis of written assignments;

• increasing the pace and depth of learning by adapting assignments to the individual needs of students.

The results of the conducted research also show that the digital assistant promotes the development of interactive learning, cooperation between students, the exchange of ideas and joint text editing. It has become noticeable that the digital assistant is becoming a key tool in the three-pronged model of teacher—student—learning content interaction.

However, along with the advantages, a number of disadvantages have been identified:

• technical difficulties associated with the configuration and stability of programs;

• time spent on mastering the functionality and preparing digital materials;

• limitations of the interface, which does not always ensure the accuracy of the analysis of semantic and stylistic nuances of the text;

• The risk of decreased critical thinking if students overly rely on automatic recommendations without informed analysis.

Based on this, it can be concluded that the digital assistant is a powerful tool for the development of academic writing competence, but its effectiveness directly depends on the didactic model of its application, professional training of teachers and well-structured pedagogical integration.

Materials and methods

The materials of the study consisted of empirical data collected during the integration of a digital assistant into the academic writing instruction process. The data set included:

✓ pre- and post-writing assignments produced by 112 undergraduate students;

✓ diagnostic survey responses identifying students' initial academic writing difficulties and digital literacy levels;

✓ classroom observation logs documenting students' interaction with the digital assistant;

✓ semi-structured interview transcripts from 12 instructors specializing in language pedagogy and educational technology;

✓ automatically generated feedback from the digital assistant (text corrections, structure suggestions, coherence indicators, and error visualizations).

AI-powered tools used in the study included functions for automated text evaluation, natural language processing, coherence checking, and intelligent text recognition.

Research Design

A mixed-methods approach (quantitative + qualitative) was used to comprehensively evaluate the pedagogical impact of integrating a digital assistant into academic writing instruction. This design provided a holistic understanding of learning outcomes and user experiences.

Participants

The sample included 112 students from three universities in Kazakhstan and 12 instructors. Students represented diverse academic backgrounds and different levels of digital and writing proficiency.

Data Collection Procedures

Data were collected using four complementary instruments:

1. Diagnostic survey to identify baseline writing challenges;
2. Pre- and post-writing tasks assessed using an analytic rubric (structure, coherence, argumentation, linguistic accuracy);
3. Non-participant classroom observations during writing sessions using the digital assistant;
4. Semi-structured interviews with instructors to determine benefits, challenges, and pedagogical implications.

Procedure for Integrating the Digital Assistant

The implementation process followed four structured stages:

1. Diagnostic Stage – identifying students' initial weaknesses and attitudes toward AI tools;
2. Training Stage – conducting workshops for ethical and effective AI use;
3. Writing Stage – using the digital assistant during all phases of writing: brainstorming, drafting, revising, editing;
4. Reflection and Evaluation Stage – rubric-based assessment, comparison of drafts, and student self-reflection.

Data Analysis Methods

- Quantitative analysis**:** descriptive statistics and paired t-tests were used to measure improvements in writing quality.
- Qualitative analysis: thematic coding of interview transcripts, reflections, and observation notes.

Triangulation was applied to strengthen validity by comparing evidence from multiple data sources.

Result and discussion

In addition, adapting to the interface and functionality of a digital assistant requires time and appropriate teacher training. Technical constraints–such as the need for regular system updates, configuration of language models, and a stable Internet connection–may also affect the continuity of work. Nevertheless, when the digital assistant is integrated into the educational process in a pedagogically meaningful way, these limitations do not diminish its potential. On the contrary, they highlight the importance of a methodologically grounded implementation strategy and the careful selection of tools that genuinely contribute to the formation of students' academic writing competence.

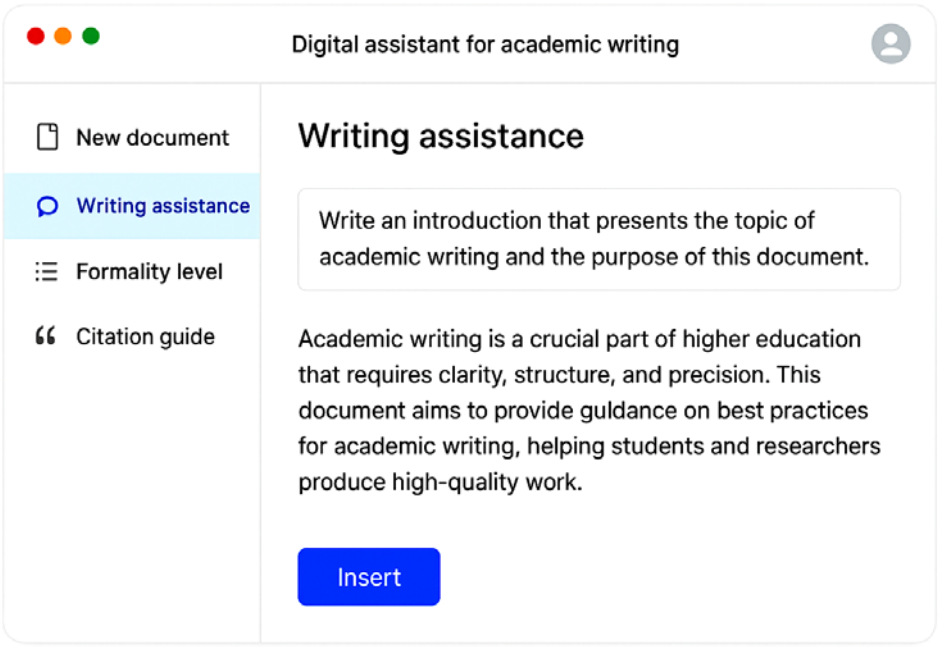

Figure 2 – Interfaceof a digital assistant for academic writing

One of the key reasons why the potential of digital assistants in developing academic writing competence is not yet fully realized lies in the limited capabilities of existing authoring and educational design tools. Most available systems lack intelligent interfaces capable of recognizing handwriting, semantic text patterns, or academic discourse elements. Although modern technologies support the recognition of symbols, words, and semantic structures (Optical Character Recognition, Intelligent Text Understanding), their integration into educational platforms is still at an early stage.

Particularly relevant is the need for intelligent analysis of students' written responses–an automated function that can determine the logic of argumentation, academic structure (introduction, argumentation, conclusion), and the degree of originality. However, popular authoring tools such as Adobe Captivate, Articulate Storyline, and iSpring do not currently support natural language processing (NLP) or provide adaptive real-time feedback. A similar situation occurs with voice interfaces: despite their potential to support text formulation, reading, and editing, their functionality remains limited due to dependency on operating systems and external speech-recognition services.

Existing attempts to apply Intelligent Character Recognition (ICR) in educational environments demonstrate promising results, but are still experimental and cover only a narrow range of characters. Most systems do not support multilingual input or semantic analysis of complex academic texts. Future development of ICR technologies should enable recognition of diverse writing systems and academic structures, which is especially important for handling terminology, citations, and argumentation patterns in student writing.

Some standalone software solutions–such as MyScript, PenReader, Windows Ink, and built-in handwriting tools in educational platforms–already provide basic handwriting recognition. However, these tools remain dependent on specific operating environments and lack integration with semantic analysis mechanisms.

To enhance the pedagogical value of digital assistants in developing academic writing competence, it is necessary to integrate intelligent functions capable of recognizing both handwritten and typed input. Such functions would enable the creation of interactive writing areas, facilitate analysis of handwritten drafts, and provide immediate, context-sensitive feedback during the process of composing essays, abstracts, and research papers.

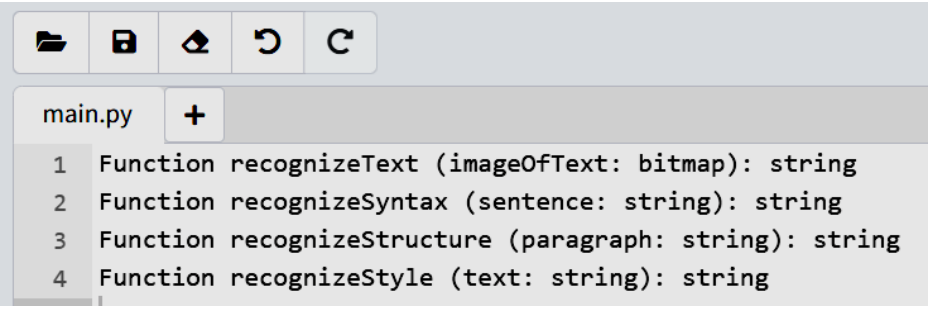

Figure 3 – Code fragmentillustratingthescructure of text analysis functions

Conclusion. The digital assistant opens up new pedagogical opportunities to support the development of students' academic writing competence. However, it is important to understand that the innovativeness of such tools is manifested not only in their technological effectiveness, but also in their ability to transform the writing process into an interactive, meaningful and reflective activity.

The most significant advantages of a digital assistant are the ability to:

• perform recognition of text, syntax and structure of utterances,
• Provide instant and adaptive feedback,
• stimulate students' self-regulation and self-esteem,
• Increase motivation for academic writing through personalized interaction.

Thus, the digital assistant combines the functional advantages of artificial intelligence and the pedagogical goals of the formation of a written culture. It not only complements traditional forms of writing instruction, but also forms new mechanisms of cognitive and metacognitive development. Further research should be aimed at developing intelligent algorithms for analyzing written texts and integrating the assistant into adaptive educational environments that provide individual support to students at all stages of academic writing formation.

Although modern digital assistants have extensive didactic capabilities and built-in text analysis functions, most educational platforms and educational content development tools do not yet allow them to fully exploit their potential. Many systems lack specialized modules and interfaces for recognizing academic text structure, argumentation, style, and logical connections. As a result, teachers and developers of educational resources are limited in creating interactive tasks aimed at developing students' written reflection and critical thinking. The development and integration of intelligent natural language processing tools into authoring environments will allow the creation of specialized digital assistants capable of supporting students at all stages of writing an academic text – from idea generation to editing and self-verification.

REFERENCES:

1 **Sharshova R., Salkhanova Z., Yelubayeva P., Maral A., Sholakhova A., Kaliaskarova A. The Use of AI Writing Tools in Second Language Learning to Enhance Kazakh IT Students' Academic Writing Skills.** *In Forum for Linguistic Studies*, 2025, vol. 7, no. 8, pp. 251-267. https://doi.org/10.30564/fls.v7i8.10408.

2 **Perkins M. Academic Integrity considerations of AI Large Language Models in the post-pandemic era: ChatGPT and beyond.** *Journal of University Teaching and Learning Practice*, 2023, vol. 20(2). https://doi.org/10.53761/1.20.02.07.

3 **Brodahl C., Hansen N.K. Education students' use of collaborative writing tools in collectively reflective essay papers.** *Journal of Information Technology Education: Research*, 2014, vol. 13, pp. 91-120.

4 **Berk E.H., Aydin S. The Impact of Artificial Intelligence-Powered Writing Assistance Systems on Metacognitive Writing Strategies. In Transformations in Digital Learning and Educational Technologies.** *GI Global Scientific Publishing*, 2025, pp. 241-274. https://doi.org/10.4018/979-8-3373-3678-7.ch011.

5 **Karimova G.S., Ishanov P.Z., Anesova A.Zh. Cifrlyk oku kontentteri negizinde bastauysh synyp okushylarynyn shetel tildik kommunikativtik kuzyrettiligin kalyptastyru** [Formation of foreign language communicative competence of Primary School students based on digital educational content]. *Bulletin of the Karaganda University Pedagogy series*, 2023, vol. 110(2), pp. 165-176. https://doi.org/10.31489/2023ped2/165-176 (In Kazakh)

6 **Liu C.C., Liu S.J., Hwang G.J., Tu Y.F., Wang Y., Wang N. Engaging EFL students' critical thinking tendency and in-depth reflection in technology-based writing contexts: A peer assessment-incorporated automatic evaluation approach.** *Education and Information Technologies*, 2023, vol. 28(10), pp. 13027-13052. https://doi.org/10.1007/s10639-023-11697-6.

7 **Arroyo González R., de la Hoz Ruiz J., Fernandez Lancho E. Technologies for learning writing in L1 and L2 for the 21st century: Effects on writing metacognition, self-efficacy, and argumentative structuring.** *Journal of Information Technology Education: Research*, 2021, vol. 20, pp. 87-116. https://doi.org/10.28945/4705.

8 **Hu Y., Curdt-Christiansen X.L., Wang J. Smart tools, smarter minds? Learner-AI interaction and AI assistance on critical thinking in EAP contexts.** *Journal of English for Academic Purposes*, 2025, vol. *78*, art. 101586. https://doi.org/10.1016/j.jeap.2025.101586.

9 **Strobl C., Ailhaud E., Benetos K., et al. Digital support for academic writing: A review of technologies and pedagogies.** *Computers & Education*, 2019, vol. 131, pp. 33-48. https://doi.org/10.1016/j.compedu.2018.12.005.

10 **Nazari N., Shabbir M.S., Setiawan R. Application of artificial intelligence powered digital writing assistant in higher education: randomized controlled trial.** *Heliyon*, 2021, vol. 7(5), art. 5e07014. https://doi.org/10.1016/j.heliyon.2021.e07014.

Information about the authors:

Abildinova Gulmira Maratovna – Candidate of Pedagogical Sciences, Associate Professor of the Department of computer science, L.N Gumilyov Eurasian National University, Republic of Kazakhstan, 010005, Astana, 11 Pushkin Str., tel.: +77753340708, e-mail: gulmira_2181@mail.ru.*

Kultenova Makhabbat Tulegenovna – PhD student, "8D01511 Computer Science" educational program, Department of computer science, L.N. Gumilyov Eurasian National University, Republic of Kazakhstan, 010005, Astana, 11 Pushkin Str., tel.: +77085521100, e-mail: maxabbat.k@mail.ru.

Абильдинова Гульмира Маратовна – педагогика ғылымдарының кандидаты, информатика кафедрасының қауымдастырылған профессоры, Л.Н.Гумилев атындағы Еуразия ұлттық университеті, Қазақстан Республикасы, 010005 Астана қ., Пушкин көш. 11, тел.: +77753340708, e-mail: gulmira_2181@mail.ru.*

Культенова Махаббат Тулегеновна – информатика кафедрасының «8D01511 Информатика» ББББ PhD докторанты, Л.Н. Гумилев атындағы Еуразия ұлттық университеті, Қазақстан Республикасы, 010005 Астана қ., Пушкин көш. 11, тел.: +77085521100, e-mail: maxabbat.k@mail.ru.

Абильдинова Гульмира Маратовна – кандидат педагогических наук, ассоциированный профессор кафедры информатики, Евразийский национальный университет им. Л.Н. Гумилева, Республика Казахстан, 010005 г. Астана, ул. Пушкина 11, тел.: +77753340708, e-mail: gulmira_2181@ mail.ru.*

Культенова Махаббат Тулегеновна – PhD докторант, ОП «8D01511 – Информатика» кафедра информатики, Евразийский национальный университет им. Л.Н. Гумилева, Республика Казахстан, 010005 г. Астана, ул. Пушкина 11, тел.: +77085521100, e-mail: maxabbat.k@mail.ru.

МРНТИ 14.35.01
УДК 378.14.015.62
https://doi.org/10.52269/NTDG254224

СИСТЕМНЫЙ ПОДХОД В ФОРМИРОВАНИИ ЭКОЛОГИЧЕСКИХ КОМПЕТЕНЦИЙ ОБУЧАЮЩИХСЯ

Абильтаева А.А. – докторант, Евразийский национальный университет имени Л.Н. Гумилева, сеньор-лектор Департамента спортивного образования и коучинга, Академия физической культуры и массового спорта, г. Астана, Республика Казахстан.*

Длимбетова Г.К. – доктор педагогических наук, профессор кафедры педагогики, Евразийский национальный университет имени Л.Н. Гумилева, г. Астана, Республика Казахстан.

Петров Б.С. – докторант, Евразийский национальный университет имени Л.Н. Гумилева, сеньор-лектор Школы креативных индустрий, Astana IT University, г. Астана, Республика Казахстан.

В статье рассматривается процесс формирования экологических компетенций студентов на основе системного подхода. Особо подчеркивается важность применения системного подхода, который обеспечивает целостность восприятия экологических знаний и их интеграцию в образовательный процесс. Основное внимание уделяется разработке модели формирования экологических компетенций, которая включает когнитивный, эмоциональный и поведенческий уровни. Представленная модель демонстрирует процесс восприятия информации на экологическую тематику, эмоциональную обработку, мотивацию к действиям, а также закрепление экологического навыка. В целях оценки представленной модели было проведено анкетирование среди обучающих-