

DEVELOPING STUDENT INTEREST IN GEOGRAPHY LESSONS THROUGH ARTIFICIAL INTELLIGENCE

D.B. Kasainova*, Zh.T. Mukayev, A.M. Nurpeysova

Shakarim University, Semey, Kazakhstan

*e-mail: danara19-91@mail.ru

Abstract: *The rapid development of digital technologies in modern education requires the modernization of teaching methods and instructional tools. In particular, the integration of artificial intelligence (AI) into the educational process opens new opportunities for increasing students' cognitive activity, motivation, and learning effectiveness. This article examines the impact of using artificial intelligence technologies in geography lessons on the cognitive interest and academic performance of 9th grade students.*

The study was conducted on the basis of a general secondary school in Semey, Kazakhstan, and involved 61 students aged 14-15 years from experimental and control groups. Pedagogical diagnostics, questionnaires, the method "Study of Cognitive Interest Characteristics" by V.S. Yurkevich, and quantitative and comparative analysis methods were applied. At the initial stage, the results indicated approximately equal levels of cognitive interest in both groups, demonstrating an overall insufficient level of learning motivation.

During the experimental stage, geography lessons integrating AI-based tasks were implemented on the topics "Atmosphere" and "Climate of Kazakhstan." The results of the final assessment showed a significant improvement in learning outcomes and cognitive interest in the experimental groups compared to the control group. The findings confirm that the systematic use of artificial intelligence in geography lessons is an effective pedagogical tool that enhances students' learning activity, analytical thinking, and engagement in the educational process.

Key words: *artificial intelligence, geography education, cognitive interest, learning motivation, digital technologies, secondary school students.*

INTRODUCTION

The rapid development of digitalization in the modern education system requires the modernization of teaching methods and technologies. In particular, the introduction of artificial intelligence (AI) tools into pedagogical practice opens up new opportunities for increasing the efficiency of the learning process.

AI technologies allow students to develop cognitive interest, increase learning motivation, and complete tasks individually [1].

In this regard, one of the important and relevant issues is the study of ways to effectively use artificial intelligence in teaching geography at school.

Due to the age characteristics of 9th grade students, their professional orientation, interest in the subject, and cognitive activity are intensively formed. Therefore, studying the impact of the systematic introduction of ICT tools in geography lessons on their learning activity is valuable for pedagogical practice [2].

This article presents the results of an experimental study aimed at determining the impact of the use of AI on the cognitive interest and level of knowledge acquisition of 9th grade students.

Objective: To determine the impact of using artificial intelligence technologies in geography lessons on the cognitive interest and effectiveness of learning activities of 9th grade students.

In accordance with the goal, the following tasks were identified: determining the initial level of cognitive interest of 9th grade students; diagnosing students' skills in using artificial intelligence and the level of mastery of AI; developing a system of geography lessons based on artificial intelligence and introducing it into the educational process.

Research methods. The study employed pedagogical diagnostics, the method «*Study of Cognitive Interest Characteristics*» (V.S. Yurkevich), a questionnaire survey, quantitative analysis, and comparative analysis to assess students' cognitive interest and learning outcomes.

MAIN PART

The following methods were used in the study:

Pedagogical diagnostics; "Study of cognitive interest characteristics" method (V.S. Yurkevich); questionnaire; quantitative analysis; comparative analysis.[3]

The research base is the Semey city education department's «№ 35 GENERAL SECONDARY EDUCATION SCHOOL MUNICIPAL STATE INSTITUTION». 61 students participated in the experiment. Age range: 14-15 years. Students from grades 9 «A», 9 «A» and 9 «B» participated in the study. 19 students (7 girls, 12 boys) in grade 9 «A» (experimental group). 21 students (12 girls, 9 boys) in grade 9 «A» (experimental group). 21 students (6 girls, 15 boys) in grade 9 «B» (control group).

Experimental work was carried out in November 2025.

To determine the level of cognitive interest, the method «Study of cognitive interest characteristics» (V.S. Yurkevich) was used [4].

Procedure: The student is given a questionnaire in which he must choose one of three answers. A standardized questionnaire contains five questions. Interpretation of the results: It is necessary to determine which of the answers «A», «B» or «C» is dominant.

A predominance of «A» answers indicates strong cognitive interest.

A predominance of «B» answers indicates moderate cognitive interest.

A predominance of «C» answers indicates weak cognitive interest.

Interpretation of results.

25-20 points – strong cognitive interest.

20-10 points – moderate cognitive interest.

10 points or less – weak cognitive interest [5].

The data obtained from assessing the level of cognitive interest of 9th grade students were presented at the stage of the experiment in the control and experimental groups using the method "Study of cognitive interest characteristics" (V.S. Yurkevich).

A comparison of the control and experimental groups of students based on the results of assessing the intensity of cognitive interest during the discovery phase is presented in Table 1. As shown in Table 1, the initial levels of cognitive interest in the experimental and control groups were approximately the same.

Table 1 – Levels of cognitive interest of students in experimental and control groups

Groups	Level		
	Strong	Medium	Weak
Experimental Group 1	8 people(42%)	6 people (32%)	5 people (26)
Experimental Group 2	11 people(52%)	5 people(24%)	5 people(24%)
Control Group	7 people(33%)	6 people(29%)	8 people(38%)

For clarity, the results of the «Study of Cognitive Interest Characteristics» method (V.S. Yurkevich) are presented in the following graph: Figure 1 illustrates the distribution of cognitive interest levels among the studied groups.

As shoup own in Table 1 and Figure 1, cognitive interest is strongly expressed in 42% of children in Experimental Group I, 52% in Experimental Group II, and 33% in the control group. For these students, this stage of cognitive interest is mostly related to their career choice.

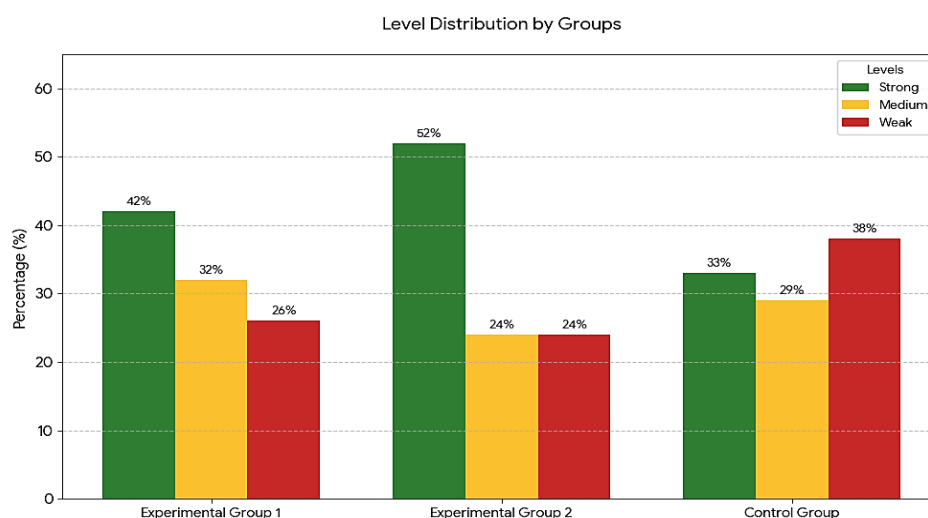


Figure 1 – Levels of cognitive interest according to the V.S. Yurkevich method

Cognitive interest was manifested at an average level in 32% of children in Experimental Group I, 24% in Experimental Group II, and 29% in the control group. These children showed equal interest in all subjects studied at school, but were unable to demonstrate good results in these subjects.

Cognitive interest was weakly expressed in 26% of children in Experimental Group I, 24% in Experimental GrII, and 38% in the control group.

Thus, the control and experimental groups demonstrated approximately the same levels of cognitive interest and cognitive activity. These research data indicate an insufficient level of students' cognitive activity and cognitive interest.

The results of determining the level of cognitive interest required further investigation of additional factors influencing students' activity in the learning process. Among these factors, the development of skills related to the use of artificial intelligence – which plays an important role in the modern educational space – is of particular importance.

For this reason, at the next stage of the study, a survey was conducted to determine students' level of proficiency in artificial intelligence. A total of 61 students participated in the survey, which consisted of 4 questions. This diagnostic work made it possible to identify how frequently and for what purposes students use AI tools, as well as to analyze their relationship with indicators of cognitive interest.

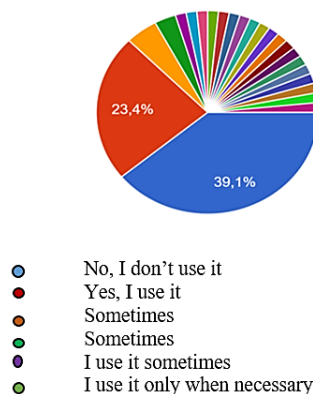
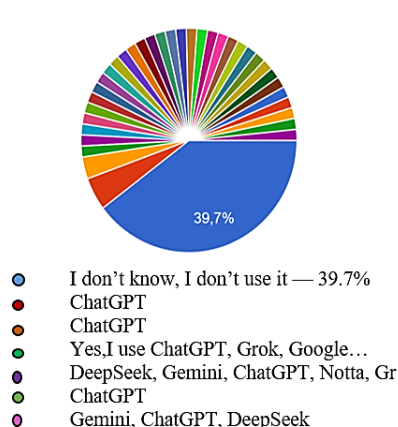
The results of Diagram № 1 show that the level of students' use of artificial intelligence tools is not uniform. 39.7% of respondents indicated that they do not use AI at all, while the remaining portion noted that they frequently use certain types of AI tools. This demonstrates that a significant number of students actively integrate AI technologies into their learning process or daily life.

These findings also indicate that students' understanding of AI varies: some do not know the exact names of AI tools, yet they still use various services in practice. In addition, it is observed that widely known services-chatbots, text generators, and support platforms-are commonly used.

Diagram No. 2 illustrates the frequency with which students use artificial intelligence in their learning activities. According to the results, 39.1% of respondents stated that they do not use AI, while 23.4% reported using it "sometimes," and the remaining students indicated that they use it frequently. This suggests that nearly half of the students regularly use artificial intelligence for educational purposes.

At the same time, several students noted that they use AI "rarely" or "never." Possible reasons for this may include a lack of skills in using AI tools, limited technical access, or personal preference.

Overall, the results of the diagram show that AI is becoming established as a supportive tool in the learning process, particularly in tasks such as explaining theoretical material, writing texts, visualizing information, and making comparisons.



After identifying the levels of cognitive interest and the extent of AI usage, the experimental stage of the study was organized. The main objective of this stage was to enhance teaching effectiveness in the experimental groups by introducing AI-based learning materials, tasks, and methodological approaches [6].

A preliminary assessment of baseline knowledge was conducted in both the control and experimental groups. The diagnostic work covered the “Atmosphere” unit of the geography curriculum and aimed to evaluate students’ theoretical knowledge, analytical skills, and map-reading abilities.

The results showed that the initial knowledge levels of the two experimental groups were similar: the first experimental group demonstrated 53%, the second experimental group 59%, while the control group showed a learning quality level of 52%.

In the experimental groups, lessons integrating AI tools were conducted during the second term on the topic “Atmosphere. Climate of Kazakhstan.” During the lessons, the following methods were used: visualization of theoretical material, modeling of geographical objects, and the creation of stimulating tasks. Test questions, matching exercises, cartographic dictations, and problem-based questions were automatically generated using AI (3). The aims of the lessons were to develop students’ logical and creative thinking, enhance their creative and intellectual abilities, and foster positive motivation and a conscious attitude toward learning. Below are examples of such lessons (Table 2).

Table 2 – Lesson Plan № 1 «Climate-forming factors»

Lesson topic	Climate-forming factors
Learning objective according to the curriculum:	9.3.2.1 Analyzes the factors that form the climate of Kazakhstan.
Lesson objective:	Students identify the factors that form the climate; analyze the types of solar radiation and the climate-forming factors.
Values education:	Unity and cooperation Ability to work in a team Kindness and empathy towards others Fairness and responsibility Understanding the importance and necessity of completing tasks that matter to others Completing the work they have started

During the lesson, AI-based group tasks were prepared for three groups.

Group 1: Using *ChatGPT*, determine the impact of solar radiation on climate. Compare the total solar radiation levels of the cities of Petropavl and Shymkent, as well as Oral and Oskemen, and record the results in a table. Group 2: Study the influence of atmospheric circulation by searching for information using AI and verifying the data with the textbook. Group 3: Using AI, analyze the impact of relief on climate and evaluate how the flat terrain in western and northern Kazakhstan affects climate formation. The students completed each task with the help of artificial intelligence and wrote down the obtained information in their notebooks, comparing it with the textbook data.

The AI-based group tasks increased the effectiveness of the lesson and strengthened students' analytical thinking skills. They gained a deeper understanding of complex geographical processes and developed the ability to use AI as an educational tool. In particular, the following skills showed clear improvement:

- identifying cause-effect relationships,
- visualizing information,
- formulating conclusions in scientific language.

This lesson format enhanced students' interest and helped connect the geography subject with real life and modern technology (Table 3) [7].

Table 3 – Lesson Plan № 2 Climate conditions of Kazakhstan

Lesson topic:	Climate conditions of Kazakhstan
Learning objective according to the curriculum:	9.3.2.2 Analyzes the climate conditions of Kazakhstan.
Lesson objectives:	All students: determine the climate conditions of Kazakhstan; analyze climate diagrams and infographics using artificial intelligence. Most students: understand the patterns of temperature and precipitation distribution across the territory of Kazakhstan. Some students: analyze the climate conditions of Kazakhstan in depth.
Values education according to the «Adal Azamat» (Honest Citizen) programme:	Developing the values of research skills and responsibility.

During the lesson, students completed AI-based analysis tasks such as «Compare the climates of Petropavl and Shymkent using ChatGPT and fill in the table» and «Make the climate map speak». Each group described the climate of its own region (north, south, west, east) and analyzed its impact on economic activities. Students created posters or mini-presentations and carried out analysis using AI-generated images, posters, infographics, and presentations.

Integrating artificial intelligence into the learning process in this lesson was aimed at improving students' skills in working with climate data, developing their spatial thinking, and forming the ability to analyze information scientifically. The structure of the lesson was effectively organized according to differentiated objectives based on students' levels [8].

CONCLUSION

The results of the experimental work showed that the systematic integration of artificial intelligence tools into geography lessons has a significantly positive impact on teaching effectiveness. The AI-based lessons conducted on the topics «Atmosphere» and «Climate of Kazakhstan» not only increased students' learning activity but also contributed to the development of their abilities to analyze, compare, model, and draw conclusions.

During the experimental stage, new teaching formats and AI-based tasks were actively used in both the first and second experimental groups. This increased students' interest in the subject and

made the learning material more accessible and understandable. Interactive tasks, «making climate maps speak», analyzing data using AI, and working with diagrams, infographics, and tables made students' learning activities more dynamic [9].

At the end of the experiment, a final test was conducted in both the control and experimental groups. The test tasks corresponded to the content of the previously studied topics, which allowed for an accurate comparison of changes in learning outcomes.

A brief description of the results:

- Experimental Group I – demonstrated a learning quality of 58% (initially 53%)
- Experimental Group II – demonstrated a learning quality of 67% (initially 59%)
- Control Group – demonstrated a learning quality of 55% (initially 52%)

These indicators clearly prove that the lessons involving artificial intelligence had a direct positive impact on learning outcomes. The average improvement in learning quality in the experimental groups was 6.5%, while in the control group it was only 3%.

Since working with AI represents a new and modern format, it significantly increased students' interest. They became more active in completing tasks and were motivated to independently search for additional information. In the experimental groups, students' skills in identifying cause–effect relationships, comparing information, visualizing data, and conducting scientific analysis noticeably improved.

Interpreting climate diagrams and infographics using AI tools helped students understand complex material more easily. Students participated in the lessons with great enthusiasm and showed particular interest in comparing AI-generated data with information from the textbook. AI-based lessons made students' learning more interactive, independent, and research-oriented, contributing to the development of 21st-century skills [10].

Therefore, the systematic use of artificial intelligence in geography lessons is an effective pedagogical tool that fully meets the requirements of modern education.

References

1. Andreeva YU.V. Aktivizatsiya poznavatel'noj deyatelnosti obuchayushchih'sya na urokah geografii / YU.V. Andreeva // *Metody, priemy, formy obucheniya, pozvolyayushchie povysit' effektivnost' usvoeniya geograficheskikh znaniy onnyj.* – 2018. <https://nsportal.ru/shkola/geografiya/library/2013/05/05/aktivizatsiya-poznavatelnoy-deyatelnosti-obuchayushchikhsya-na>. (In Russian).
2. Artificial Intelligence in Geography Teaching: Potentialities, Applications, and Challenges / Cennet Şanlı // *International Journal of Current Educational Studies.* – 2025. – Vol. 4, № 1. – P. 47-76. <https://doi.org/10.46328/ijces.170>.
3. Artificial intelligence in geographical education of Kazakhstan and Uzbekistan: Revolution of knowledge and approaches / A. Nurgazina et al // *International Journal of Innovative Research and Scientific Studies.* – 2025. – № 8(2). – P. 1797-1811. <https://doi.org/10.53894/ijirss.v8i2.5546>.
4. On Education and Geographers: The Role of Cognitive Developmental Theory in Geographic Education / Roger M. Downs et al // *Annals of the Association of American Geographers.* – 2010. – Vol. 78. – P. 680-700. <https://doi.org/10.1111/j.1467-8306.1988.tb00238.x>.
5. Urkevich Y. Razvitie poznavatel'noj potrebnosti u shkol'nikov v processe obucheniya, Moskva. <https://psychlib.ru/mgppu/periodica/SZP022013/SZP-0871.htm?ysclid=mmukaimw8k843885943>. (In Russian).
6. Kotlyarova I.O. Tekhnologii iskusstvennogo intellekta v obrazovanii / I.O. Kotlyarova // *Vestnik Yuzhno-Ural'skogo gosudarstvennogo universiteta. Seriya: Obrazovaniye. Pedagogicheskiye nauki.* – 2022. – № 3. – P. 24-27. <http://dx.doi.org/10.14529/ped220307>. (In Russian).
7. Serdyuchenko M.V. Primenenie iskusstvennogo intellekta v obrazovanii: reshenie i zadachi personalizatsii obucheniya / M.V. Serdyuchenko // *Vestnik nauki.* – 2026. – № 2(95). – Vol. 1. <https://www.вестник-науки.пф/article/28702>. (In Russian).

8. Aytkozshina S.K. Iskusstvennyy intellekt i tsifrovyye tekhnologii: innovatsionnyye podkhody v obuchenii geografii Vostochnogo Kazakhstana / S.K. Aytkozshina // Bulletin of the Karaganda University. Pedagogy series. – 2025. – Vol. 30, № 3(119). – P. 50-59. <https://doi.org/10.31489/2025ped3/50-59>. (In Russian).
9. Roger M. Downs. The Development of Expertise in Geography: A Cognitive-Developmental Approach to Geographic Education / Roger M. Downs, Lynn S. Liben // Annals of the Association of American Geographers. – 2010. – P. 304-327. <https://doi.org/10.1111/j.1467-8306.1991.tb01692.x>.
10. Mansurov T.T. Klyuchevye trebovaniya k tsifrovoy obrazovatelnoy srede bazovoy organizatsii sng / T.T. Mansurov, O.V. Meretskov // Competence. Russia. – 2023. – № 9(25). <https://doi.org/10.24412/1993-8780-2023-9-05-10>. (In Russian).

ГЕОГРАФИЯ САБАҚТАРЫНДА ОҚУШЫЛАРДЫҢ ҚЫЗЫҒУШЫЛЫҚТАРЫН ЖАСАНДЫ ИНТЕЛЛЕКТ ҚОЛДАНУ АРҚЫЛЫ ДАМУЫ

Д.Б. Касаннова*, Ж.Т. Мукаев, А.М. Нурпейсова

Шәкәрім университеті, Семей қ., Қазақстан

*e-mail: danara19-91@mail.ru

Аңдатпа: Қазіргі білім беру жүйесінде цифрлық технологиялардың қарқынды дамуы оқыту әдістері мен дидактикалық құралдарды жаңғыртуды талап етеді. Әсіресе жасанды интеллектіні (ЖИ) білім беру үдерісіне енгізу оқушылардың танымдық белсенділігін, оқу мотивациясын және білім алу тиімділігін арттыруға жаңа мүмкіндіктер ашады. Бұл мақалада география сабақтарында жасанды интеллект технологияларын қолданудың 9-сынып оқушыларының танымдық қызығушылығы мен оқу үлгеріміне әсері қарастырылады.

Зерттеу Қазақстан Республикасы, Семей қаласындағы жалпы орта білім беретін мектеп базасында жүргізіліп, оған 14-15 жастағы 61 оқушыдан тұратын эксперименттік және бақылау топтары қатысты. Зерттеу барысында педагогикалық диагностика, сауалнама, В.С. Юркевичтің «Танымдық қызығушылықтың ерекшеліктерін зерттеу» әдістемесі, сондай-ақ сандық және салыстырмалы талдау әдістері қолданылды. Эксперименттің бастапқы кезеңінде алынған нәтижелер екі топта да танымдық қызығушылық деңгейінің шамалас екенін көрсетіп, жалпы оқу мотивациясының жеткіліксіз деңгейін анықтады.

Эксперименттік кезеңде «Атмосфера» және «Қазақстанның климаты» тақырыптары бойынша жасанды интеллектке негізделген тапсырмалар енгізілген география сабақтары өткізілді. Қорытынды бағалау нәтижелері эксперименттік топтардағы оқушылардың оқу жетістіктері мен танымдық қызығушылығының бақылау тобымен салыстырғанда едәуір артқанын көрсетті. Зерттеу нәтижелері география сабақтарында жасанды интеллектіні жүйелі қолдану оқушылардың оқу белсенділігін, аналитикалық ойлауын және білім беру үдерісіне қатысу деңгейін арттыратын тиімді педагогикалық құрал екенін дәлелдейді.

Түйін сөздер: танымдық белсенділік, география, интерактивті әдістер, жасанды интеллект құралдары, пәнге деген қызығушылық, цифрлық сауаттылық.

РАЗВИТИЕ ИНТЕРЕСА УЧАЩИХСЯ К УРОКАМ ГЕОГРАФИИ С ИСПОЛЬЗОВАНИЕМ ИСКУССТВЕННОГО ИНТЕЛЛЕКТА

Д.Б. Касаннова*, Ж.Т. Мукаев, А.М. Нурпейсова

Шәкәрім университет, г. Семей, Республика Казахстан

*e-mail: danara19-91@mail.ru

Аннотация: Быстрое развитие цифровых технологий в современном образовании требует модернизации методов обучения и учебно-методических средств. В частности, интеграция искусственного интеллекта (ИИ) в образовательный процесс открывает новые возможности для повышения познавательной активности, мотивации и эффективности обучения учащихся. В статье рассматривается влияние использования технологий искусственного интеллекта на уроках географии на познавательный интерес и учебную успеваемость учащихся 9-х классов.

Исследование проводилось на базе общеобразовательной школы города Семей (Казахстан) и охватило 61 учащегося в возрасте 14-15 лет, разделённых на экспериментальные и контрольную группы. В ходе исследования применялись педагогическая диагностика, анкетирование, методика В.С. Юркевича «Изучение характеристик познавательного интереса», а также методы количественного и сравнительного анализа. На начальном этапе результаты показали примерно одинаковый уровень познавательного интереса в обеих группах, что свидетельствовало о в целом недостаточном уровне учебной мотивации.

На экспериментальном этапе были проведены уроки географии с интеграцией заданий на основе искусственного интеллекта по темам «Атмосфера» и «Климат Казахстана». Результаты итогового оценивания продемонстрировали значительное улучшение учебных достижений и уровня познавательного интереса учащихся экспериментальных групп по сравнению с контрольной группой. Полученные данные подтверждают, что систематическое использование искусственного интеллекта на уроках географии является эффективным педагогическим инструментом, способствующим повышению учебной активности, развитию аналитического мышления и вовлечённости учащихся в образовательный процесс.

Ключевые слова: познавательная активность, география, интерактивные методы, инструменты искусственного интеллекта, интерес к предмету, цифровая грамотность.

Авторлар туралы мәлімет

Данара Бекболатовна Касаннова* – «7М01506 – География» білім беру бағдарламасының ІІ курс магистранты, Шәкәрім университеті, Семей қ., Қазақстан; e-mail: danara19-91@mail.ru. ORCID: <https://orcid.org/0009-0005-8025-4258>.

Жандос Төлеубекевич Мукаев – PhD, қауымдастырылған профессор, Шәкәрім университеті, Семей қ., Қазақстан; e-mail: zhandos.mukaev@mail.ru. ORCID: <https://orcid.org/0000-0003-0538-2645>.

Акерке Муратказиновна Нурпейсова – «Химия және биология» кафедрасының аға оқытушысы, Шәкәрім университеті, Семей қ., Қазақстан; e-mail: akerke_140285@mail.ru. ORCID: <https://orcid.org/0009-0004-7718-0668>.

Информация об авторах

Данара Бекболатовна Касаннова* – магистрант 2-го курса по образовательной программе «7М01506 – География», Шәкәрім университет, г. Семей, Казахстан; e-mail: danara19-91@mail.ru. ORCID: <https://orcid.org/0009-0005-8025-4258>.

Жандос Төлеубекевич Мукаев – PhD, ассоциированный профессор кафедры «Химия и биология», Шәкәрім университет, г. Семей, Казахстан; e-mail: zhandos.mukaev@mail.ru. ORCID: <https://orcid.org/0000-0003-0538-2645>.

Акерке Муратказиновна Нурпейсова – старший преподаватель кафедры «Химия и биология», Шәкәрім университет, г. Семей, Казахстан; e-mail: akerke_140285@mail.ru. ORCID: <https://orcid.org/0009-0004-7718-0668>.

Information about the authors

Danara Bekbolatovna Kasainova* – 2nd year master's student of the educational program «7M01506-Geography», Shakarim University, Semey city, Kazakhstan; e-mail: danara19-91@mail.ru. ORCID: <https://orcid.org/0009-0005-8025-4258>.

Zhandos Toleubekovich Mukaev – PhD, associate professor of the department of «Chemistry and Biology», Shakarim University, Semey city, Kazakhstan; e-mail: zhandos.mukaev@mail.ru. ORCID: <https://orcid.org/0000-0003-0538-2645>.

Akerke Muratkazinovna Nurpeisova – Senior lecturer of the department of «Chemistry and Biology», Shakarim University, Semey city, Kazakhstan; e-mail: akerke_140285@mail.ru. ORCID: <https://orcid.org/0009-0004-7718-0668>.

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КЕРІ ТРИГОНОМЕТРИЯЛЫҚ ТЕҢСІЗДІКТЕРДІ ШЕШУ ӘДІСТЕРІНІҢ ЕРЕКШЕЛІКТЕРІ

Г.Е. Берикханова*, Ж.Т. Ғафиз

Шәкәрім университеті, Семей қ., Қазақстан

*e-mail: gulnazezhenkan@gmail.com

***Аңдатпа:** Математиканы оқыту үдерісі шығару арқылы жүзеге асады, ал олардың ішінде зерттеу сипатындағы есептердің маңызы зор. Осындай күрделі әрі қызықты тапсырмалардың қатарына кері тригонометриялық функцияларды қамтитын теңсіздіктерді жатқызуға болады.*

Жоғары сынып оқушылары үшін кері тригонометриялық функциялармен байланысты есептер жиі қиындық туғызады. Тәжірибе көрсеткендей, оқушылар кері тригонометриялық функциялардың мәнін есептеу тапсырмаларын орындай алғанымен, дәл осы функцияларды қамтитын теңсіздіктерге келгенде көпшіліктерінде қиындық туындайды. Мұның негізгі себебі – мектеп бағдарламасында кері тригонометриялық функцияларды оқытуға бөлінген уақыттың жеткіліксіздігінде.

Логикалық тұрғыдан алғанда, көрсеткіштік функциялар үшін логарифмдер қаншалықты маңызды болса, тригонометриялық функциялар үшін кері тригонометриялық функциялар да соншалықты қажетті ұғым болып табылады. Бұл тақырыптағы есептер тригонометрияны толықтырып қана қоймай, оқушының математикалық ойлау икемділігін дамытуға үлкен септігін тигізеді. Кері тригонометриялық функциялармен жұмыс істеу оқушыға оқулық «шеңберінен шығып», шығармашылық зерттеу жұмысын бастауға және танымдық қабілеттіктерін арттыруға мүмкіндік береді.

Мектеп бағдарламасында кері тригонометриялық функцияларға қатысты есептер қарастырылғанымен, оқу-әдістемелік құралдарда бұл тақырыпқа тиісті деңгейде көңіл бөлінбеген. Көптеген оқулықтарда тіпті қарапайым теңдеулер мен теңсіздіктерді шешу әдістемесі де толыққанды баяндалмаған. Нәтижесінде, оқушылардың бұл тақырып бойынша білім нәтижелері төмен көрсеткіштікті көрсетуде.