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METHODS OF FORMATION OF SELF-REGULATION SKILLS IN YOUNGER SCHOOLCHILDREN THROUGH DIFFERENTIATED LEARNING

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The article is devoted to the study of methods for developing self-regulation skills in primary school students through differentiated learning. The relevance of this study arises from the need to develop children's ability to consciously regulate their learning activities, which is a key factor in achieving academic success, fostering independence, and adapting to the demands of the modern educational environment. Self-regulation contributes to effective time planning, overcoming learning difficulties and increasing motivation, which is especially important in primary school age. The paper presents theoretical and practical aspects of implementing a differentiated approach, with an emphasis on taking into account the individual characteristics of primary school students. Factors such as the level of cognitive activity, the pace of learning, educational motivation and emotional readiness to complete tasks are considered. Particular attention is paid to the introduction of pedagogical methods aimed at developing the skills of goal setting, self-control, reflection and self-assessment. The study was conducted using an integrated methodological approach, including observation, testing, questionnaires and experimental programs. It was found that the use of differentiated tasks, project activities and interactive methods significantly increases the learning motivation, involvement of schoolchildren and their academic performance. The experimental results demonstrate that the adaptation of the educational process to the individual characteristics of students allows not only to improve current educational results, but also to develop metacognitive abilities in children necessary for independent solution of complex problems. The practical significance of the study lies in the development of methodological recommendations for primary school teachers on the integration of differentiated learning methods aimed at the effective development of self-regulation skills. These recommendations will help create favorable conditions for increasing the motivation, involvement and independence of younger students, which contributes to their successful adaptation to further education.

Key words: self-regulation, differentiated learning, pedagogical strategies, individual approach, educational motivation, project activity, educational process, methodological recommendations.

ДИФФЕРЕНЦИАЛДЫ ОҚЫТУ АРҚЫЛЫ БАСТАУЫШ СЫНЫП ОҚУШЫЛАРЫНДА ӨЗІН-ӨЗІ РЕТТЕУ ДАҒДЫЛАРЫН ҚАЛЫПТАСТЫРУ ӘДІСТЕРІ

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Мақала бастауыш сынып оқушыларының өзін-өзі реттеу дағдыларын дифференциалды оқыту арқылы қалыптастыру әдістерін зерттеуге арналған. Зерттеудің өзектілігі балалардың оқу әрекетін саналы басқару қабілетін дамыту қажеттілігімен байланысты, бұл табысты білім алудың, дербестікті қалыптастырудың және заманауи білім беру ортасының талаптарына бейімделудің негізгі факторы болып табылады. Өзін-өзі реттеу уақытты тиімді жоспарлауға, оқу қиындықтарын жеңуге және мотивацияны арттыруға ықпал етеді, бұл бастауыш мектеп жасында ерекше маңызды. Жұмыста дифференциалды тәсілді жүзеге асырудың теориялық және практикалық аспектілері ұсынылған, бастауыш сынып оқушыларының жеке ерекшеліктерін ескеруге баса назар аударылған. Танымдық белсенділік деңгейі, оқу материалын меңгеру қарқыны, оқу мотивациясы және тапсырмаларды орындауға эмоционалдық дайындық сияқты факторлар қарастырылған. Мақсат қою, өзін-өзі бақылау, рефлексия және өзін-өзі бағалау дағдыларын дамытуға бағытталған педагогикалық әдістерді енгізуге ерекше мән берілген. Зерттеу кешенді әдіснамалық тәсілді қолдану арқылы жүргізілді, ол бақылау, тестілеу, сауалнама жүргізу және эксперименттік бағдарламаларды қамтыды. Дифференциалды тапсырмаларды, жобалық іс-әрекетті және интерактивті әдістерді қолдану оқу мотивациясын, оқушылардың оқу үдерісіне тартылуын және академиялық үлгерімін айтарлықтай арттыратыны анықталды. Эксперименттік нәтижелер оқу үдерісін оқушылардың жеке ерекшеліктеріне бейімдеу тек білім сапасын жақсартуға ғана емес, сонымен қатар балалардың күрделі мәселелерді өз бетінше шешуге қажетті метатанымдық қабілеттерін дамытуға ықпал ететінін көрсетті. Зерттеудің практикалық маңыздылығы бастауыш мектеп мұғалімдеріне дифференциалды оқыту әдістерін интеграциялау бойынша әдістемелік ұсыныстар әзірлеуде көрініс табады. Бұл ұсыныстар бастауыш сынып оқушыларының мотивациясын, оқу үдерісіне тартылуын және дербестігін арттыру үшін қолайлы жағдай жасауға көмектеседі, бұл олардың әрі қарай оқуға сәтті бейімделуіне ықпал етеді.

Түйінді сөздер: өзін-өзі реттеу, дифференциалды оқыту, педагогикалық стратегиялар, жеке тәсіл, оқу мотивациясы, жобалық қызмет, білім беру үдерісі, әдістемелік ұсыныстар.

МЕТОДЫ ФОРМИРОВАНИЯ НАВЫКОВ САМОРЕГУЛЯЦИИ У МЛАДШИХ ШКОЛЬНИКОВ ЧЕРЕЗ ДИФФЕРЕНЦИРОВАННОЕ ОБУЧЕНИЕ

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Статья посвящена исследованию методов формирования навыков саморегуляции у младших школьников через дифференцированное обучение. Актуальность исследования обусловлена необходимостью развития у детей способности к осознанному управлению учебной деятельностью, что является ключевым фактором успешного обучения, формирования самостоятельности и адаптации к требованиям современной образовательной среды. Саморегуляция способствует эффективному планированию времени, преодолению учебных трудностей и повышению мотивации, что особенно важно в младшем школьном возрасте. В работе представлены теоретические и практические аспекты реализации дифференцированного подхода, с акцентом на учёт индивидуальных особенностей младших школьников. Рассмотрены такие факторы, как уровень познавательной активности, темп усвоения материала, учебная мотивация и эмоциональная готовность к выполнению заданий. Особое внимание уделено внедрению педагогических методов, направленных на развитие навыков целеполагания, самоконтроля, рефлексии и самооценки. Исследование проводилось с использованием комплексного методологического подхода, включающего наблюдение, тестирование, анкетирование и экспериментальные программы. Выявлено, что применение дифференцированных заданий, проектной деятельности и интерактивных методов значительно повышает учебную мотивацию, вовлечённость школьников и их академическую успеваемость. Экспериментальные результаты демонстрируют, что адаптация учебного процесса к индивидуальным особенностям учащихся позволяет не только улучшить текущие образова-

тельные результаты, но и развить у детей метапознавательные способности, необходимые для самостоятельного решения сложных задач. Практическая значимость исследования заключается в разработке методических рекомендаций для педагогов начальной школы по интеграции методов дифференцированного обучения, направленных на эффективное развитие навыков саморегуляции. Эти рекомендации помогут создать благоприятные условия для повышения мотивации, вовлечённости и самостоятельности младших школьников, что способствует их успешной адаптации к дальнейшему обучению.

Ключевые слова: саморегуляция, дифференцированное обучение, педагогические стратегии, индивидуальный подход, учебная мотивация, проектная деятельность, образовательный процесс, методические рекомендации.

Introduction. The main conclusions. In recent decades, differentiated learning has become one of the key pedagogical approaches aimed at improving the quality of education by considering individual characteristics of students. It focuses on adapting teaching methods, materials, and learning tasks to meet the diverse needs of schoolchildren, thus ensuring more effective knowledge acquisition and skill development. Differentiated learning strategies are particularly relevant for fostering self-regulation skills in primary schoolchildren, as they help develop planning, self-monitoring, emotional regulation, and independent learning abilities.

Self-regulation plays a crucial role in academic success and personal development. It enables students to manage their learning processes, control their emotions, and overcome challenges, ultimately contributing to their motivation and engagement. Research in this field demonstrates that a personalized approach to education, including project-based learning, interactive teaching methods, and differentiated tasks, significantly enhances students' ability to self-regulate.

Furthermore, differentiated learning encourages the development of problem-solving skills, creativity, and autonomy. By providing students with choices in their learning paths, it fosters a sense of responsibility and ownership over their educational progress. However, the successful implementation of this approach requires well-structured methodologies, teacher training, and carefully designed instructional materials that align with students' cognitive, emotional, and social needs.

Relevance of the study. The relevance of this study for the theory and practice of primary school work in times of crisis and reorganization of educational systems, firstly, lies in the need for independent people who have their own view on problems. Secondly, in the organization of educational activities for the development of self-regulation, the formation of a certain motivation and personality traits.

In the modern educational landscape, the necessity of developing self-regulation skills among primary schoolchildren has become increasingly evident. With the rapid evolution of pedagogical technologies and teaching methodologies, education must not only impart knowledge but also equip students with essential skills for independent learning and adaptation to changing environments. Differentiated learning serves as a vital tool in this process, as it allows teachers to tailor instruction based on students' abilities, learning paces, and motivational factors.

The integration of differentiated learning into primary education is crucial for enhancing students' self-regulation capabilities. It helps in fostering self-directed learning, critical thinking, and emotional resilience, which are essential for lifelong learning and future academic success. Addressing the challenges of implementing differentiated learning requires an in-depth exploration of its effectiveness, potential limitations, and best practices.

Purpose of the study: To analyze the impact of differentiated learning on the development of self-regulation skills in primary schoolchildren, examining the effectiveness of various pedagogical methods and strategies.

Objectives of the study:

- To explore theoretical foundations of self-regulation and its role in the learning process.
- To analyze differentiated learning approaches and their influence on self-regulation skills.
- To assess the effectiveness of project-based learning, interactive methods, and adaptive tasks in fostering self-regulation.
- To evaluate academic performance and motivation levels among students exposed to differentiated learning methods.
- To develop methodological recommendations for teachers on integrating differentiated learning to enhance self-regulation skills.

From infancy, people instinctively turn toward new or loud sounds. Many other regulatory functions become automatic, but only after a period of intentional use. On the other hand, deliberate practice is required to learn how to regulate and coordinate balance and motor movements necessary for activities such as riding a bicycle. Typically, once a person masters a skill, it becomes automatic.

The process of transitioning from intentional to automatic regulation is called internalization. Some regulatory functions, such as greeting others appropriately or following a sequence to solve a math problem, always require intentional effort. It is not surprising that research has shown that young children who engage

in deliberate self-regulation learn more and make greater progress in their education. Children develop basic self-regulation skills within the first five years of life [1], which means that early childhood educators play a crucial role in helping young children regulate their thinking and behavior. Fortunately, teaching self-regulation does not require a separate curriculum. The most effective way teachers can help children learn self-regulation is by modeling and supporting it during everyday activities.

The foundation of effective social problem-solving is self-regulation, or the ability to manage emotions when interacting with others. It is easier to focus on one's own feelings, understand the emotions and perspectives of others, and work collaboratively on solutions when a child can self-regulate and remain calm. Children develop self-regulation skills over time, through practice and under adult guidance. Equally important is how adults model emotional regulation and co-regulation.

"Caregivers play a key role in the development of emotional regulation through co-regulation, or the processes by which they provide external support or guidance as children manage their emotional experiences" [2].

When adults model calm and self-regulated approaches to problem-solving, it teaches children how to handle challenges constructively. For example, a teacher might say, "I'm going to take a deep breath and calm down so I can think more clearly." This model helps children see and hear a strategy that supports self-regulation. Problem-solving skills help children resolve conflicts and interact with others as partners and collaborators. Developing problem-solving abilities enables children to learn empathy, advocate for their rights, and build resilience and competence to handle difficulties in their world.

Self-regulation involves several complex processes that allow children to respond appropriately to their environment [3]. In many ways, human self-regulation is similar to a thermostat. A thermostat detects and measures temperature and compares its reading to a set threshold [4]. When the reading exceeds the threshold, the thermostat turns the heating or cooling system on or off. Similarly, children must learn to evaluate what they see, hear, touch, taste, and smell, and compare this information with what they already know. They must then use self-regulation to communicate with various systems (such as motor or language systems) to select and execute an appropriate response.

Self-regulation is clearly not an isolated skill. Children must translate their experiences into information they can use to regulate their thoughts, emotions, and behavior [5].

The early school years create favorable conditions for the development of self-regulation and the transformation of personal experience into an essential source of personal growth and self-development. Most researchers emphasize that early primary school age is the most sensitive period for the development of self-regulation, as it is during this time that key developmental changes occur, which largely determine a person's future success or difficulties in adulthood.

One of the effective conditions for the development of self-regulation is a differentiated approach. V. A. Sukhomlinsky argued that the methods used in educational activities should spark a child's interest in exploring the world, and that a school should become a place of joy – joy in learning, creativity, and communication. This defines the primary role of a teacher: to create conditions for each student that foster motivation for learning and the development of self-regulation skills. Modern society requires educated, enterprising, and proactive individuals who can independently make responsible decisions, anticipate possible consequences, and collaborate effectively.

Most psychologists, both domestic and international, who study volitional processes, examine the problems of regulation and self-regulation of behavior [6]. In the context of self-regulation, scholars attribute a regulatory function to willpower, considering it within the framework of "mastering oneself." However, willpower is not only associated with suppressing emotions. As conscious regulation of life activity, it has a specific energy source—the sense of socially responsible behavior (V. K. Kalin et al.). Since many researchers have used the term "regulation" when discussing "willpower," it can be concluded that these processes are closely related.

In foreign studies, the concept of self-regulation has primarily been examined through the lens of "personality" and "personal self-regulation." Self-regulation in relation to personality has been explored by A. Bandura, W. Wundt, and C. Rogers.

The study of self-regulation began with the works of physiologist I. P. Pavlov. Normally, any living organism adapts adequately to external environmental stimuli while maintaining itself through self-regulation mechanisms. Any deviation from the norm is perceived by the organism as a need to return to its original state of normal functioning. This principle later became known as the "golden rule of self-regulation," according to which self-regulation ensures the equilibrium process between an organism and its environment [7].

While studying self-regulation, Russian physiologist L. P. Grimak identified several essential levels of self-regulation, including informational-energy, emotional-volitional, motivational, and individual-personal levels. The informational-energy level is responsible for mobilizing physiological energy to support effective mental functioning. Without an energy balance, excessive mental activity can lead to impulsive behavior, fatigue, and exhaustion, while a lack of energy results in passivity, asthenia, and depressive tendencies. The emotional-volitional level ensures an appropriate emotional response to events and involves personal traits and abilities realized through volitional processes. At the core of this level is self-control, which enables

individuals to manage their actions, behavior, and emotions in challenging situations. The motivational level highlights the connection between actions and internal drives, emphasizing that self-regulation begins with regulating motivation. Finally, the individual-personal level is activated when a person realizes that external circumstances are not the issue, but rather their own attitudes, values, and goals need to change. This level examines the personal characteristics that determine an individual's unique self-regulation style.

Early childhood marks the initial stage in the development of voluntary emotional processes [8]. During this period, emotions become further socialized, and children learn ways to express and respond to different emotional states in others. According to L. I. Bozhovich, the key developmental change at the end of early childhood is the emergence of a connection between affect and intellect, the formation of images and representations that possess motivational power and influence behavioral tendencies in children [9].

According to A. V. Zaporozhets, at the early stages of ontogenesis, special forms of exploratory actions begin to emerge in practical activities, determining the significance of various objects or their properties for meeting a child's needs [10].

Addressing the physiological characteristics of younger schoolchildren, it is important to highlight the perspective of A. R. Luria, who believes that the ages of 6 to 8 mark a critical stage in the development of voluntary activity organization. During this period, the second major leap in the development of the frontal lobes of the cerebral cortex is completed, and changes in the characteristics of brain activity occur. These changes are associated with the increasing role of the frontal cortex in programming and controlling voluntary forms of activity. These findings align with the research of physiologist N. I. Krasnogorsky, which demonstrates that from the age of 7, the regulatory inhibitory control of the brain's cortical map over instinctive and emotional reactions begins to strengthen significantly [11].

Self-regulated learning is a process that helps students manage their thoughts, behaviors, and emotions to successfully navigate their learning experiences [12]. According to Canadian researcher Shanker [13], "self-regulation refers to a child's ability to effectively and efficiently cope with stressors and then return to a state of calm focus and alertness."

Developing self-regulation skills in students is a challenging task. Teachers need to assist students in actively controlling their thinking, taking pauses to reflect when necessary, and making independent decisions in the learning process. It is widely believed that many learning difficulties result from a lack of metacognitive skills or abilities. "To foster self-regulated learning, teachers must explicitly demonstrate how to use appropriate strategies, explain them in a way that students can understand, and consistently apply metacognitive and strategic learning techniques across all parts of the school curriculum" [14].

A differentiated approach plays a significant role in fostering independence in younger schoolchildren's learning. The word "differentiation" was borrowed from foreign terminology and means stratification, division, or segmentation of a whole into multiple parts, levels, or forms.

Differentiated learning is a specially organized educational and cognitive activity (subject–subject interaction) that considers the age, individual characteristics, social experience, and initial level of students. It is aimed at the optimal physical, spiritual, and psychological development of students, as well as the acquisition of necessary knowledge and practical skills.

The pedagogical system of differentiated learning is a dynamic structure encompassing all components of the educational process, including goals, content, methods, and resources. It aims to develop general educational skills, enhance cognitive interest, strengthen learning motivation, and nurture personal qualities [15].

The use of differentiated learning for developing self-regulation skills in younger schoolchildren allows teachers to consider their individual characteristics and readiness for academic activity. This approach helps children plan their actions, set goals, and regulate their progress by adapting both the content and volume of learning materials.

Providing a choice of tasks with different levels of difficulty fosters responsibility for academic outcomes and self-monitoring, while the teacher's role shifts to creating a motivational and supportive environment. Individualized approaches help identify students' strengths, boost their confidence, and increase their resilience to challenges while simultaneously developing metacognitive skills such as reflection and self-assessment.

Group-based learning in differentiated instruction supports the development of co-regulation skills, including managing emotions and distributing tasks. This approach reduces stress and enhances students' ability to exercise self-control.

Differentiation fosters students' motivation for independently organizing their learning activities, improves time management skills, and enables them to adjust their own actions. It helps students recognize the importance of choosing appropriate learning strategies, thereby increasing their responsibility for the learning process. Implementing this approach in primary education contributes not only to academic success but also to the development of conscious, goal-oriented individuals.

Material and methods. The experiment was conducted at Secondary School №155 in Almaty, Auezov District, over a period of three weeks. A total of 64 schoolchildren from two classes participated in the study, evenly divided into an experimental group (32 schoolchildren) and a control group (32 schoolchildren). The

aim of the experiment was to determine the impact of differentiated learning methods on the development of self-regulation skills in primary schoolchildren.

The experimental group followed a specially designed program that included differentiated tasks, project-based learning, interactive methods, and self-assessment activities. The tasks were adapted to the individual characteristics of the schoolchildren and varied in complexity (basic, intermediate, and advanced levels). Project-based learning helped develop research and analytical skills, for example, through projects related to studying the schoolyard environment. The program also incorporated interactive methods such as role-playing games, discussions, and group assignments, which stimulated active engagement. Additionally, creative homework assignments and reflection sessions were conducted, where schoolchildren analyzed their achievements, challenges, and strategies for overcoming difficulties.

The control group followed the standard school curriculum using traditional teaching methods, including lectures, reproductive exercises, and homework focused on reinforcing theoretical material. Project-based learning and interactive methods were not applied in this group.

The effectiveness of the implemented methodology was assessed through testing, surveys, and academic performance analysis. The testing evaluated self-regulation skills, including planning, self-monitoring, and emotional regulation. Surveys measured schoolchildren's motivation and satisfaction with the learning process. Academic performance was analyzed in core subjects (mathematics, Russian language, and Kazakh language) to assess overall educational outcomes. Comparing data between the groups helped determine the effectiveness of the proposed program and its impact on the development of key skills in primary schoolchildren.

Results and discussion. The objective of the experiment was to determine the effectiveness of methods for developing self-regulation skills in primary schoolchildren through differentiated learning.

The methodology for the experimental group was based on adapted assignments, interactive methods, and project-based learning aimed at developing planning, self-monitoring, and emotional regulation skills. The control group followed the standard school curriculum without the introduction of new approaches.

The experimental group's learning process included four types of adapted tasks:

1. Differentiated Assignments

Tasks were tailored to each schoolchild's level of preparedness and divided into three difficulty levels: basic, intermediate, and advanced. Examples:

- Basic level: Simple exercises to determine action sequences (e.g., "Count how many apples are in the basket if three more are added").
- Intermediate level: Tasks requiring analysis (e.g., "Solve the problem and explain why this answer is correct").
- Advanced level: Creative assignments (e.g., "Create your own math problem and ask a classmate to solve it").

2. Project-Based Learning

Schoolchildren worked on projects related to real-life situations, promoting planning and self-regulation skills. Examples:

- In environmental studies, they explored the flora and fauna of the schoolyard, conducted mini-research, and created presentations on their observations.
- In art classes, they designed posters about a healthy lifestyle, learned to allocate time for different project stages, and presented their work to classmates.

3. Interactive Methods

Game-based and role-playing activities were used to enhance self-regulation:

- In math lessons, team-based games required schoolchildren to collaborate on problem-solving.
- In reading lessons, they acted out story plots, helping them develop emotional regulation skills.

4. Self-Assessment and Reflection

Weekly self-assessment and reflection sessions were conducted, where schoolchildren discussed their progress and challenges. They kept observation journals, noting:

- Which tasks were difficult for them.
- What helped them overcome challenges.
- What they learned during the week.

5. Homework Assignments

Homework was designed to be creative and research-oriented. Examples:

- In environmental studies, schoolchildren, together with their parents, observed the weather and wrote short reports.
- In Kazakh language lessons, tasks included writing short stories using given words, fostering independence and creativity.

The control group followed the standard curriculum, which included:

- Teacher-centered instruction, where all schoolchildren completed the same assignments.
- Repetitive exercises to reinforce knowledge.
- Homework was limited to reviewing textbook materials.

- Self-assessment and reflection were not practiced.

Results of Self-Regulation Skills Assessment

To evaluate the effectiveness of differentiated learning methods, diagnostic techniques were used to measure the following self-regulation components:

- Planning
- Self-monitoring
- Emotional regulation

The diagnostic results before and after the experiment are presented below in Table 1.

Table 1 – Dynamics of formation of self-regulation skills in younger schoolchildren (%)

Self-regulation skills	Experimental group (before)	Experimental group (after)	Control group (before)	Control group (after)
Planning	17% (5 people)	73% (22 people)	18% (5 people)	29% (9 people)
Self-control	20% (6 people)	80% (24 people)	22% (7 people)	34% (10 people)
Emotional regulation	15% (4 people)	67% (20 people)	16% (5 people)	25% (8 people)

The results show that schoolchildren in the experimental group demonstrated significant progress across all indicators. The most substantial improvement was observed in planning skills (+56%) and self-monitoring (+60%). The control group showed minimal changes, confirming the effectiveness of the proposed methodology.

To assess satisfaction with the learning process, a survey was conducted using the Likert scale. The results are shown below in Figure 1.

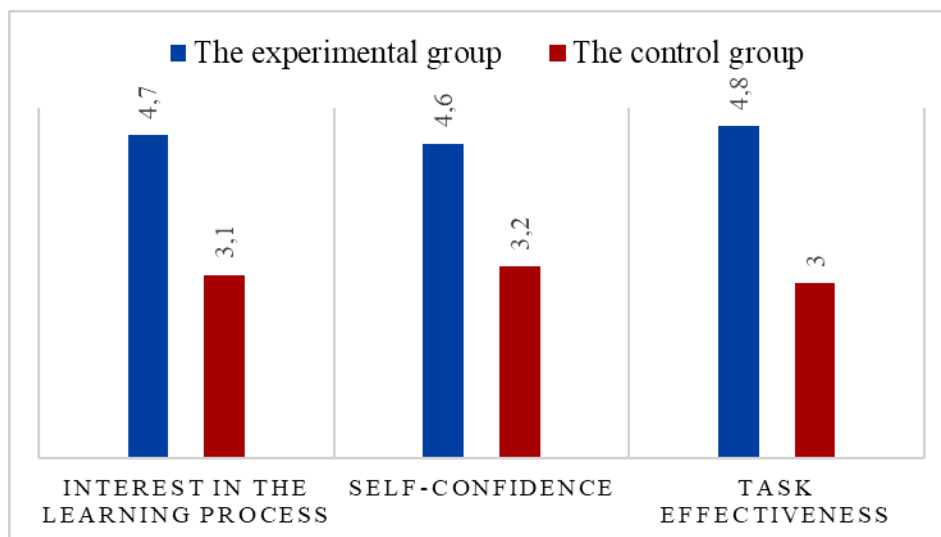


Figure 1 – Student satisfaction with the educational process (Likert scale, 1-5)

The results (Figure 1) demonstrate that schoolchildren in the experimental group, who were taught using differentiated learning methods, achieved higher levels of satisfaction with the educational process compared to the control group. The use of differentiated assignments, project-based activities, and interactive approaches created conditions that fostered interest in learning, self-confidence, and active engagement. While traditional methods used in the control group showed lower effectiveness, the differentiated approach proved significantly more beneficial, not only in developing self-regulation skills but also in enhancing motivation for learning.

To assess the impact of differentiated learning on academic performance, an analysis was conducted comparing the progress of schoolchildren in both groups before and after the experiment. The experimental group followed a specially designed program that included adapted assignments and project-based learning, while the control group continued learning through the standard curriculum. The results of this analysis are presented in Figure 2.

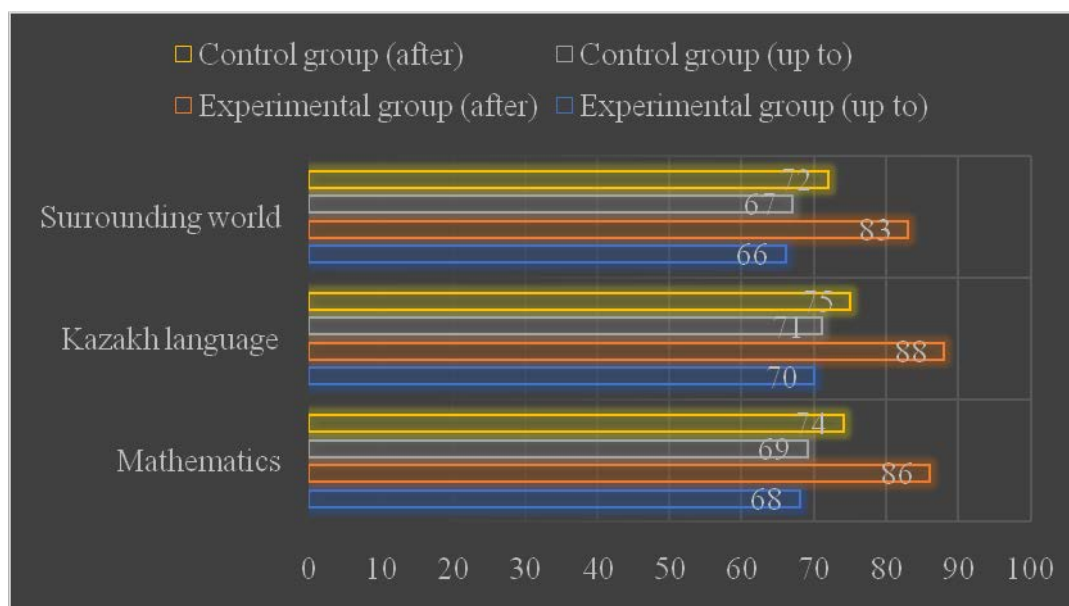


Figure 2 – The dynamics of academic performance in core subjects as a percentage

The analysis of academic performance showed significant improvement in the experimental group, particularly in mathematics, Russian language, and Kazakh language, due to the use of differentiated learning methods. Schoolchildren who studied under the new methodology demonstrated deeper comprehension of the material and greater confidence in their knowledge. In contrast, the control group showed minimal progress, confirming the limited effectiveness of traditional approaches. Thus, differentiated learning has proven its effectiveness in enhancing the academic performance of younger schoolchildren.

The results of the experiment clearly confirmed the high efficiency of differentiated learning methods as a key factor in developing self-regulation skills among younger schoolchildren. The implementation of adapted assignments, project-based activities, and interactive learning methods created favorable conditions for active learning and independent work.

The use of interactive methods, such as group work, role-playing, and discussions, was particularly effective in developing communication skills and teamwork abilities. Schoolchildren became more engaged in expressing their thoughts, arguing their positions, and collaborating with peers, which is an essential element of the modern educational process.

Differentiated assignments, tailored to the individual skill levels and learning needs of each student, ensured a comfortable learning pace, allowing every schoolchild to achieve success. This approach stimulated independence, responsibility, and motivation, which directly influenced the growth in academic performance and self-regulation skills in the experimental group.

The findings of this study align with leading educational practices worldwide. In Finland, for example, an emphasis on project-based learning and individualized instruction has been shown to enhance critical thinking and independent information-seeking skills. In the United States, competency-based learning programs successfully foster critical analysis and practical knowledge application among schoolchildren. In Singapore, similar methods actively develop cognitive flexibility and adaptability to change.

A comparison of these international practices with our experimental results confirms that differentiated learning is a universal pedagogical strategy that can be effectively applied in various educational systems. The integration of these methods into national educational practices will contribute to the formation of essential skills in schoolchildren, ensuring their successful self-realization in both academic and everyday life.

Conclusions. The implementation of a differentiated approach in teaching younger schoolchildren has proven to be highly effective, especially in developing self-regulation skills such as planning, self-control, and emotional regulation. The findings of the study indicate noticeable progress in students' academic achievement, especially in mathematics, Russian language, and Kazakh language. This outcome underscores the importance of continuing to apply such methodologies to enhance the quality of education and provide schoolchildren with the competencies necessary for successful adaptation in a dynamic educational environment.

It is recommended to actively expand the use of differentiated assignments, project-based activities, and interactive teaching methods. These approaches not only enhance students' motivation and academic performance but also foster independence, critical thinking, and flexibility. Special attention should be given to creating conditions for interdisciplinary integration, which allows students to apply knowledge in practice and develop a holistic understanding of educational material.

Future research prospects include developing new methods for assessing self-regulation skills and exploring the impact of creative and project-based tasks on the personal development of younger school-children. It is important to continue adapting differentiated approaches to various age groups and educational systems.

Additionally, significant attention should be given to improving teachers' professional training. This includes mastering modern technologies for differentiated learning and actively applying innovative methodologies. Such steps will create conditions for schoolchildren to develop not only strong academic knowledge but also key competencies necessary for their successful self-realization in the future.

The obtained results also emphasize the importance of individualizing the educational process as a key aspect of increasing learning efficiency. A personalized approach helps address the unique characteristics of each student, fostering their balanced development and engagement in learning activities. The implementation of these methods not only improves current educational outcomes but also lays the foundation for sustained learning motivation, which is crucial for preparing students for future challenges.

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THE IMPORTANCE OF ENVIRONMENTAL EDUCATION OF STUDENTS IN TEACHING CHEMISTRY

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This article presents insights into the pedagogical significance of environmental education for school students, organized through the teaching of two core scientific subjects—chemistry and ecology. The emphasis extends to the broad implementation of environmental education across various types of secondary schools nationwide, along with the proactive initiation of numerous projects to address environmental challenges, which are undeniably one of the most pressing issues of our time.

Many scholars remain dissatisfied with the current state of research on this topic. Therefore, a review of the works of prominent researchers who have studied environmental education within the school chemistry curriculum was conducted, along with an analysis of the methods and approaches tested in scientific studies. The article explores the ways in which the younger generation, starting from school age, can be instilled with habits of environmental protection and respect for the natural world. In the context of explaining the importance of the environment to students, the paper outlines strategies for preventing many pressing issues at both local and national levels through the development of environmental awareness and knowledge. Furthermore, the article presents a comprehensive analysis of research conducted among 8th-grade students at the A.Navoiy Gymnasium-School No.13. This investigation monitored students' active participation in general chemistry classes, assesses their individual abilities, and assigns tasks tailored to their specific skills. At the conclusion of the pedagogical experiment, students are asked to revisit the questionnaires they completed at the study's baseline, facilitating a thorough comparison of the pre- and post-study results.

Key words: chemistry, research work, environmental protection, ecology, environmental education.