



## PEDAGOGICAL SITUATIONS OF SMALL REGIONAL SCHOOLS AND PROBLEMS OF TEACHING CHEMISTRY

**Ontagarova Dinara Rakhimovna**

Candidate of Pedagogical Sciences, Associate Professor  
Berikzhanova Shyryn Bauyrzhankyzy, Master of Science  
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### ABSTRACT

*This study explores the primary objectives, direction, and gaps within the educational environments of small schools. It examines the challenges faced by students and teachers in these settings, particularly in the context of chemistry education. The study incorporates a comprehensive analysis, draws specific conclusions, and provides an in-depth examination of the pedagogical conditions affecting these schools.*

### Introduction

Small schools are common in many countries, particularly in areas with low population density. These schools typically serve fewer than 240 students and lack multiple sections for each grade level. The unique pedagogical process in such settings often involves students working independently while the teacher instructs another class. In Kazakhstan, 56.9% of schools are classified as small, yet only 15% of the nation's students attend them. These schools are predominantly located in rural areas and play a vital role in organizing the social sphere. Consequently, the program for preserving and developing rural education holds national and state significance. It is widely acknowledged that schools are crucial for the preservation and development of rural communities; they are the primary institutions capable of sustaining and revitalizing villages.

Implementing theoretical knowledge in practice is essential for effective learning. Therefore, independent research by students is a mandatory requirement. Integrating elements of pedagogical technologies into students' research activities enhances their learning and cognitive development.

If the walls of the school represent the initial stage of a child's education, then each subject taught within them serves as a guide to the child's development and exploration of their own path. Teaching chemistry in schools, for instance, has its unique characteristics and significance. Chemistry is a comprehensive subject that fosters understanding of the internal elements of the environment, studies its composition, and draws scientific conclusions.

Chemistry is a foundational science, systematically developed through experimentation. Consequently, its teaching often involves practical work and numerous experiments. In this context, chemistry teachers consider various teaching methods. The educational system of small schools, particularly those with collective classes, is unique and distinct from general

education technologies. Today, there are more than five hundred types of educational technologies, but not all are suitable for every context. The methodology for small educational centers is particularly specialized.

In small schools, grades 9 and 11 are typically not combined into one class, as students in these grades need to prepare individually for exams. For instance, chemistry is taught starting from grade 7, so grades 7-8, 7-10, and 8-10 may be combined for instruction. Given the different levels of students in these combined classes, pedagogical technologies are carefully selected to ensure that the quality of education is maintained.

A teacher in a small integrated school faces a challenging situation: they must teach children of different ages and varying levels of training simultaneously, following the curricula of different classes. Conducting classes for multiple grades at the same time requires careful preparation, effective organization of educational activities, rational scheduling of lessons, and a masterful demonstration of pedagogical integrity.

### Methodology

The study employed the "Assessment of School Work" survey for school teachers by Sabilo V.V. and Malakhovskaya T.N. (<https://clck.ru/3BXUCf>). The simplicity of the prepared questions, the ability to conduct the survey with several teachers simultaneously, and its anonymous administration allowed teachers to openly express their thoughts.

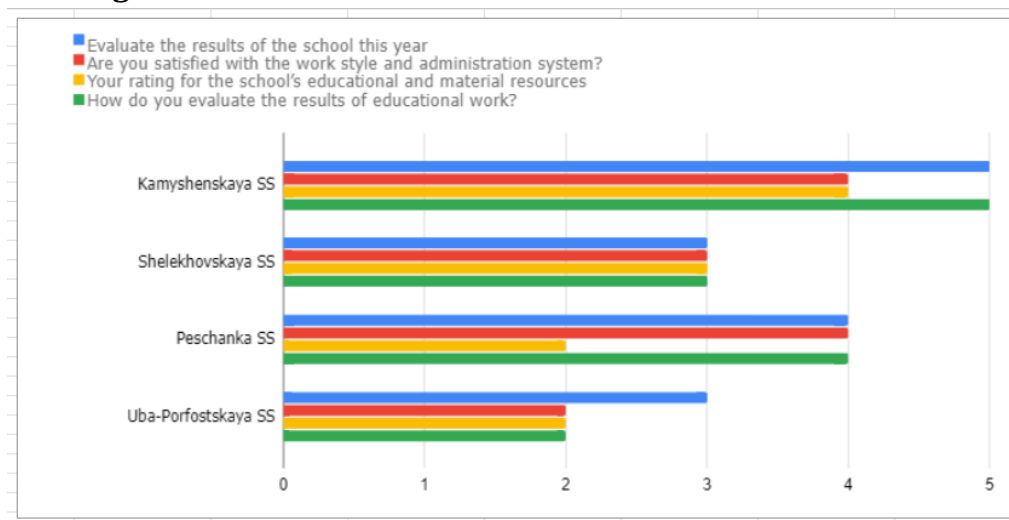
The study of the pedagogical conditions of small schools was conducted among the staff and students of Kamyshenskaya Secondary School, Shelekhovskaya Secondary School, Peschanskaya Secondary School, and Uba-Porfostskaya Secondary School in the Borodulikha district of the Abay region.

The survey questions were formulated in two directions:

- 1) Assessment of the work of the educational institution where the teacher works.
- 2) Assessment of the teacher's own work in a small school.

### Results

Evaluating the work of a school provides insights into the work of its teachers. The survey was conducted during the 2023-2024 school year and collected the following information, summarized in **Figure 1**:



**Figure 1. Assessment of the work of the educational institution where the teacher works**



The style of administration and the material and technical resources of a school significantly impact the work of its teachers, as assessed in the survey of teachers' experiences within their schools. For instance, chemistry teachers in small schools often face shorter working hours and lower salaries. Due to teacher shortages in rural areas, some teachers may work across multiple schools within a single academic year. Consequently, school administrations collaborate closely with subject teachers to coordinate class schedules and organize supplementary classes.

The educational and material resources of public education encompass the physical assets that support teachers' living and working conditions. E.V. Savelyeva, an innovative Russian language teacher, emphasizes that these resources "engage students in the learning process and facilitate teachers' work."

When examining teachers' own work in the second direction, several challenges of working with combined classes were identified:

1. The teacher must directly engage with the class for only half of the lesson (or less), while the remaining time is dedicated to organizing independent work for the children.
2. The teacher's attention is divided between two or three classes, requiring careful management of time and resources.
3. During independent work periods, students may lack immediate access to the teacher's assistance, as the teacher may be occupied with another class.
4. Students may need to work independently while another class is active, which can disrupt their focus and learning process.
5. In small schools, teachers typically prepare for 8-12 lessons daily, which demands significant preparation and organization.

Despite these challenges, teachers in small schools acknowledge certain advantages when working with multiple classes simultaneously compared to working with a single class exclusively.

The small student-to-teacher ratio in small schools allows teachers to conduct individual interviews with each student during lessons and thoroughly understand their unique characteristics. Knowing students' home environments becomes easier with fewer students, and checking notebooks is more efficient.

Students in small schools also have more opportunities to assist younger children since they interact daily within the same class. By effectively managing challenges and leveraging the advantages of working with multiple classes simultaneously, teachers in small schools successfully address the educational challenges their schools face.

Working in a small school necessitates a focus on independent learning, as it's impractical to conduct two or three simultaneous classroom activities. Independent work comprises more than 50% of teaching time in small-group schools, compared to about 20% in regular schools. Therefore, it is crucial to cultivate students' ability to work independently from an early stage.

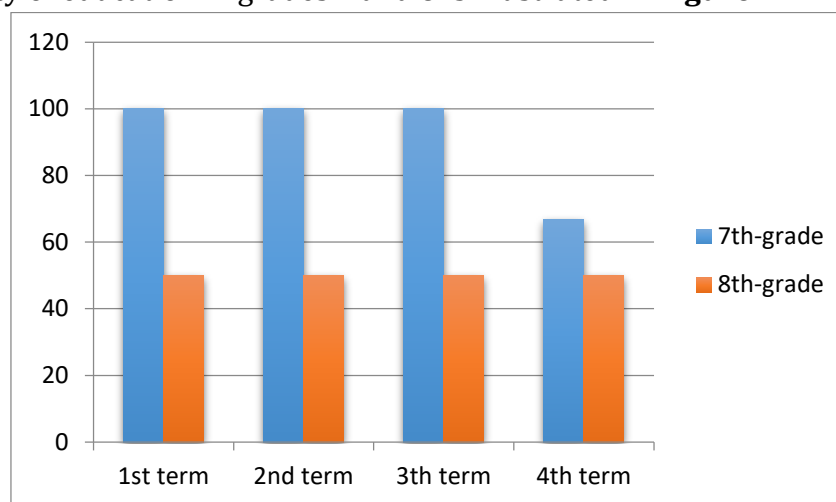
In chemistry classes from 7th to 8th grade, students are introduced to various independent tasks. Initially, these tasks are small and imitative, such as matching a chemical element with its symbol based on a model. As students progress, tasks become more intricate and creative. Throughout the course, students develop skills in using textbooks and educational materials to support their learning.



In organizing independent work, the same fundamental requirements as those in regular schools were adhered to:

1. The requirements of the program must be met by independent work.
2. Logical thinking development should be promoted by independent tasks, thereby stimulating students' cognitive abilities.
3. All independent work must be performed by students themselves to ensure conscious learning.

A study on chemistry education was conducted at Kamyshenka Secondary School in the village of Kamyshenka, Borodulikha district, Abay region, focusing on combined grades 7-8. The quarterly quality of education in grades 7 and 8 is illustrated in **Figure 2**.



**Figure 2. The quarterly assessment of education quality for grades 7 and 8 during the 2023-2024 academic year**

At Kamyshenskaya Secondary School, there are two 7th-grade students studying chemistry for the first time. Each topic is supplemented with practical work to maintain student interest. In secondary schools, chemistry is typically taught for 1 hour per week, totaling 34 hours per school year. However, due to the combined 7th and 8th-grade class, these students receive 2 hours of chemistry instruction per week, totaling 64 hours per school year for 8th-grade students. Therefore, 7th-grade students must complete the annual syllabus by Terms 1 and 2 in the combined class setting.

This unique teaching situation allows the subject teacher to merge related topics and flexibly allocate teaching hours. With a small class size, group work is not implemented to ensure active participation of all students. Instead, individual or paired teaching methods are employed, varying in format and content. Organizing independent work adheres to the principle of consistency, with each assignment reviewed and evaluated.

In the 8th grade, students assist in explaining and analyzing topics as they progress through the 7th-grade syllabus. Consequently, the education quality in 7th grade showed 100% in the first three quarters but decreased in the fourth quarter due to a student transitioning from a Russian to a Kazakh class, facing language comprehension challenges.

In the 8th grade, there are four students. The increasing complexity of topics poses challenges in fully mastering the material within limited timeframes.



When handling multiple classes, similar teaching methods are applied as in single-class settings, given the absence of specialized methodological literature for small schools. Consequently, extensive didactic materials (such as tables, maps, and assignments) must be prepared for each lesson. These materials help students organize their independent work, tailored to their individual characteristics.

By creating conditions for every student to achieve outcomes, the teacher systematically advances their knowledge, skills, and methodologies, as outlined in the state standards for compulsory general secondary education. Developing lesson plans that incorporate students' independent research aligns with contemporary requirements and optimizes the educational process in small schools.

### **Conclusion**

This paper has identified key directions and goals, addressed gaps within the educational environments for small students, and assessed the learning processes. Through systematic analysis and drawing specific conclusions, the study has provided valuable insights.

In education, each type of school plays a distinct role and purpose that are crucial for shaping future lives. Effective organization of the educational process, ensuring equitable conditions for both teachers and students, and providing adequate educational materials are pivotal factors contributing to enhanced educational quality.

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