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НАУЧНЫЙ ЖУРНАЛ Торайгыров университета

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## \*A. E. Zarypkhanova<sup>1</sup>, B. T. Tantybaeva<sup>2</sup>

<sup>1,2</sup>S. Amanzholov East Kazakhstan University, Republic of Kazakhstan, Ust-Kamenogorsk

# EFFECTIVE METHODS AND TECHNIQUES FOR TEACHING CHEMISTRY IN AN INCLUSIVE CLASSROOM

We cannot deny the presence of children with disabilities in society. Creating conditions for quality education outside of their characteristics is one of the most pressing problems at the moment. One of the tasks facing us today is to provide equal quality education to including children with special educational needs, without leaving anyone indifferent. The condition for the sustainable development of Kazakhstan as an open civil society is to ensure the right of children to life and the full development of their capabilities, as stated in the «Convention on the rights of the child», to provide equal opportunities for all children, their social and legal protection. Nowadays working with such children is studied well. Based on research methods, theoretical judgments and practical recommendations can be used for teaching children with special needs, forming their cognitive activity, increasing interest in the subject and the quality of the educational process.

Keywords: children with disabilities, inclusive education, correctional and developmental, PMPK, method.

#### Introduction

Currently, there are economic crises around the world, environmental pollution, an increase in hereditary diseases, aggravation of human relations, etc. It is known that many negative environmental factors have a negative impact on human psychology and health. In particular, it has led to deteriorating maternal and child health.

According to the Constitution, all children should be covered by general secondary education. As the number of children with special needs is growing

every year, the state system of special and general education creates conditions for children with disabilities in different situations to receive education and equal opportunities with other children with normal development. In our education system, from the education authorities and the PMPK to every secondary school, we must first move from a medical model (approach) to a social model of education. The introduction of a socio-educational model that assumes the right of students with disabilities to quality education requires significant changes in the general education system. This system should be an effective system that allows all students to have equal rights and opportunities in education without discrimination and non-discrimination. The preconditions for the formation of a system of special education for children with disabilities in Kazakhstan date back to the 1920s. The role of public intellectuals of that period played an important role in the development of education and upbringing of children with special needs. Prerequisites for the organization of assistance to students with disabilities are based on the organization of the Russian experience. In the 1930s, the development of the education system in the republic continued, and an important innovation in its development was the decision of June 8, 1931 on the obligation of children with disabilities to receive education [1].

The term disability (special needs) refers to children with mental and physical disabilities, behavioral and perceptual disorders, long-term treatment at home or in the clinic, emotional problems, orphans, single-parent families, victims of violence, military conflict applied. It is also widely used for gifted children, ie for the development of talents and personal qualities in the child.

Today, one of the main tasks is to integrate children with disabilities into society. To this end, the development of general education is based on the principle of inclusion. The current definition of the need for education for children with disabilities in the development of inclusive education is the need for psychological, pedagogical, social and other assistance in providing students with quality education. The following groups of children with disabilities are indicated:

Group 1. Children with various disorders of mental and physical development: vision, speech, hearing, musculoskeletal, intellectual, mental retardation and emotional-volitional disorders.

Group 2. Children with special learning difficulties, behavioral and emotional problems. Particular difficulties of children with intellectual disabilities are observed in the acquisition of individual reading skills: writing, reading and counting (dysgraphia, dyslexia, dyscalculia, etc.). Such problems are temporary and can be eliminated by children with the help of specialists. Behavioral and emotional problems are caused by certain psychological factors (disorders of family upbringing, parent-child and family relationships), as well as the presence

of specific developmental problems (hyperactivity, inattention, a range of autistic disorders, etc.) ) may have various difficulties in communicating with peers and teachers (disobedience, indifference, aggression, isolation or conflict).

Group 3. Children with special educational needs arising from sociopsychological, linguistic, economic and cultural features. This group includes children from low-income families or those who do not pay attention to child rearing, children from socially vulnerable groups (parents addicted to alcohol and drugs), as well as those who have difficulty adapting to local society (migrants, refugees, repatriates) or the language of instruction. children who do not understand and do not speak this language are included [2].

Assessment of the child's special educational needs is carried out as a result of a comprehensive examination by specialists, after the diagnosis is made in a psychological, medical and pedagogical consultation (PMPK). This work is carried out in the following directions:

- 1) identification and confirmation of the need for medical, social services and education;
- 2) development of a comprehensive program of rehabilitation of the child and establishment of the route of individual training. It includes:
- educational activities (determining the type of curriculum and the content of psychological and pedagogical support);
- social services (benefits and privileges, technical aids and habitat adaptation, home care, etc.);
- medical services (the need for examination and treatment by various specialists, in the hospital, etc.)
  - providing financial, legal, social and psychological assistance to families;
- 3) counseling, training and involvement of parents in the process of pedagogical correction;
- 4) providing consulting and methodological assistance to teachers, psychologists and other specialists of the school organization in the education and upbringing of children with special needs;
- 5) monitoring of mental development and regular medical, social, psychological and pedagogical support of children with special educational needs [3].

Inclusive education is a process of development of general, vocational, secondary and higher education for all in terms of adapting to the different needs of all, providing access to education for students with special needs. In addition, inclusive education - the inclusion of all students in the general and vocational environment, higher education, social adaptation, correctional and pedagogical, family, social support for the individual needs of the child, regardless of age, gender, ethnicity, religion, the influence of active family is to provide. Creating

conditions for all students to learn – to include them in the pedagogical process, regardless of the specifics of physical, intellectual, emotional, social, linguistic development [4].

Inclusive education seeks to develop a methodology aimed at recognizing learners with different learning needs as individuals. Inclusive education involves being flexible to meet different learning needs. It is also learning in educational institutions in a way that allows you to feel normal among your normally developing peers, that is, your classmates, classmates, friends and children in the yard. Conditions for «special» children to study in the traditional education system:

- special (correctional) educational institutions;
- home schooling;
- special boarding schools;
- correctional schools and preschool institutions;
- rehabilitation centers.

The following unresolved issues and obstacles to the introduction of inclusive education in Kazakhstan should be noted:

- Lack of specially trained teaching staff not ready to teach children with developmental disorders in general schools. The state should change the standards of higher pedagogical education in this regard;
- Lack of material and technical equipment in educational institutions. Lack of special equipment and teaching materials for students, as well as insufficient teaching aids for teachers;
- strict requirements of the state standard. It is important to introduce a system of large-scale transformation in assessing the achievements of students who are lagging behind in terms of intelligence.

#### Materials and Methods

As we know the chemistry is specific. The study of chemistry at school, including children with mental retardation, is aimed at achieving the following goals:

- mastering the most important knowledge about the basic concepts and laws of chemistry, chemical symbolism;
- mastering the ability to observe chemical phenomena, conduct a chemical experiment, perform simple calculations based on chemical formulas and equations of chemical reactions;
- development of cognitive interest, the ability to independently acquire knowledge;
  - education of attitude to chemistry as one of the sections of the natural sciences;
- application of acquired knowledge and skills for the safe use of substances and materials in everyday life, agriculture and production, prevention of phenomena that are harmful to human health and the environment.

To organize the learning process, it is desirable to use various forms of training sessions: conversations, integrated lessons, workshops, group work, business games. As the preferred forms of control of knowledge, skills and abilities, use tests, tests, chemical dictations, independent work.

When working with children with mental retardation, it is important to include in the content of the program health issues, material on the prevention of the use of psychoactive substances, and the promotion of a healthy lifestyle.

When conducting lessons, it is recommended:

- more time to devote to the use of chemicals in the home and the safe handling of them;
- include the maximum possible number of demonstrations, since it is the demonstration experiment that contributes to the development of cognitive interest in children with mental retardation;
- when planning practical work and laboratory experiments, exclude those that require the use of concentrated acids, alkalis, formaldehyde, alcohol, due to their high toxicity and health hazard.

Below we will talk about how to support students with different abilities in the teaching of chemistry in an inclusive classroom. In order to avoid confusion for children with disabilities, it is necessary to clarify and define the agenda, ie what the lesson will start, how it will take place and other questions.

Working with children with intellectual disabilities and developmental disabilities should be structured and flexible. To do this, you need to take timely breaks. Such breaks can be useful for children with mental disorders, behavioral disorders, as well as chronic diseases. Such situations help them to stay focused and motivated, so that they have more opportunities to get an equal education with other children. Children with motor impairments should change their sitting position regularly during the lesson [5].

While to creating lesson plan, there are some rules to need to follow:

Lessons with children with intellectual disabilities should always begin with a review of the material from previous lessons;

The main course should be as personalized as possible.

The first version of the work is that healthy children work with cards while learning a new lesson. At the same time, the teacher explains the new lesson to the child with disabilities. Visual materials are also used (each word or action is confirmed by a picture, cards, diagrams, experiments); gradually moves from one action to another or from one concept to another; The teacher must always be able to explain clearly, but the most important thing is to be short and concise, that is, the vocabulary is mastered in a small amount.

Finally, the material will be approved. One or more students complete the task in front of the class. The teacher helps as much as possible. Then children with disabilities perform individual tasks related to the new lesson, and during this time the teacher checks the tasks performed by other children.

The second option is for the teacher to explain the new lesson to all students equally. And when choosing a new topic, you should choose only a light topic in terms of size and content. Also, do not forget about the use of algorithms and visuals. High-achieving students can complete individual assignments, while low-achieving students can be re-explained the new topic, given assignments to complete on their own, and then move on to check the assignments completed by high-achieving students.

Each task for children with disabilities must follow a specific algorithm.

Oral tasks are performed according to the following algorithm:

the teacher tells the students the task (ie what to do) – children or one student repeats after the teacher; can be done with cards with key words or sentences;

The teacher determines the order of the task, ie after telling what to do first and then what to do, the children or one student repeats the task. Here you can use graphics with execution algorithms, including cards, diagrams and tables with an algorithm of actions; perform the task in turn; that is, we go back to the beginning, the children do the tasks, and check it with the teacher; check the completed tasks, calculate errors (teacher, and only then students will tell).

Written assignments: the teacher tells the students the task (ie what to do) – children or one student repeats after the teacher; can be done with cards with key words or sentences; cards with tasks for students to perform on their own (algorithms of actions are written on a card or board, on the walls of the classroom can be hung diagrams and tables with such tasks); checking tasks: the teacher comes to each student and receives the completed tasks; The teacher asks each child to tell the task they have completed, or one student reads their answer, the other students check their answers, and all the mistakes are named and ways to correct them are discussed.

In an inclusive classroom, more visual aids should be used to make it easier for students to have the material. Children with hearing impairments are reminded of information stored in their visual thinking in order to receive materials. They do not fully use the processes of verbal and logical thinking, because their speech is impaired or retarded.

What the teacher should consider and know when using visual aids:

- take into account the role of visual aids in performing the tasks of the textbook;
- take into account whether these visual aids are clear or not clear to students;

- pay attention to the functions of tools in the learning process; visual aids can be used to give students a clear idea of the subject, phenomenon and event being taught; visual aids can be used in any action;
- to know the age characteristics and personal abilities of students; visual aids should be interesting and clear, but visuals should not be too much, as low perception and attention of children with disabilities do not allow them to explore and recognize each visual aid as much as possible;
- take into account the level of knowledge of students about the object of acquaintance: use only tools that are understandable to children, as well as the scope of the topic to be studied;
- The visual aids used should not be pictures or objects that are just being looked at, they should help the child understand the new topic.

One of the main requirements for the lesson is to take into account the poor attention of children with disabilities and to transform them from normal activities:

- a) start a new lesson with tasks that train the mind, attention;
- b) use complex intellectual tasks only in the middle of the lesson;
- b) learning-related tasks should be in the direction of correction (visual exercises, fine motor skills, the use of tasks aimed at developing skills, perception and development of thinking);
- c) use of surprises, games and competitions, tension, role-playing games, small performances (ie all actions that affect the child's emotions and connect life and knowledge).

Depending on the complexity of the task being taught, the interpretation of homework can be individual or collective. Depending on the complexity of homework, it is checked in turn or all, and the assessment of the task is carried out taking into account the individual capabilities of each student.

For the successful implementation of corrective and developmental work in chemistry:

- 1 Ability to find a way to the heart of each child on an optimistic forecast (increase the child's confidence): children can be taught everything. However, it takes time, as well as effort on the part of both the teacher and the student, but the teacher must have no doubt that each student will be able to achieve the result.
- 2 A good result can be achieved through «success to success». It is a great victory for a child to always feel his success. This only happens when the tasks suggested by the teacher are appropriate, depending on the child's level of ability. A teacher who keeps this in mind while learning can help them succeed. Another factor to consider when assessing a student's work is to pay attention to the child's work and then make recommendations for specific improvement.

3 Creating a friendly atmosphere during the lesson. Psychologists have proven that development occurs only in a positive emotional state. When a child believes in his own strength, the confidence in the teacher's words will lead to quick success. The teacher should not be stingy in praising the child for each correct answer, a small achievement.

4 The level of work of each student depends on his individual abilities. If the child constantly hears the words «fast, fast, you're late again», the student will do the work poorly or slower, thinking that he will do it quickly. It is best to implement the principle of «let it be good, even if it is small».

- 5 Keep track of each student's progress. It is necessary to know where the «point» is now and how it will develop in the future. To do this, the teacher needs to know exactly what the student can do on their own and with the help of the teacher.
- 6. In education, the diagnostic process should be based on the «strengths» of the child's development.

The requirements of today's world, full of change and innovation, oblige the teacher to be highly educated, inquisitive, innovative, talented, able to find their way into the hearts of students, some of whom are slow, some are fast, some are low-minded, have different memory, perception and thinking.

The use of games in the learning process is the formation, consolidation, consolidation or testing of knowledge and skills identified in the program. In general, games can be used as a teaching method when explaining a new topic, reviewing past material, reviewing and testing knowledge, ie at any time during the lesson, adapting it to the age and psychological characteristics of students.

The method of learning through play is a modern pedagogical technology of education based on the activation and interest of students. The method of play differs from other methods, which allows children to participate in the activities of the phenomenon under study, to live for some time in «real» life situations. The content of game technologies includes the use of various components in combination with other methods of game activity: instructions, questions, explanations, definitions, demonstrations. In the organization of the game type of learning, game conditions are created as a means of stimulating children's cognitive activity.

«Follow the pattern» – a card game for individual performance. Students receive a card with a task with an explanation or a way out, and on that card the student is given a second task to complete, depending on the model, but the characters are changed. Similar tasks are designed to be done individually and in groups, but when working in a group, there must be a task that a student with disabilities can do. In addition, all tasks should be aimed at self-confidence and self-esteem of a child with special needs.

#### Results and Discussion

Students' «conversations» with chemists are one way to work on a new topic. It is important for children to learn to read the author's questions directly and anonymously in the text. Usually, the scientist himself answers. In any case, these questions require pausing, thinking, answering, and checking for accuracy as you read on. It is important that students are helped by the teacher to learn to «talk to the scientist» on their own as they move from collaborative learning to independent learning. You can put «Alarms» for children at the end of sentences in the text.

Q – question (find, ask);

A – answer (answer the question);

C – check (check the accuracy of the sentence).

The teacher should try to «awaken» the creative imagination of students. Children can get information from the teacher's report or from individual phrases about who discovered the law, what experiments they did, and what theories they relied on. The teacher's task is to teach children to ask questions to the scientist while reading. These are questions that can be asked in the learning process. For example: «How can this be explained?...», «What will be the result?...», «Why so?». «Why?...», «Who is he?...». The questions that arise suggest the emergence of answers and assumptions and self-assessment during further study.

The use of elements of modern educational technologies, such as information and communication technologies with the inclusion of electronic educational resources (EER);

EER is the most complex and most important area of informatization. New generation electronic educational resources are open educational modular multimedia systems (OMS). For example, the new innovative qualities of electronic educational resources include:

- 1 Providing all components of the educational process:
- receiving the information;
- workshops;
- control of educational achievements.
- 2 Interactivity, which provides a sharp expansion of the possibilities of independent educational work through the use of active-activity forms of learning.
- 3 The possibility of a more complete learning outside the classroom. In this case, usefulness implies the implementation outside the classroom of such types of educational activities that could previously only be performed at school: the study of new material on a subject basis, a laboratory experiment, current control of knowledge with assessment and conclusions.

What is benefit of EER for a student?

First of all, the opportunity to learn easily.

As we know, educational work includes classes with a teacher (classroom) and independent (at home). Until now, the second part has been mainly about remembering information. The practical component of homework was limited to writing texts and formulas. The best option is considered to be the work of students with modules not only in the classroom, but also at home, in the process of self-preparation and repetition of the material covered. EERs allow you to perform much more valuable practical exercises at home - from a virtual visit to a museum to a laboratory experiment, and immediately to attest your own knowledge, skills and abilities.

With EER, the first component, the receipt of information, also changes. It is one thing to study textual descriptions of objects, processes, phenomena, and quite another to see them and explore them interactively.

What will give EER to the teacher?

The main thing is that it is much more interesting and effective to work with a student. The teacher must learn to use the EER wisely for the benefit of the educational process and for each student.

The use of EER provides an opportunity to shift the emphasis in training to the development of each student; a real transition from simple assimilation of a body of knowledge to developmental learning and, as a result, the formation of the student's main skill - the ability to self-learn [6].

Algorithmization is an effective technique for normalizing the educational activities of students with mental retardation. These are various memos-instructions in which the sequence of actions for solving problems is recorded. Memos teach children to reason correctly and control themselves while doing independent work. In order to adapt the volume and nature of the educational material to the cognitive abilities of students, the system for studying one or another section of the program must be significantly detailed: the educational material should be presented in small portions, it should be made more complicated gradually, it is necessary to find ways to facilitate difficult tasks, such as prescriptions with an indication of the sequence operations required to solve problems, assistance in performing certain operations, examples of problem solving, step-by-step verification of tasks.

When solving a problem, we provide assistance through a ready-made short record, which explains the solution method. The child writes down only the solution of the problem, which saves him time and makes it possible, together with the whole class, to finish writing the solution of the problem at the same time. In the future, corrective assistance is curtailed. The child himself makes a short note, focusing on the key words allocated by the teacher for him in the text of the problem [7].

Also possible to use algorithms in the training of visual and auditory memory, such as solving problems, creating equations of chemical reactions. Algorithms «The amount of matter. Silence. Avogadro's number. Molar mass of substances»,

«Construction of equations of chemical reactions», «Problems on chemical equations». For example, in the Molar Volume of Objects lesson, the teacher explains the learning material, explains how to solve the problem of finding the volume of a gaseous substance under normal conditions for a given number of objects, and then asks students to create an algorithm for solving problems in notebooks. In the lesson «Creating the equations of chemical reactions» the teacher explains to students the basic rules of building the equations of chemical reactions. Students repeat the main points of the teacher. Then the teacher gives a concrete example of the algorithm for creating a chemical reaction equation. Students will recite the algorithm aloud and complete the equation for the chemical reaction [8].

«Find the hidden words» method. This method can be used to find hidden letters in a sentence [9].

Here's how to explain the lesson in a different way, depending on the level of acceptance for each child. The development of the child's mind is associated not only with a certain amount of knowledge, but also with the development of cognitive activity, memory, imagination, thinking, various abilities of the child. The ability to think and remember is important for the development of a child with disabilities. All this is closely related to the environment and the formation of knowledge, skills, memory and thinking [10].

#### **Conclusions**

The main task in the implementation of the right to education of students with special educational needs is to create the necessary conditions for the education of children, taking into account their mental and physiological characteristics. Depending on the capabilities of the students in question, the necessary conditions can be created not only in special education institutions, but also in general education schools. Creating a professional environment in the children's community that ensures their equal integration and self-realization is a necessary condition for the successful teaching and education of students with special educational needs in chemistry.

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\*А. Е. Зарыпханова<sup>1</sup>, Б. С. Тантыбаева<sup>2</sup> <sup>1,2</sup>С. Аманжолов атындағы Шығыс Қазақстан университеті, Қазақстан Республикасы, Өскемен қ. Материал 13.06.22 баспаға түсті.

## ИНКЛЮЗИВТІ СЫНЫПТА ХИМИЯ ПӘНІН ОҚЫТУДЫҢ ТИІМДІ ӘДІСТЕРІ МЕН ТӘСІЛДЕРІ

Қоғамда мүмкіндігі шектеулі балалардың бар екенін жоққа шығара алмаймыз, олардың ерекшеліктерінен тыс сапалы білім алуына жагдай жасау қазіргі кездегі өзекті мәселелердің бірі болып табылады. Бүгінгі таңда алдымызда тұрған міндеттердің бірі – ешкімді қалыс қалдырмай, барлық балаларға, соның ішінде арнайы білім алу қажеттіліктері бар балаларға да бірдей сапалы білім беруді қамтамасыз ету. Қазақстанның ашық азаматтық қоғам

ретінде тұрақты даму шарты — балалардың өмір сүру құқығын және «Балалар құқығы туралы Конвенцияда» көрсетілгендей, олардың өз мүмкіндіктерін толық дамытуын қамтамасыз ету және барлық балаларға бірдей мүмкіндіктер беру, оларды әлеуметтік әрі құқықтық қорғау болып табылады. Мұндай балалармен жұмыс жасау қазіргі таңда жақсы зерттелген. Зерттеу жұмысында негізделген әдіс-тәсілдер, теориялық пайымдаулар мен практикалық ұсыныстарды ерекше қажеттілігі бар балаларды оқытуда, олардың танымдық белсенділігін қалыптастыруға, пәнге қызығушылығын және оқу процесінің сапасын арттыруға пайдалануға болады.

Кілтті сөздер: мүмкіндігі шектеулі балалар, инклюзивті білім беру, түзету-дамыту, ПМПК, әдіс.

\*А. Е. Зарыпханова<sup>1</sup>, Б. С. Тантыбаева<sup>2</sup>

<sup>1,2</sup>Восточно-Казахстанский университет имени С. Аманжолова, Республика Казахстан, г. Усть-Каменогорск. Материал поступил в редакцию 13.06.22.

### ЭФФЕКТИВНЫЕ МЕТОДЫ И ПРИЕМЫ ОБУЧЕНИЯ ХИМИИ В ИНКЛЮЗИВНОМ КЛАССЕ

Нельзя исключать наличие в обществе детей с ограниченными возможностями, одна из самых актуальных проблем сегодня — это создание условий для качественного образования, выходящего за рамки их специфики. Одна из задач, стоящих перед нами сегодня, — обеспечить одинаковое качество образования для всех детей, в том числе детей с особыми образовательными потребностями, не оставляя никого позади. Условием устойчивого развития Казахстана как открытого гражданского общества является обеспечение права детей на жизнь и, как указано в Конвенции о правах ребенка, их всестороннее развитие и равные возможности для всех детей, их социальных и правовых норм. Работа с такими детьми в наше время хорошо изучена. Методики, теоретические соображения и практические рекомендации, основанные на исследовании, могут быть использованы в воспитании детей с особыми потребностями, формировании их познавательной активности, интереса к предмету и качества учебного процесса.

Ключевые слова: дети с ограниченными возможностями, инклюзивное образование, коррекционное развитие, ПМПК, метод.

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«Toraighyrov University» баспасы Торайғыров университеті 140008, Павлодар к., Ломов к., 64, 137 каб. 8 (7182) 67-36-69 e-mail: kereku@tou.edu.kz vestnik-pedagogic.tou.edu.kz