Didactic working conditions for filling gaps in students' knowledge

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Annotation. The article discusses the didactic working conditions to fill the gaps in the knowledge of students. An algorithm for filling the knowledge gaps of students is presented, which consists of four stages: diagnostics, planning, implementation and monitoring. Practical examples are given.

Keywords: international experience, pandemic, education system, knowledge gap of students, didactic condition.

The pandemic crisis has had a profound impact on the global education system. International experts said school closures during the pandemic have affected the academic performance, quality and level of learning of the school curriculum by students around the world. According to UNESCO, 108 countries of the world did not spend an average of 47 days of full-time education due to the closure of schools in 2020, which is equivalent to a quarter of the academic year [1].

During the pandemic, in the process of switching to distance learning, the problem was exacerbated by the lack of skills in working with digital content among both students and teachers. When implementing distance learning, countries have dealt with the situation in different ways, using and adapting different solutions depending on the level of digital and infrastructural training before the start of the pandemic. Several countries (Singapore, France) used national LMS solutions developed several years before the pandemic. China has adapted the dingtalk app to meet the needs of distance education. World famous platforms for organizing the educational process and conducting asynchronous, synchronous online classes, such as Zoom, Skype, MS Teams, Google Classroom, have been used in all countries, including our country. Also, Kazakhstani digital educational content covered all classes and subjects with online lessons.

With the forced transition to a distance learning format, Kazakhstan managed to effectively organize a continuous educational process. In connection with the sanitary and epidemiological situation in the academic year, the educational process in schools was carried out in traditional, distance, combined learning formats. Each school independently determined the list of subjects and the number of hours for full-time or distance learning.

On the TV channels "El Arna" and "Balapan" TV lessons were broadcast 5 days a week with sign language interpretation. TV lessons were posted on the educational platform of the Ministry online.edu.kz, on the YouTube channel and in the electronic magazine “Kundelik.kz”. A large-scale work was carried out to improve the qualifications of teachers for the development of digital competencies. However, in the context of distance learning, the question of a decrease in the quality of education, gaps in the knowledge of students began to be raised more often. [2].

Now, in the post-pandemic period, it is necessary to restore the educational process and create conditions for creating a system of educational organizations capable of responding to challenges. The work to fill the gaps in the knowledge of students requires constant and systematic work.

In Kazakhstan, the main task of the 2021-2022 academic year is to implement the program for the new academic year with filling the gaps in the knowledge of students over the past academic year.

In the instructional and methodological letter "On the features of the educational process in secondary education organizations of the Republic of Kazakhstan in the 2021-2022 academic year", recommendations (work algorithm) are given for subject teachers on how to work on mastering new educational goals with filling the gaps in the student's knowledge for previous years [3] (Table 1). The work algorithm consists of four stages: diagnostics, planning, implementation, monitoring.

Table 1 - Algorithm of work to fill the gaps in the knowledge of students

№	Stage of work	Work period	The content of the work
1	Diagnostics	1st week 1st quarter	1. Carrying out a diagnostic test on the educational objectives of the program of the subject for the previous years of study. 2. Based on the results of a comprehensive diagnostic work, *identify* learning goals / topics for which students have gaps and *determine* the corresponding learning goals 3. Based on the identified learning objectives, determine the sequence of difficult topics depending on the number of students with gaps in topics. *For example*, with a large number of students who do not know a topic, this topic is considered the most difficult.

			With fewer students who have not mastered the topic, it is considered less difficult.
2	Planning	2nd week 1st quarter	1. Drawing up short-term lesson plans that integrate the learning objectives of the new school year with the corresponding learning objectives of the curriculum of the previous school year. 2. Determination of topics that do not have educational goals, corresponding to the goals of training in the curriculum of the subject for the past academic year. 3. Depending on the gaps in knowledge on the learning goals that do not correspond to the learning goals in the new academic year, divide the students into groups. 4. Scheduling consultations for each group. 5. Principles for planning consultation schedules: 1) consultations before a new lesson; 2) consultations on Saturdays, if classes cannot be included in the five-day lesson schedule; 3) consultations on vacation days; 4) consultations during the summer school. 6. Identification of groups that need consultation before new lessons and scheduling. 7. As needed, identify and schedule groups for Saturday consultation. 8. Identification of groups that need consultation during the vacation time and scheduling. 9. Identification of topics to be repeated during summer school and scheduling. 10. Preparation of a plan for analytical work and a schedule for systematic monitoring of the quality of knowledge of students in academic subjects for the new academic year (this reflects both the quality of the student's knowledge over the past academic year and gaps): 1) second week of September (diagnostic administrative control);

			2) the table of summative assessment for the section; 3) table of summative assessment for a quarter.
3	Implementation	During the academic year	1. Achievement of the learning goals of the new academic year according to the curriculum of the academic subject with the filling of the first gaps in the knowledge of students through the organization of the lesson on the basis of an integrated short-term plan. 2. Achievement of the learning goals of the new academic year according to the curriculum of the academic subject with filling the gaps in the knowledge of students by consulting before a new lesson. 3. Achievement of the learning goals of the new academic year according to the curriculum of the academic subject with filling the gaps in the knowledge of students by consulting on Saturdays. 4. Achievement of the learning goals of the new academic year according to the curriculum of the academic subject with filling the gaps in the knowledge of students by consulting vacation days 5. Achievement of the learning goals of the new academic year according to the curriculum of the academic subject with filling the gaps in the knowledge of students by conducting classes during the summer school.
4	Monitoring	At the end of each quarter	1. Analysis and discussion of the results of the system monitoring of the quality of students' knowledge at the methodological association, methodological council, pedagogical council: 1) an analytical report of the diagnostic control work at the methodological association, methodological council, pedagogical council; 2) an analytical report on the results of the summative assessment for the section on the methodological association; 3) an analytical report on the results of the summative assessment for a quarter at the methodological association,

			methodological council, pedagogical council. 4) an analytical report on the results of the academic year at the methodological association, the pedagogical council.

Let's consider some stages of the algorithm separately using the example of academic subjects.

For example, to carry out diagnostic work on the subject "Algebra" in the 7th grade, it is necessary to consider the curriculum of the updated content on the subject "Mathematics" for grades 5-6 of the level of basic secondary education [4]. In the 6th grade, ten sections are covered. The learning objectives that fully cover the content of the 6th grade are presented in table 2.

Table 2 - Learning Objectives for Grade 6

№	Section name	Learning objectives
1	Relationships and proportions	6.1.2.4 - recognize and make proportions; 6.1.2.5 - know and apply the basic property of proportion; 6.5.1.1 - recognize and solve problems in which quantities are related by direct and inverse proportions; 6.5.1.2 - solve problems for percent using proportions;
2	Rational numbers and actions on them	6.1.2.13 - perform addition with the same signs and with different signs of rational numbers; 6.1.2.14 - perform subtraction of rational numbers; 6.1.2.24 - find the distance between points on the coordinate line; 6.1.2.15 - perform multiplication of rational numbers; 6.1.2.16 - perform division of rational numbers; 6.1.2.22 - find the values of numerical expressions containing rational numbers; 6.5.1.4 - solve word problems with rational numbers;
3	Algebraic expressions	6.2.1.5 - know the rules for opening brackets; 6.2.1.6 - know the definitions of the concepts of the coefficient, similar terms; 6.2.1.7 - bring similar terms in algebraic expressions; 6.2.1.9 - perform identical transformations of algebraic expressions; 6.5.2.4 - compose expressions with variables and formulas when solving word problems;
4	Linear Equation in One Variable	6.2.2.3 - solve linear equations in one variable; 6.2.2.4 - solve equations of the form $\|x \pm a\| = b$, where a and b are rational numbers; 6.5.1.6 - solve word problems by writing linear equations;
5	Linear inequalities in one variable	6.2.2.8 - display numerical intervals; 6.2.2.9 - find the union and intersection of numeric intervals; 6.2.2.12 - depict solutions to inequalities on a coordinate line; 6.2.2.13 - write down solutions to inequalities in the form of a

		numerical interval and write down a given numerical interval in the form of an inequality; 6.2.2.14 - solve systems of linear inequalities with one variable; 6.2.2.15 - to depict a set of points on a coordinate line, given by an inequality of the form $\|x\|>a$, $\|x\|\geq a$, $\|x\|<a$, $\|x\|\leq a$;
6	Coordinate plane	6.3.1.4 - build a point in the coordinate system by its coordinates and find the coordinates of a point specified on the coordinate plane; 6.3.2.3 - find graphically the coordinates of points of intersection of segments, rays or straight lines with each other, with coordinate axes;
7	Statistics. Combinatorics	6.4.3.1 - know the definitions of the arithmetic mean of several numbers, the range, median and mode of a number of numerical data; 6.4.3.2 - calculate statistical numerical characteristics; 6.5.1.5 - solve problems of finding the average speed of movement; 6.4.2.1 - solve combinatorial problems by the method of enumeration;
8	Dependencies between quantities	6.5.2.10 - find and investigate relationships between quantities using graphs of real processes; 6.2.1.12 - know the formula and build a graph of direct proportionality; 6.5.2.11 - interpret graphs of real dependencies between directly proportional values; 6.5.2.12 - write down the formula of direct proportionality according to the description; 6.5.2.13 - build a graph of direct proportionality;
9	Linear equations in two variables and their systems	6.2.2.19 - solve systems of equations by substitution and addition methods

Organization of the lesson based on a short-term plan in which learning objectives are integrated (corresponding to the learning objectives of two consecutive classes).

Examples of integrating learning objectives for the academic subjects "Algebra" of the 7th grade and "Mathematics" of the 6th grade are presented in Table 3 [4-5].

Table 3 - Learning objectives for grades 6-7

7th grade learning goal	6th grade learning goal
7.1.2.4 - find the numerical value of a power with an integer exponent and represent the given numbers as a power;	6.1.2.13 - perform addition with the same signs and with different signs of rational numbers; 6.1.2.15 - perform multiplication of rational numbers; 6.1.2.16 - perform division of rational numbers;
7.2.1.1 - apply the properties of a degree with an integer exponent when finding the values of numerical expressions;	6.1.2.13 - perform addition with the same signs and with different signs of rational numbers; 6.1.2.15 - perform multiplication of rational numbers; 6.1.2.16 - perform division of rational numbers;
7.2.1.13 - perform identical	6.2.1.6 - know the definitions of the concepts of the

transformations of algebraic expressions using actions on polynomials	coefficient, similar terms 6.2.1.7 - bring similar terms in algebraic expressions 6.2.1.8 - know the definitions of identity and identical transformations; 6.2.1.9 - perform identical transformations of algebraic expressions;

If the subjects of the educational process realize the importance of working to fill the gaps in the knowledge of students, develop and implement a target work plan, then the development of the curriculum by the students of the new academic year with filling the gaps in the knowledge of students will be productive.

References

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3. Instructional and methodological letter "On the features of the educational process in secondary education organizations of the Republic of Kazakhstan in the 2021-2022 academic year." - Nur-Sultan: NAO named after Y. Altynsarin, 2021. - 338 p.

4. Typical curriculum for the academic subject "Mathematics" for 5-6 grades of the level of basic secondary education according to the updated content Appendix 9 to the order of the acting Minister of Education and Science of the Republic of Kazakhstan dated October 25, 2017 No. 545.

5. Standard curriculum on the subject "Algebra" for grades 7-9 of the level of basic secondary education on the updated content. Appendix 10 to the order of the acting Minister of Education and Science of the Republic of Kazakhstan dated October 25, 2017 No. 545.