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Designing the intra-school system of meta-subject education

Diseño del sistema intraescolar de educación por meta-asignatura

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Contents

ABSTRACT:
The manuscript presents results of 15 years of experimental work in several Moscow schools on creation, theoretical substantiation, and approbation of teaching, methodological, and managerial support for meta-subject education. This support was designed as a complex intra-school didactic-methodical system with the rationale for the socio-pedagogical values of meta-subject education, the definition of the main components of its content, teaching, and methodical complexes of meta-subject courses, methodological recommendations on designing meta-subject lessons and organizing project and research activities of students.
Keywords: meta-subject educational results; education content; meta-subject course; meta-subject lesson

RESUMEN:
El manuscrito presenta los resultados de 15 años de trabajo experimental en varias escuelas de Moscú sobre creación, fundamentación teórica y aprobación de la enseñanza, el apoyo metodológico y de gestión para la enseñanza de la meta-asignatura. Este apoyo se diseñó como un sistema didáctico-metódico intraescolar complejo con el fundamento de los valores socio-pedagógicos de la educación de la meta-asignatura, la definición de los componentes principales de su contenido, la enseñanza y los complejos metódicos de los cursos de la sub-asignatura. Recomendaciones metodológicas sobre el diseño de lecciones de meta-asignatura y la organización de proyectos y actividades de investigación de los estudiantes.
Palabras clave: resultados educativos meta-sujeto; contenido educativo; curso de meta-asignatura; lección de meta-asignatura

1. Introduction

The results of international studies of educational achievements of Russian 15-year-old PISA school students (Programme for International Student Assessment), conducted in Russia since 2000, are of great concern, firstly, due to low quantitative indicators and secondly, due

to with their negative dynamics. According to international experts, "the results of Russian students show not only the insufficient formation of individual reading skills but also the presence of a more general problem - the lack of formation of general skills of working with information. This problem cannot be successfully resolved using only one academic subject or group of subjects or the efforts of only one particular group of teachers. It is necessary to develop and implement a comprehensive targeted program that covers all aspects of the educational activities of students, all academic subjects and all stages of schooling" (FIOCO, 2015, Pintrich, 2002, Abulkhanova, 2014, Sukhodimtseva et al., 2018, Popov et al., 2016, Mazilina, 2016, Tabachuk et al.,2018). As a kind of hail to the unfavourable state of affairs in the Federal State Educational Standard of Primary General Education, one of the most important educational results was “meta-subject, including universal, learning activities developed by students, ensuring mastery of the key competencies that form the basis of learning”.

The purpose of the article is to submit he project of intra-school system of meta-subject education.

In this regard, our research is aimed at finding answers to the following questions:

- First, it is necessary to correctly define what is meta-subject education, what are its value-oriented priorities?

- Second, a clear definition of the content of meta-subject education is required. What is the need to master students, is it only universal learning activities, or is everything much more complicated?

- Third, it is necessary to develop and implement in the format of the whole school a holistic teaching and methodological support of meta-subject education. It is about meta-subject courses, and meta-subject lessons of general education subjects, and additional education studios that grow "able students," etc. - Fourth, how to form the methodological readiness of teachers to ensure students achieve meta-subject educational results?

The authors emphasize that these positions are equal, theoretically sound and technologically equipped answers to the questions are required: "Why?", "What?", "How?", and "Due to what?". Answers to these questions imply the development of the intra-school system of meta-subject education because adequate systemic solutions solve the complex system problems of the educational process. A description of this system of meta-subject education will be presented in this article.

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2. Literature review

It should be recognized that in the Russian pedagogy the fundamental theory of meta-subject education has not been formed (Burmakina et al., 2006, Chigisheva et al.2017, Dammer, 2014, Golub et al., 2016). At present, rare publications of domestic researchers are just beginning to appear on the subject of the achievement of meta-subject educational results by students (Boyatzis, 2008, Caner et al., 2015, Germanov et al., 2015, Sergeeva et al., 2017, Serghienko, 2013). It should be noted that predominantly only two scientific schools, Gromyko (1998, 2001, 2001) and Khutorskoy (2014, 2015), conducted in-depth theoretical and practical studies of meta-subject over a quarter of a century. If Yu.V. Gromyko, in his research, relied on the achievements of Russian psychology, then A.V. Khutorskoy bases its theory of meta-subject education on the philosophy of Russian cosmism (S. Bulgakov, V. Vernadsky, V.l. Soloviev, P. Florensky, and others). Let us imagine and briefly describe the critical approaches of these researchers, revealing the substantive and technological aspects of meta-subject education.

A) What are the approaches to determining the content of meta-subject education?

A.V. Khutorskoy believes as follows: “The meta-subject content of educational standards includes:

1. Real objects of the studied reality, including the primary educational objects.

2. General cultural knowledge about the studied reality, including fundamental problems.

3. Meta-subject and general educational skills, skills, generalized methods of activity.

4. Key (meta-subject) educational competencies" (Khutorskoy, 2012).

This definition of the content of meta-subject education is based on the concept of human culture, which is based on the student's holistic view as a person with a physical, emotional and intellectual component, as well as a value, spiritual and moral basis of life activity (Khutorskoy, 2015).

It is regrettable to recognize that in the development of federal standards of general education, almost half a century of history of Russian pedagogy on the system understanding of general education skills was ignored. Studies are presented in the works of different authors (Loshkareva, 1984, Vorovshchikov, 2007, 2011; Palamarchuk, 1987; Tatianchenko and Vorovshchikov, 1996, 2003; Usova and Bobrov, 1987).

According to Gromyko, meta-subject education suggests a meta-subject type of content integration, the features of which are as follows:

1) The priority of the activity bases of educational content. Transferring to students not just knowledge, but activity-based ways of working with knowledge. For example, a concept may be viewed as an activity unit of content. If a teacher reveals for the student a way of its generation and provides their mastery as a means of the student's action, then it can be argued that the teacher works with the concept as an activity unit of educational content.

2) Reflexive rethinking of the subject foundations of educational content. The meta-subject approach is an excellent knowledge of one's subject, which allows one to actively reassemble educational material and re-interpret it from activity content units.

3) Orientation to the development of basic skills in schoolchildren, such as thinking, imagination, unique ability, goal-setting or self-determination ability, idealization ability, speech, etc. - the essential specificity of meta-subject integration (Gromyko, 2000).

Thus, Khutorskoy and Gromyko do not reduce the content of education only to universal educational activities, as it is presented in the Russian educational standard of general education. According to the unanimous opinion of researchers, the meta-subject approach provides a transition from the existing practice of eclectic fragmentation of knowledge into academic subjects to a holistic perception of the world, meta-activity, and the study of objects of the real world as primary educational objects.

B) What are the approaches to the definition of educational and methodological features of a meta-subject course?

A.V. Khutorskoy rightly states: "Educational meta-subject is a new category of pedagogy" (Khutorskoy, 2012). The first version of the "Approximate basic educational program of an educational institution. Primary School" indicates four so-called inter-subject courses - "Formation of universal educational activities," "Formation of ICT competence of students," "Basics of educational and research and project activities" and "Basics of semantic reading and work with the text". Unfortunately, the new version of the approximate basic education program of general education levels does not even mention these, undoubtedly, meta-subject courses (Federal Academic Methodological Association on General Education, 2015).

A.V. Khutorskoy sees a meta-subject as the main component of an educational subject: "Educational meta-subject is a pedagogically adapted educational system based on one or several interrelated fundamental educational objects, in the corresponding problems, activities and competences" (Khutorskoy, 2012). A.V. Khutorskoy believes that the main feature of the meta-subject is the subjective nature of the organization of the development of this course, the possibility of its quick reconfiguration, depending on the needs of the students. The content of the meta-subject is qualitatively different from the content of the usual training course in that the semantic field of objects of knowledge in it goes beyond the traditional academic subjects and is located at the meta level. The result of the knowledge of these objects is not reported to the student as a finished material but is obtained by each student in own way in the course of organized heuristic activity (Khutorskoy, 2018). The following courses can be cited as examples of already developed meta-subjects: "Numbers", "World Studies" (Khutorskoy, 1993, 1994).

Gromyko sees a meta-subject as not the main component of an educational subject, but its

activity "slice." The researcher defines meta-subject as an educational subject of a new type, based on an activity-based type of integration of educational material and the principle of a reflexive attitude to the basic organizations of thinking - "knowledge," "sign," "task," which are over-subject and universal (Gromyko, 2000). Following this, the name of meta-objects is "Knowledge", "Sign", "Problem" (Gromyko, 1998, 2001, 2001).

Thus, representatives of two scientific schools are unanimous in interpreting the priority role of the meta-subject course in the educational system of meta-subject education. The main features of the meta-subject course are manifested in the inter-subject integration of the content of education, an orientation towards the formation of a holistic picture of the world through the comprehension of the fundamental problems of the universe, primary key meanings.

C) What are the approaches to the definition of educational and methodological features of meta-subject lessons?

Scientific School of Meta-subject Integration and Mental Pedagogy by Gromyko suggests five main components of a meta-subject lesson: the topic of the lesson should be devoted to a meta-subject matter that can be disclosed on different subject matter; it is necessary to determine what kind of activity can be taught to students; a meta-subject lesson means good knowledge of fundamental scientific laws; it is necessary to determine what essential ability will be formed in students during the training session; the teacher must be prepared for improvisation, changing the tactics of interaction with students depending on the situation, although the pre-built strategy of the didactic movement is preserved. According to representatives of the scientific school of Yu.V. Gromyko, such meta-subject lessons allow for preserving and developing a culture of thinking and a complete picture of the world (Gromyko N.V., 2015).

Khutorskoy, following the same and formulated principle of a human-like education, proposes the following sequence of stages of a meta-subject heuristic lesson: “Any question or topic is first stated by the students themselves at their presentation level. Answers and opinions of children are discussed, compared, and commented. The teacher no longer assesses as "right" or "wrong." After the students have created own educational product - a drawing, a version, a table, etc., the teacher introduces them to the cultural-historical versions of solving the same problem that the students have solved. The teacher leads and discusses quotations from primary sources with students, compares the definitions given by the students to those that are available to the scientists, and are placed in dictionaries and encyclopaedias. There is a comparison of the material being studied with the content created by the student personally. As a result, each student says that they did the best, how they came to his result, what they liked most of all, was remembered. This stage is called reflexive. Its task is to make each student understand the results, difficulties, and ways of own activity. Self-assessment and evaluation of educational results occur by the reflexive stage (Khutorskoy, 2012). Khutorskoy considers meta-subject lessons as an effective means of heuristic learning - learning, in which knowledge is not transferred by the teacher, but is born in the students' activities.

Thus, the scientific schools by Gromyko and Khutorskoy are convinced that the development of the meta-subject content of general education cannot be carried out in traditional ways within the framework of general education subjects. A new component of educational content requires new educational resources. The leading role in meta-subject education is played by meta-subject courses that form a complete picture of the world, and meta-subject lessons are the most widespread pedagogical means promoting the purposeful development of cognitive, activity and axiological components of the content of meta-subject education by students.

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3. Materials and methods

Development of the project of intra-school system of meta-subject education were carried out from 2003 to the present in the format of an experimental network platform, which operates under the auspices of Moscow State Pedagogical University and Moscow City University. The experimental base consisted of the following Moscow schools: No. 870, 879,

1280, 2086 (Orlova, 2005), Rosinka (Novozholova, 2009), Olimp-Plus, gymnasiums No. 1508 and 1591 (Vorovshchikov, 2011; Mogilnuchenko, 2008).

Each research possessed unique methodology. But for all researches there were general methodological bases: *system approach,* which considers the studied phenomenon as difficult social system; *synergetic approach*, which learns the general processes of self-organization in difficult systems; *activity approach,* which considers active interaction of the person with surrounding reality; *research approach to management,* which considers administrative activity as one of types of cognitive activity; *the theory of motivation of educational activity,* which defines major factors of influence on formation of positive motivation to educational activity; competence-based approach to the content of education.

Considering the long-term and large-scale nature of the project, in different periods, the development and implementation of various components of the intra-school system of meta-subject education, which were reflected in five dissertation research, became priorities (Vorovshchikov, 2011; Gladik, 2008; Mogilnichenko, 2008; Novozholova, 2009; Orlova, 2005). For example, the development and testing of the intra-school system for the development of research skills as an activity component of the content of meta-subject education was carried out within the boundaries of three stages: project (2003-2005), constructive-correction (2005-2007) and analytical-synthesis (2008-2014). The dynamics of the development of research skills was established in the course of correlating the actual results obtained with the planned and applied efforts determined through cost indicators. The primary and advanced levels were defined as the levels of development of students' research skills. The primary level: the pupil owns some integrative abilities of research activity; the teacher helps the pupil to conduct research. The advanced level: the pupil owns all integrative abilities of research activity, learning to conduct independently research. The indicators of the dynamics of the research skills development are presented in the form of an increase in the proportion of, first, the independence of students, second, their awareness (readiness to verbalize, explain the goals, consistency and criteria for evaluating the achievement of the result) when performing a research activity, third, ability to perform a set of complex skills, which allows for effective carrying out of educational research.

Table 1

Dynamics of possession of research skills

№	Indicators of possession of research skills	Levels of proficiency in skills	2003-04 academic year		2007-08 academic year	
			control schools	experimental schools	control schools	experimental schools
1	Independence of pupils	the primary levels	95%	95%	85%	55%
		the advanced levels	5%	5%	5%	45%
2	Sensibleness when performing specific research action	the primary levels	95%	90%	90%	65%
		the advanced levels	5%	10%	10%	35%
3	Readiness to execute more difficult way of research activity	the primary levels	90%	95%	90%	75%
		the advanced levels	10%	5%	10%	25%

In the course of the experimental work, three complementary methods were used to study the dynamics of the formation of research skills. The first method involved an assessment of the level of development of this skill in the implementation of project and research activities

based on the assessment of the jury of the school conference, analysis of the portfolio, presentations, observations of group work, expert assessments of teachers and consultants and a research supervisor. The second method was to assess the formation of skills within the framework of the meta-subject course "Educational Research." The third method consisted of the students' self-appraisal of possession of research skills (Novozhilova, 2009). The received results testify: complete use of intra school system of meta-subject education promotes more harmonious development of research abilities.

The main methods of consulting support of experimental work on the creation, discussion, approbation and adjustment of educational, methodological and managerial support of meta-subject education were the project consulting and process consulting.

- Project consulting assumes that the initiative groups of school leaders and teachers are invited to discuss and adjust the already developed projects of teaching and management documents. In this case, the consultant acts as a developer, and the school teachers as experts and participants in the approbation of management and methodological documents.

- Process consulting involves the joint work of the consultant, managers, and teachers to identify problems of educational, methodical and managerial support of meta-subject education, develop solutions and implement them in educational and management processes. In this case, the school's employees act as developers, and the consultant, as an expert in management and methodological documents (Vorovshchikov, 2011).

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4. Results

In connection with the general goal of large-scale experimental work throughout fifteen years, the following didactic, methodological and management documents were created and introduced into educational practice. These documents reflect intra school system of meta-subject education:

1. Justification of the social and pedagogical values of meta-subject education as an integral part of the target section of educational programs of general education levels.

2. Determination of the content of meta-subject education, a more detailed presentation of the activity component in the form of classification of general educational skills (Tatianchenko and Vorovshchikov, 1996, 2003).

3. Justification of the "logical five-minute" as a small form of purposeful development of educational and logical skills of students in primary grades.

4. Educational and methodical complexes of meta-subject courses "Fundamentals of educational research" (Novozhilova et al., 2011) and "The ABC of logical thinking" (Vorovshchikov, 2007).

5. Technology for developing scenarios of meta-subject lessons.

6. Monitoring toolkit for studying the development of priority general educational skills of students and a package of case assignments to determine the readiness of teachers to organize students' mastery of the meta-subject content of education.

7. A package of educational, methodological and management documents on the organization of the meta-subject orientation of the project and research activities of students.

8. Technology (self) analysis of a meta-subject lesson.

9. The technology of managing the development and implementation of the intra-school system of meta-subject education.

Thus, we answered questions which put at the beginning of article.

The effectiveness of this didactic-methodical and managerial support was substantiated and proved in five dissertation research conducted by the leaders of experimental schools and a scientific consultant (Vorovshchikov, 2011; Gladik, 2008; Mogilnichenko, 2008; Novozhilova, 2009; Orlova, 2005).

It should be noted that the process of developing, discussing and implementing the methodological and managerial support of meta-subject education was carried out in the

format of intra-school scientific methodological work, which initiated practice-oriented improvement of the professional competence of teachers. The mentioned materials became the content of the master's degree program "Meta-subject Education," advanced training courses, which were conducted for ten years at the Moscow State Pedagogical University.

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5. Discussion

Let us imagine and comment on the composition and structure of the intra-school system of educational and methodological support of meta-subject education. Let us note that the implementation of each block of the system of meta-subject education separately will not lead to the development by the students of the content of meta-subject education. This can be achieved only if all the efforts of the leaders, teachers, and tutors of additional education will be directed to the implementation of the entire system of units of this system. Main condition of realization of meta-subject education: design and introduction in educational process of all components of intra school system:

1st unit. Socio-pedagogical values of meta-subject education

2nd unit. The content of meta-subject education

3rd unit. Educational and methodical complexes of meta-subject courses

4th unit. Meta-subject lessons

5th unit. Additional general education programs

6th unit. Project and research activities

The first unit has a value-semantic focus, answering the question “Why?”. The second is a substantive focus, answering the question "What?". The following units are technological, answering the question "How?” It should be noted that the main emphasis on the technological blocks is made on the development of the activity component of the content of meta-subject education - general education skills.

1st unit. Socio-pedagogical values of meta-subject education

Let us focus on the activity component of the content of meta-subject education; the authors will define the value aspects of mastering general educational skills by students as universal for many academic subjects ways of obtaining and applying knowledge:

- First, it is a factor of student's academic mobility, i.e., the success of their school years and the readiness of continuous lifelong education.

- Second, it is a factor of professional mobility of the individual, ensuring the implementation of higher education, the acquisition of a profession, permanent professional development, and professional retraining.

- Third, it is a factor that increases the efficiency of the school, a social institution, designed to implement the program of general education. Indeed, without an active cognitive position of the student, without their willingness to independently carry out educational and cognitive activity, effective school work is impossible (Lebedev, 2004).

2nd unit. The content of meta-subject education

The authors believe that the interpretation of the content of meta-subject education following the culture concept of the content of education is promising (Kraievskiy et al., 1982). Following this concept let us define four culture-like components of the content of meta-subject education:

- Cognitive component includes knowledge of fundamental methodological concepts: principle, law, hypothesis, sign, problem, reflection, etc., ideas about real objects of studied reality as primary educational objects, etc. The meta-subject approach is the essence of the convergence of the content of education, but through not only establishing external inter-subject connections but substantiating the deep integrity and fundamental nature of education as a reflection of the integrity of the knowable reality.

- Activity component is universal for many school subjects educational and cognitive methods of acquiring, organizing and applying knowledge in standard and non-standard

situations, i.e. the so-called general educational skills; general scientific methods of cognition, "which should have not so much a training as a really effective role in life" (Khutorskoy, 2017). Thus, the activity-competence component of the content of meta-subject education cannot be reduced only to general educational skills. However, considering the general educational orientation of school education, of all meta-subject types of activity, we will focus on educational and cognitive activity. Let us define learning and cognitive activity as a student's self-governing activity on solving personally significant and socially relevant real cognitive problems, accompanied by mastering the knowledge and skills necessary for its resolution in obtaining, processing and applying information. This interpretation determined the composition and structure of our classification of general education skills.

In the authors' classification, published for the first time in 1996 (Tatianchenko and Vorovshchikov, 1996), general education skills are grouped into three groups:

1. Educational and management skills.

2. Educational and information skills.

2.1. Ability to work with written texts.

2.2. Ability to work with verbal texts.

2.3. Ability to work with real objects as sources of information.

3. Educational and logical skills.

3.1. Analysis and synthesis.

3.2. Comparison.

3.3. Generalization and classification.

3.4. Definition of concepts.

3.5. Proof and refutation.

3.6. Identifying and solving problems.

Each skill group contains specific operational language skills. Educational and management skills mean general educational skills that provide planning, organization, control, regulation and analysis of students' learning activities. Educational and information skills mean general educational skills that provide finding, processing and use of information for solving educational tasks. Educational and logical skills are general educational skills that provide a clear structure for the content of the process of setting and solving learning tasks.

- The creative component includes procedures of creative activity as creative skills of posing and solving problems following the creative activity logic, the Russian didactics classics - Skatkin, Lerner, and Kraievskiy - identified the following skills to make effective decisions in non-standard cognitive problem situations: ability to identify cognitive problems, i.e. establish a discrepancy between the desired and the actual; the ability to determine to solve problems a new function of the object; the ability to transfer knowledge and skills to a new situation; skills to combine known means for new problem solving, etc. (Kraievskiy et al., 1982).

- The axiological component includes value-semantic orientations, beliefs about the meanings, goals, subjects, and results of the educational and cognitive activity, etc. Undoubtedly, the values of the learning process, scientific activity, truth, the value of creativity are essential.

The authors emphasize that the interpretation of general education skills as complex intellectual skills implies the obligatory presentation of theoretical instructional knowledge to students to implement a particular skill correctly. Students in the performance of substantive learning tasks as a necessary by-product do not automatically master general educational skills. The effective use of general education skills in solving educational problems suggests that they must first act as a subject of purposeful mastering. This is precisely the purpose of the technological blocks of the meta-subject education system, in which the primary emphasis is placed on mastering the activity component of the meta-subject education content - general educational skills.

3rd unit. Educational and methodical complexes of meta-subject courses

Meta-subject courses aimed at mastering the activity component of the content of meta-subject education make it possible to form theoretical-instructive, technological and axiological foundations of general education skills (Bespalko et al., 1989). The authors indicate their courses as an example of educational and methodical complexes of similar meta-subject courses: "Fundamentals of educational research" for students of 5-10 grades (Novozhilova et al., 2011) and "The ABC of Logical Thinking" for students of 9-10 grades (Vorovshchikov, 2007). The values, knowledge, and skills mastered by students within the boundaries of the meta-subject course of activity orientation allow subject teachers for more effective improvement of the priority components of the meta-subject education content within the boundaries of general education subjects. When organizing a project and research activity at a school, this course forms the general starting level of knowledge and skills required for competent participation in a project and conducting educational research.

4th unit. Meta-subject lessons

Meta-subject lessons play a significant role in meta-subject education, including through meta-subject integration of the educational content. Various components of the meta-subject education can be treated as an object of mastering on meta-subject classes: methodological categories of educational and cognitive activities such as problem, the purpose of knowledge, hypothesis, reflection, etc., logical means: analysis and synthesis, comparison, generalization and classification, definition, proof, and refutation. Thus, the content of the meta-subject lessons is subject to the reflexive nature of the learning and cognitive activity, which is aimed not only at obtaining new knowledge but also at the very process of receiving it (Koval et al., 2011). Meta-subject lessons, which are mainly aimed at the development by students of the activity content of meta-subject education, contribute to the purposeful formation of the cognitive, activity, and axiological components of general educational exercises.

5th unit. Additional general education programs

The educational potential of additional general education programs for children's associations is significantly increased due to the integration with extracurricular meta-subject courses. The implementation of additional general education programs for children's associations (intellectual clubs, sections, studios, circles, etc.) is further developed in the project and research activities of students.

6th unit. Project and research activities

Project and research activities should be based on the integration of general and additional education. One of the mechanisms of such integration is an integral package of intra-school didactic-methodical documents on ensuring the organization and implementation of project and research activities of students:

- Intra-school regulatory documents ensuring the stable development of this area of the educational process, for example, the provision of the school conference of project and research works of students (Artamonova et al., 2017, Dofman, 2016, Dofman et al., 2014), etc.

- Methodological recommendations for teachers acting as consultants for project and research work of students, for example, the teaching and methodical complex of a meta-subject course (Novozhilova, 2009), etc.

- Didactic recommendations to students, for example, requirements for the selection and formulation of a topic, the structure of defensive speech, etc.

Thus, the didactic-methodical support for the organization and implementation of project and research activities of students includes both strategic and tactical documents, both regulatory and advisory, both methodological and didactic. The package of these documents should not only be annually discussed, adjusted and approved by the pedagogical council and the student scientific community, but also communicated to all participants: both students and their parents, so teachers, teachers of additional education, acting in the role

of scientific consultants.

6. Conclusion

The development and implementation of teaching and methodological support of meta-subject education, in turn, involves the design of appropriate management support (Seitenova et al., 2016). This support should be aimed at ensuring the coordination of the activities of teachers working in the same class and the continuity of the activities of teachers at all levels of general education. Intra-school management is required, which initiates the involvement of teachers in the development, adjustment, adaptation and testing of the teaching and methodological support of meta-subject education.

At that, the following provisions shall be considered:

1. The systemic nature of meta-subject education requires an appropriate multi-level design of its educational and methodological support not only at the level of individual curricula of meta-subjects or meta-subject lessons but also the detailed development of the substantive part of educational programs of general education levels aimed at mastering universal educational activities.

2. Due to the high rate of innovativeness of meta-subject education, the development and implementation of appropriate educational and methodological support in the educational process of a school require the organization of an intra-school system of scientific and methodological support. It is the intra-school scientific and methodological work that contributes to ensuring the quality of education by solving innovative psychological and pedagogical problems through the development, identification, adaptation, and introduction of educational and methodological means into the educational process, which are accompanied by problem-oriented and practical-oriented improvement of teachers' professional competence.

3. Only active participation of teachers in the development, discussion, and implementation in practice of solving problems of students’ skills to learn will, on the one hand, create educational-methodical complexes adequate to school’s characteristics, and on the other hand, master them and form methodological and psychological readiness of teachers to implement given educational support.

Bibliographic references

Abulkhanova, K.A. (2014). Methodological principle of a subject: study of person's life course. *Psychological Journal*, *35*(2), 5-18.

Artamonova, E.I., Vorovshchikov, S.G. (2017). School of sciences of Management of educational systems of T.I. Shamova. *Pedagogical education and science*, *1*, 7-11.

Bespalko, V.P., Tatur, YU.G. (1989). *System and methodical ensuring teaching and educational process of training of specialists*. Moscow: The higher school.

Boyatzis, R.L. (2008). Competencies in the 21st century. *Journal of Management Development, 27*(1), 5-12.

Burmakina, V., Khoroshilov, A. and Fedanov, A. (2006). Assessment of information and communication competency of schoolchildren. *Elearning World, 1*, 62-70.

Caner, E., Acun, I. and Demirhan, G. (2015). The impact of ICT on pupils' achievement and attitudes in social studies. *Journal of Social Studies Education Research, 6*(1), 190-207.

Chigisheva, O., Soltovets, E. and Bondarenko, A. (2017). Functional foreign language literacy for global research career development: Analysis of standardized open-ended interview responses. *Xliguae, 4*, 138-153.

Dammer, M.D. (2014). The meta-subject content of an academic discipline. *Education. Pedagogical Sciences, 1*, 46-52.

Dofman, L.Ya., Beleva, M.V. (2014). The relationship between creativity and variability. *Psychological Journal, 35*(2), 57-67.

Dofman, L.Ya. (2016). Creative mental field, divergence and variability*. Psychological*

Journal, 37(1), 26-34.

Federal Academic Methodological Association on General Education. (2015). Approximate basic education program of primary general education. Decision as of April 08, 2015 No. 1/15.

FIOCO. (2015). *Main results of PISA-2015 international research*. Retrieved from http://fioco.ru/Media/Default/Documents//Report_PISA2015.pdf.

Germanov, G.N., Filimonova, S.I. and Sabirova, I.A. (2015). Meta-subject educational results in vocational training of athlete and coaches (on the example of bullet firing). *Scientific notes of Lesgaft National State University of Physical Education, Sport and Health, 2*, 43-51.

Gladik, N.V. (2008). *Forming self-assessment of the effectiveness of quality management for scientific and methodological work in a general education institution: Author's abstract of Doctor of Sciences (Pedagogy)*. Moscow: Publishing house of the Moscow pedagogical state university.

Golub, G., Kogan, E. and Fishman I. (2016). Meta-subject and Personal Results of Education: Problems of Introducing. *Standards and Monitoring in Education, 4*(6), 50-60.

Gromyko, N.V. (2015). *Meta-subject approach in education when implementing new educational standards*. Received from http://www.docme.ru/doc/38300/stat._ya-gromyko-n.v.-metapredmetnyj-podhod-v-obuchenii.

Gromyko, Yu.V. (1998). *Meta-subject "Problem."* Moscow: Institute of the "Paideiia" textbook.

Gromyko, Yu.V. (2000). *Mental pedagogy*. Minsk: Tekhnoprint.

Gromyko, Yu.V. (2001). *Meta-subject "Knowledge."* Moscow: The Pushkin Institute.

Gromyko, Yu.V. (2001). *Meta-subject "Sign." Schematization and construction of signs. Understanding symbols*. Moscow: The Pushkin Institute.

Khutorskoy, A.V. (1993). *Meta-subject "World Studies."* Chernogolovka: Eidos Publishing House.

Khutorskoy, A.V. (1994). *Meta-subject "Numbers."* Chernogolovka: Eidos Publishing House.

Khutorskoy, A.V. (2012). *Meta-subject approach in learning*. Moscow: Eidos Publishing House.

Khutorskoy, A.V. (2014). *Methodology of pedagogy: human congruity approach. The study results*. Moscow: Eidos Publishing House.

Khutorskoy, A.V. (2015). *The concept of the scientific school of human congruity education*. Moscow: Eidos Publishing House.

Khutorskoy, A.V. (2017). *Didactics*. Saint Petersburg: Piter.

Khutorskoy, A.V. (2018*). Educational meta-subject*. Received from http://khutorskoy.ru/science/concepts/terms/metapredmet.htm.

Koval, T.V., Lazebnikova, A.YU. (2017). Interdisciplinary outcomes as a new component of educational standards. *The European Proceedings of Social & Behavioural Sciences*, 379-387.

Kraievskiy, V.V., Lerner, I.Ya. and Skatkin, M.N. (1982). *Didactics of high school*. Moscow: Prosveshchenie.

Lebedev, O.E. (2004). Competence approach in education. *School technologies, 6*, 3-12.

Loshkareva, N.A. (1984). The development of general education skills of schoolchildren. *Education of schoolchildren, 4*, 64-69.

Mazilina, D. (2016). Achievement of meta-subject results in the process of studying literature. *Bulletin of Moscow State Regional University. Series: Pedagogics, 1*, 78-84.

Mogilnichenko, T.N. (2008). *Improving the professional competence of teachers in the development of elective courses: Author's abstract of Doctor of Sciences (Pedagogy)*. Moscow: Publishing house of the Moscow pedagogical state university.

Novozhilova, M.M. (2009). *Formation of the culture of research activities of high school students in the context of specialized training. Author's abstract of Doctor of Sciences (Pedagogy)*. Moscow: Publishing house of the Moscow pedagogical state university.

Novozhilova, M.M. (2009). *Forming the culture of research activities of high school students in the context of specialized education*. Moscow: Prometheus.

Novozhilova, M.M., Vorovshchikov, S.G., Tavrel, I.V. (2011). *How to conduct an educational study correctly: from conception to discovery*. Moscow: 5 for knowledge.

Orlova, E.V. (2005). *Managing the development of general education skills of middle school students: Author's abstract of Doctor of Sciences (Pedagogy)*. Moscow: Publishing house of the Moscow pedagogical state university.

Palamarchuk, V.F. (1987). *School teaches one to think*. Moscow: Prosveshchenie.

Pintrich, P.R. (2002). The role of metacognitive knowledge in learning, teaching, and assessing. *Theory into Practice, 41*(4), 219-225.

Popov, L.M., Ibraghimova, E.N. and Ustin. P.N. (2016). Ponomarev's concept of the psychology of creativity and its use for studying the self-development. *Psychological Journal,* 37(1), 35-47.

Seitenova, S.S., Kaplieva, A.K., Kudassova, G., Knisarina, M., Mailybayeva, G. and Mustoyapova, A.S. (2016). The formation of management skills in junior school children: the analysis of the problem. *The Social Sciences (Pakistan), 11*(10), 2636-2641.

Sergeeva, M., Sinelnikov, I., Sukhodimtseva, A. (2017). Meta-subject abilities development in upper secondary school students as a pedagogical problem. EEIA-2017 2017 International conference "Education Environment for the Information Age." *The European Proceedings of Social & Behavioral Sciences*. Retrieved from Serghienko, E.A. (2013). The problem of correlation between notions of subject and personality. *Psychological Journal, 34*(2), 5-16.

Sukhodimtseva, A.P., Sergeeva, M.G., Tomashevich, S.B. (2018). Metadisciplinarity in education: solving actual problems. *Espacios., 39*(2), 27-32. http://www.revistaespacios.com/a18v39n02/18390227.html

Tabachuk, N.P., Ledovskikh, I.A., Karpova, I.V., Kazinets, V.A., Polichka, A.E. and Shulika, N.A. (2018). Information competency and creative initiative of personality and their manifestation in activity. *Journal of social studies education research, 9*(1), 168-186.

Tateo, L. (2012). What do you mean by 'teacher'? Psychological research on teacher professional identity. *Psicologia & Sociedade, 24*(2), 344-353.

Tatianchenko, D.V., Vorovshchikov, S.G. (1996). *General educational skills: the charm of obvious things*. Chelyabinsk: Scientific and Technical Information Center.

Tatianchenko, D.V., Vorovshchikov, S.G. (2003). Development of general education skills of schoolchildren. *Public education, 8*, 115-126.

Usova, A.V., Bobrov, A.A. (1987). *Formation of learning skills in students*. Moscow: Znanie.

Vorovshchikov, S.G. (2007). *The ABCs of logical thinking*. Moscow: 5 for knowledge.

Vorovshchikov, S.G. (2011). *Intra-school management of developing educational and cognitive competence of high school students: Author's abstract of Doctor of Sciences (Pedagogy)*. Moscow: Publishing house of the Moscow pedagogical state university.

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