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INTEGRATIVE STRATEGIES FOR TEACHING AND LEARNING AS A RENEWAL OF SCHOOL EDUCATION

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Abstract

The article is devoted to the problem of introduction of integrative strategies for a renewal of school education, based upon a meta-subject-integrative approach as an innovation. The authors have substantiated the urgency of introducing technologies for teaching and learning into the educational process that ensure the integration of knowledge from different disciplines and the formation of skills to be acquired in working with meta-knowledge, proposed various interpretations of multi-, inter- and transdisciplinary ideology, presented the Russian and foreign theoretical developments which have appeared to be the most interesting from a practical point of view, analyzed the practice of introducing an integrative- *meta-subject* approach into the educational system of the Russian Federation. The authors also describe the findings of the research carried out to summarize pedagogical experience and students' attitude towards integrative skills in studies history, geography, social sciences etc. On the basis of the results received two interconnected tendencies have been revealed.

Keywords: Integration, multidisciplinarity, interdisciplinarity, transdisciplinarity, meta-subject approach, cognitive skills.

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1. Introduction

The awareness of the strategic trends of world development for the past decades, its unprecedented challenges, in particular, the formation of great information volumes, which have increased multifold, has brought the society to the recognition of significant changes which are to be carried out in the educational sphere.

The idea of introduction of ***transdisciplinary approach*** to a renewal of the sphere of education was put forward within the concept of sustainable development of UNESCO in 2005. The major emphasis was laid on the special importance of the "transdisciplinary and intersectoral approaches" providing people with "the tools to confront and adapt changes taking place around them" (UNESCO 2005). It is recognized that the apparent advantages of the above approaches are (1) an opportunity to be beyond "the knowledge and models available in different disciplines", and (2) the ability to develop new vision and new experience of learning (Morin, 1999).The "skills" necessary for adaptation of people to the dramatic ongoing changes have been brought to a focus. Here are a number of these skills:

- critical and creative thinking;
- skills of oral and written, and graphic communication;
- skills of collaboration and cooperation;
- skills of conflict management;
- skills of decision-making, problem-solving and planning;
- skills of using of various appropriate technologies, media and information communication technologies (ICTs);
- skills of civil participation and action;
- skills of an assessment, evaluation and reflection (Wheeler and Bijur, 2001).

The UNESCO development strategy for the system of education for 2014-2021 has strengthened an array of fundamental positions. Due to the fact that increasing volumes of data, information and knowledge, availability of sources, assume new opportunities and risks, formation of critical thinking (UNESCO, 2014) becomes "the key requirement" for teaching and learning.

The ideas of a renewal of education system formulated by UNESCO have defined a new - ***integrative*** vector of development which still should be comprehended and mastered. However, the designated priorities have been developed in science and have been taking root in practice for more than three decades. Integrated curricula in school education in the USA, Canada, Great Britain have been actively used for many years. The program of the International Bachelor's degree (IB) being realized in many countries of the world is based on the principle of integration of various subjects and areas of knowledge. The federal state educational standards of the general education (2009-2012) of the Russian Federation have approved meta-subject approach as obligatory. According to this approach, actually integrative teaching at school has to be organized so that pupils should gradually acquire competencies for mastering skills and methods as follows:

- the method of obtaining knowledge, working within the structure of scientific definitions and conceptual terms used in various areas of knowledge and having general scientific character;
- logical, regulatory, reflexive, reading, information communicative skills necessary for successful learning, personal growth and social adaptation;

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- skills of mastering the fundamentals of design and research activity which present a basis and incentive of cognitive, creative and social activity at present and in the future.

2. Research Questions

The analysis of literature has shown that such structural factors as the foundations and professional direction of the Russian and foreign scientific developments on a problem of introduction of integrative strategy for a renewal of school education reveal differences between our scientific schools.

The foreign tradition relies on level classification of scientific knowledge by Piaget: ***multidisciplinarity*** as unilateral addition of one discipline to another subject; ***interdisciplinarity*** as interaction of disciplines; ***transdisciplinarity*** as creation of integrated structures (Piaget, 1972). The above typology is generally used in research practice. The mechanical "transfer" of the typology to the education system doesn't clear up the understanding of the problems in which forms each approach has to be implemented and what contents it has to be filled particularly with.

In this sense, the most productive developments appear to be those researches of specific scientific professional direction which have put forward the research goals to define and substantiate ways of realization of integrative strategy for school educational practice. The important contribution to understanding the specific scientific subject of cross-disciplinary approach has been made in scientific articles by Holbrooke (Holbrook, & Rannikmae, 1997), (Holbrook, 2000). The formulated principles of the organization of interdisciplinary teaching and learning give the opportunity to understand distinctions between this interdisciplinary strategy from a polydisciplinary one, the substantial aspects of the interdisciplinary strategy.

The publication by Drake and Barnes has aroused much interest (Drake, & Burns, 2004). The book presents, firstly, a version of differentiation between the three approaches and, secondly, the principles of substantial content formation of multi-, inter-, and transdisciplinary strategies for teaching and learning. The research is based on the shift of the scientific subject from consideration of scope of common cultural development to the personality-focused perspective, from use of reproductive methods of information work to design activity of school students.

Conceptual approach to introduction of integrative strategy is presented in materials of the International Bachelor's degree. The above materials give descriptions and schemes of realization of a multi-, inter- and transdisciplinary strategy for 3 age groups. The interdisciplinary skills to be forming are defined as follows:

- ability to unite concepts, methods or forms of communication from several areas of knowledge for an explanation of a phenomenon, a solution, creation of a product or formulation of a question in the ways which are beyond the framework of one concrete discipline (Boix-Mansilla, 2010);
- ability to use knowledge, concepts, conclusions, strategies, tools, research methods, ways of obtaining knowledge or forms of communication in concrete disciplines;
- ability to apply the understanding of a concrete discipline which moves ahead to acquisition of the knowledge of subject of studying (Middle Years Programme 2015).

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Special attention has been paid to theoretical justification of the scientific and practical importance of use of integrative approach to drawing up the educational program of IB (Daly, Brown & McGowan, 2012).

In general, the volume of foreign scientific literature on the subject is extensive and various, and especially valuable is the fact that it contains a significant amount of books and brochures whose authors seek to avoid theorizing and to present the models and technologies facilitating school administrators and teachers to understand and acquire the general approaches to application of integrative strategies (Erickson, 2006, Klein, (Ed.). 2002, Lang, 2003, Repko, 2005, Wineburg & Grossman, 2000, etc.).

The Russian tradition of scientific consideration of a question of knowledge integration is guided by concepts of psychologists (L.S. Vygotsky, A.N. Leontyev, P.Ya. Galperin, D.B. Elkonin, V.V. Davydov) and places the other accents. Integration in teaching and learning is studied and lit not so much from the point of view of levels and forms of overcoming disciplinary borders as from a position of acquisition of reflexive awareness of the modes and methods of work with knowledge.

In theoretical perspective, the concepts of ***pedagogics of mental and action approach*** (Gromyko, 2001) and ***didactic heuristics*** (Khutorskoy, 2003) deserve the greatest scientific attention. Despite the existing distinctions, both concepts are aimed at searching ways of integration of knowledge from its various areas, at forming methodology of teaching and learning which assumes activity of school students in generation of the ideas and hypotheses; independence in discovery of meanings and of scientific concept content. Both concepts consider a possibility of overcoming subject borders by introduction of integrative - ***meta-subject disciplines*** into the programme of teaching and learning. The most significant type of activity is centered at the work of school students with interdisciplinary problems ("Numbers", "Culture", "World learning ", "Problem", "Sign", "Knowledge", etc.).

Both concepts pay main attention to the modes and methods of work of school students with knowledge. Khutorskoy's approach is based on creating an educational environment with "problematization points", to give a pupil an opportunity "to open" new knowledge independently then to offer him to work with "cultural and historical analogs" using comparison of common cultural achievements to his or her own results (Gromyko, 2000). Gromyko's approach is focused on students' acquisition of cognitive actions or "techniques" of work with knowledge which have universal character. These are goal-setting, planning, design, research, forecasting, scenario planning, modeling, designing, analysis, etc. (Khutorskoy, 2012).

The dissertation researches devoted to problems of use of integrative strategy for formation of informative, regulatory and communicative skills of school students are also of great interest. The potential of the integrative strategy for the lessons of the Russian language has been analyzed in Alexandrova's thesis (2008); the dissertation research by Ya.Abakumova is devoted to practical realization of the potential of integrative tasks in high school (2009); the effectiveness of introduction of modular training has been investigated in Borisova's work (2016); the research questions of management of process of acquiring universal ways of cognitive activity have been considered in Kovalyova's (2003), Dumcheva's (2006), Kotlyarova's (2016) theses, etc.

However, unlike foreign researchers, their Russian colleagues do not pay enough attention to development of the models and technologies of integrative strategy to be addressed to school teachers and to be aimed at introducing them into practice. The number of publications in which these questions are

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considered in a comprehensive manner and in the practical perspective is small (Asmolov, Burmenskaya, Volodarskaya, Karabanova, Salmina, Molchanov, 2008, 2011; Vorovshchikov & Orlova, 2012). It creates certain difficulties in promoting and introduction of the ideas of integration into educational practice.

In general, existence of two scientific traditions in understanding and realization of integrative strategy gives ample opportunities for the choice of necessary means of introduction of an innovation in practice of school teaching and learning.

3. Purpose of the Study

The strategic factors i.e. the social demand for the renewal of the educational contents and methods of teaching and learning as the challenge of our times, novelty and scale of the tasks facing the Russian scientific school of education system, an ambiguous situation with scientific and information support of process of introduction of integrative strategy into educational practice have caused the purpose of the study.

The purpose of the study is to reveal degree of readiness of the main subjects of educational activity (pupils and teachers) to accepting and acquiring a meta-subject- ***integrative***- approach as an innovation.

The main objectives are as follows:

- determining the level of formation of cognitive skills to be acquired by school students including reading abilities, abilities to use knowledge from various subjects, skills of implementation of various logical actions;
- revealing levels of teachers' understanding and acquisition of the contents and the essence of an innovation, teachers' mastering technologies of introduction of the innovation, and the scale of its realization in practice of teaching.

4. Research Methods

The research was conducted in 2015-2016 in the Center of Social- Humanitarian Education of the Institute of the Strategy of Development of Formation of the Russian Academy of Education (project managers A.Yu. Lazebnikova and I.Yu. Sinelnikov).

The categories of respondents are as follows: (1) the school teachers of History, Social Science and Geography; (2) pupils of 5-9 classes of educational institutions (all types – schools, gymnasiums, lyceums, etc.)

The following empirical methods of a research have been used for the achievement of goals and tasks. These are (1) a method of studying the teachers' readiness for innovations by implementing a written poll (questioning); (2) a method of studying (analysis and synthesis) of pedagogical experience including analysis of summaries of the lesson planning and its contents; and also (3) a method of students' testing (tests of achievements).

The organizational and information support of the research has included:

- electronic mailing: 1) questionnaires for teachers and sets of tasks for pupils (2 options); 2) instructions for teachers and pedagogical workers who were curators of the school students

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being tested; 3) recommendations for the persons responsible for carrying out a research on the basis of schools;

- placement of variants of tasks for pupils and questionnaires for teachers on the Internet on Google resource for working in online mode.

5. Findings

The methods used during the research have allowed to attract 338 teachers to participate in written poll (questioning), 942 school students to take part in testing (different tasks were performed by various number of pupils). The method of studying and summarizing pedagogical experience has allowed to analyze 240 teachers' summaries of the lesson planning and its contents from 33 regions of the Russian Federation (summaries were placed in open access on educational portals and the websites on the Internet). The results received have confirmed "pessimistic" option of the hypotheses which were put forward at the initial stage of a research.

In relation to *school students* the data has expressed the following.

First, the existence of knowledge of various subjects in most cases hasn't helped school students answer a question correctly: they haven't been able to integrate the available knowledge in case of necessity. Secondly, the existence of certain skills of work with sources of historical, social and geographical information has not become a sufficient condition for the correct use of informative and cognitive skills. Thirdly, the information sufficient and satisfactory for the correct answer hasn't affected success of the performance of the tasks: as a rule, school students didn't find the information basis and support in the text for the correct answers.

As a result, 85% of school students haven't been able to use necessary cognitive skills for the solution of the tasks: ability to classify, choose the bases and criteria for classification, compare, find information provided in the text in an explicit form, transfer information ,which is structurally complex , from a graphic form into text.

In relation *to teachers*, "pessimistic" option of hypotheses were shown in the following conclusions.

Firstly, the use of various sources of information (84% of the information has been texts, 72% of it has accounted for graphic, whereas 32% has presented audiovisual data, etc.), of information and knowledge from various subjects (History, Literature, Social Sciences, Geography, etc.) at the majority of lessons haven't changed a concrete subject-orientation of the lessons, has not become the important means for the use of integrative strategy: only 23% of teachers have specified integrative strategy as the independent purpose of the lesson.

Secondly, the recognition by teachers of importance and need of introduction of meta-subject approach (95%), knowledge of teachers of federal state educational standard requirements on the integrative strategy (87%) haven't become the sufficient basis for successful use of the available knowledge in practice: only 15% of teachers have been able to define the typology of professional orientation of the questions and tasks of the lesson including the concrete subject, inter-disciplinary or meta-subject orientation , to carry out selection of the material necessary for formation of informative and cognitive skills.

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In general, the research has recorded the results stated below:

- the low level of mastery of informative and cognitive skills (reading abilities, skills of implementation of various logical actions, abilities to use knowledge from various disciplines) of school students irrespective of age;
- the low level of teachers' acquisition of the contents of the innovation to be introduced irrespective of teachers' qualification , low level of their mastery of knowledge and technologies allowing to purposefully carry out the integrative strategies for the knowledge from various disciplines and creation cognitive methods of working with meta-knowledge ; prevalence of a concrete subject-oriented teaching strategy.

6. Discussion

On the basis of the results received two interconnected tendencies have been revealed.

The first tendency has shown that the Russian school students studying in 5-9 classes haven't shown steady positive dynamics, i.e. an increase in level of informative and cognitive skills during the period of studying at the main school.

The existence of the tendency is confirmed by results of the international comparative researches. According to data of PIRLS (2006, 2011), younger school students from Russia, are in number of leaders in indicators of reading literacy. At the same time within the PISA project, despite improvement of indicators (in 2015 Russia took the 26th place out of 70 and also entered into the second group of the countries among which there is Sweden, the Czech Republic, the USA, etc. (Main results of the international research PISA-2015, 2017), 15-year-old Russians showed low results on the level of reading abilities. While there has proved to be "extremely high level of readiness for reading for training and leaning " at the elementary level, the reading literacy of the Russian pupils of high school (9-10 classes) "is significantly lower than the international standards" (Zuckerman, 2010). It means that "there exist problems in the education system of the Russian Federation concerning the question of development of reading literacy throughout all periods of training and studying at the main school" (Zuckerman, Kovalyova & Kuznetsova, 2015).

As it is represented, the existence of this tendency is connected with lack of purposeful work of the teachers working in 5-9 classes on formation of reading abilities and informative and cognitive skills of the students, in general. The conducted research has confirmed this hypothesis and has revealed the existence of one more important tendency.

The second tendency is related to the fact that most of school teachers show a rather formalistic attitude to introduction of the idea of integration: theoretically, they recognize the need for a student to study educational themes beyond the framework of a definite subject , but in practice they tend to continue to adhere to the former strategy focused on working strictly with a subject knowledge of a definite discipline , but not to the teaching of methods of work with different volumes of knowledge and meta-knowledge in principle.

The existence of this tendency has been caused by various factors. One of the major factors is the inertia of thinking of teachers described by Holbrooke: Whether "Teachers can teach on a cross-disciplinary basis? … Whether teachers will be ready to refuse the methods of transfer focused on the

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teacher? It is a real problem. Teachers don't love changes. Teachers don't know how to change. Teachers often consider that they have changed for cross-disciplinary training …" (Holbrook, 2000)

The positive psychological and practical shifts in teachers' relation to an innovation and content of their own professional activity require changes of motivation. The external positive motivation which is expressed in various "forms of support" of activity of teachers can become an effective remedy. In this matter a lot of things depend on the success of acquisition of the "effective" methods of the management by school administrators including joint discussion of the purposes of the lessons, encouragement of an initiative, collective nature in work, collective responsibility for the achievements , etc. (Maughan, Teeman, & Wilson, 2012).

7. Conclusion

On the basis of results of the conducted research it is obviously possible to draw a conclusion on the low level of readiness of the major subjects of educational activity (pupils and teachers) to accepting and acquiring, on the one hand, a meta-subject approach as specific methodology of the Russian innovation, and, on the other hand, as multi-, inter- and transdisciplinary approaches as the strategy of a renewal of education recognized in the world.

In other words, today the integrative approach and meta-subject strategy for the education system of the Russian Federation have not become significant elements of educational activity for the teachers and school students.

Overcoming the existing difficulties and contradictions assumes a package of measures. But their realization won't make success if the psychology of the teacher isn't changed. "Interdisciplinary education … demands teachers who are able to include a wide range of techniques in their teaching. It demands teachers who recognize that students need to learn how to learn and that this is more important than the «teacher covering a syllabus». It needs teachers who recognize the need for meaningful learning… (Holbrook, 2000)

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