FOSTERING METADISCIPLINARY COMPETENCES OF PRIMARY SCHOOLCHILDREN

[a]OLGA I. CHIRANOVA, [b]SVETLANA V. MASLOVA,
[c]NATALIA V. KUZNETSOVA, [d]SVETLANA A. BABINA

*Mordovian State Pedagogical University named after
M. E. Evseviev, Studencheskaya str., 11 A, Saransk, Russia,
430007*
*email: [a]chiranovao@yandex.ru, [b]maslovasv@mail.ru,
[c]kuz_nv75@mail.ru, [d]fotina73@mail.ru*

Abstract: This paper is demonstrating a demand for theoretical analysis, methodical development and incorporation of a competence-focused approach in the primary general education. It has elucidated a need for fostering metadisciplinary competences that were never a focus of the traditional system of education, and emerged only coincidentally. A way is proposed for developing metadisciplinary competences of a primary schoolchildren with the help of competence-centered assignments. The results obtained in the experimental research indicate a positive dynamic in the fostering of metadisciplinary competences through the competence-centered assignments.

Keywords: competence, competence-focused approach, metadisciplinary competencies, competence-centered assignments, primary school student.

1 Introduction

The main strands in the system of education find reflection in the pedagogical approaches which represent the scientific foundation of the concept of education. The didactics embraces systematic, cultorological, personality-focused, ethnopedagogical, activity-centered, competence-focused and other approaches.

The competence-focused approach in education is viewed as a method of teaching directed at developing key competences (Khutorskoy, 2003; Dubova, 2010). The key competences are most often seen as universal in application and metadisciplinary in nature.

The concept "metadisciplinarity" was first introduced by Aristotle. In the end of the 20th century, a metadisciplinary approach was considered to be the main pillar of education (Khutorskoy, 2003), and by 2008 it had become one of the major focuses in regulatory documents addressing the issues of education.

The teaching process with medadisciplinarity orientation becomes the key to developing metadisciplinary competences. We see metadisciplinary competences as a system of universal educational activities necessary to efficiently address a range of objectives with account of their cross-curricular and practice-oriented character.

Metadisciplinary competences facilitate student's readiness to solve organizational, cognitive, and communicative problems, to overcome fragmentation and disconnection of different subject areas, and as a result, contribute to a holistic perception of the surrounding reality.

The above features give a concrete form to the metadisciplinary outcomes of learning the general educational program in Russian schools, but the desired results may be achieved only through a targeted educational process.

In view of the above features, there are two possible ways for developing metadisciplinary competences at the stage of primary general education:

- Use of the interdisciplinary programs: "Reading. Work with a Text", "The Program for Encouraging Universal Learning Activities", "Fostering ICT Competences of Students";
- Selection of methodological techniques for building interdisciplinary connections at the lessons.

At the same time, the analysis of educational practice indicates the intellectual passivity of primary schoolchildren, their inability to find rational solutions to practice-oriented problems.

This is a result of the emphasis being placed by primary school teachers on:

1. subject-specific learning outcomes;
2. encouraging reproductive activities of primary schoolchildren.

Due to the above, a need has emerged to design educational material in the modern primary school in such a manner that will ensure a symbiosis between a learning area of its origination and a possibility to apply the acquired knowledge, skills and abilities in situations relating to other learning areas.

This has become a determining factor in framing the theoretical and methodological aspects of the use of competence-centered assignments for the fostering of metadisciplinary competences of primary schoolchildren.

2 Literature Review

The basic concepts within the frames of this research are *competence, competence-focused approach, metadisciplinary competences.* Thus, a *competence* concept, in the broad sense, has heavily blurred boundaries, and in the definitions proposed by different scientists the overlapping between semantic fields is observed. This concept is most often viewed as a combination of the superior qualities applied by a specialist in professional activity. In the first case, these are value-purpose, universal cultural, learning-cognitive, informational, communicative, social-labor and personal self-improvement components (Khutorskoy, 2003); in the other case, the emphasis is placed on a high ability to solve problems and developed information and communication skills (Perelygina & Fishman, 2008); in the third case, it is a multifaceted unity of social, intercultural (Vodyasova et al., 2019) communication, information, cognitive, polycultural, research, information-speech components (Kiseleva & Pozdeeva, 2007).

The competence-focused approach, which has been leading in the strategy of education for almost a decade, implies both the acquisition of knowledge, skills and abilities and a capacity to use them in practice (Khutorskoy, 2003; Zimnyaya, 2004). It should be noted that as revealed by the researchers there is a close connection between the competence-focused and interdisciplinary approaches, when scientists establish parallels between the concepts in systemic and integrated areas, personality-centered and activity-centered aspects, pragmatism and humanism (Zimnyaya, 2004; Verbitsky & Larionova, 2010). The current situation in education calls for determining the ways forward with practical implementation of the competence-focused approach. One of such ways is to focus on strengthening a metadisciplinary component in the education.

Metadisciplinary competences are built on vertical connections within a subject (related to purpose, meaning, value); interdisciplinary framework suggests not only having knowledge in different subjects, but also making use of such knowledge and connections in horizontal dimension, most often in instrumental purposes (Khutorskoy, 2003).

The researchers have arrived at a conclusion that metadisciplinary content enhances productivity of actions within the curricular subjects and helps to address practice-oriented tasks (Kuznetsov, 2008; Shiryaeva, 2009; Vardanyan et al., 2018). In this regard, particular attention is paid to universal learning activities as an essential component of metadisciplinary competences (Abushkin et al., 2018).

In recent years, great emphasis on metadisciplinary competencies has been related to the breakthrough in

information and communication technologies and digitization penetrating all spheres of life. The modern society is steadily coming to grips with the need to raise people of a new kind who will become the representatives of yet non-existing professions (Kirschner et al., 1997; Kirschner & Stoyanov, 2020). A series of studies deal with the fostering of information competence, which becomes an inextricable element of an educational process from the very first lessons in primary school (Tsareva et al., 2018; Pöntinen & Räty-Záborszky, 2020). Without diminishing the advantages and importance of ICT competences, researchers also underline the usefulness of research competencies (Rakhimov et al., 2020; Zhuravleva et al., 2018).

The challenges of fostering metadisciplinary competences that bring a process of education to a qualitatively new level in the era of digital transformation have also had an effect on the process of teaching students, the specialists to become, both from the perspective of revising the content (Nguyen et al., 2020; Beloglazova, 2019; Shukshina et al., 2018), and from the perspective of technologies used in the teaching practice (Julia et al., 2020; Kuznetsova & Chiranova, 2020; Molchanova et al., 2020).

3 Research Methodological Framework

The research purpose was to study the possibilities of using competence-centered assignments for fostering metadisciplinary competences of students. The research objectives were to consolidate the theoretical evidence for the use of competence-centered assignments for fostering metadisciplinary competences; to test how effective is the use of competence-centered assignments for fostering metadisciplinary competences of primary schoolchildren.

The research employed both theoretical methods, with priority given to the analysis of scientific literature, systematization of material on the problem of using competence-centered assignments for developing the metadisciplinary competences, and empirical methods, in particular, a pedagogical experiment for solving research tasks.

The experiment lasted from 2016 to 2019. The experimental base of research included 49 primary school students of municipal educational institutions in Saransk (Republic of Mordovia, Russia).

4 Results and Discussion

In order to explore the possibilities of using competence-centered assignments for fostering metadisciplinary competences, we were guided by the need to appeal to a metadisciplinary approach in primary general education and possible practical solutions to the problem of fostering metadisciplinary competences of primary schoolchildren. Let us consider the educational potential of competence-centered assignments. By analyzing the practical work of teachers, we will point to the high or low effectiveness of competence-centered assignments for fostering and nurturing metadisciplinary competences.

Within this research, a competence-centered assignment is regarded as one of the possible forms of organizing educational material in modern primary school. The salient point here is that a competence-centered assignment draws upon real-life, typical or quasi-life situations and is aimed to build disciplinary, interdisciplinary and key competences of primary school students. It is supposed that solution to the competence-centered assignment involves several subject areas, which suggests the usefulness of assignments of this type for the fostering of metadisciplinary competences of schoolchildren.

Typological features of a competence-centered assignment are the gaining of positive experience in solving practical problems through the use of the acquired subject-specific knowledge and enhancing the practical skills when tackling non-standard interdisciplinary situations; fostering of the universal

metadisciplinary competences of students already at the initial stage of school education.

The use of competence-oriented learning content, i.e. competence-centered assignments, should be with reliance on various didactic principles: a teacher has the right to independently select practice-oriented learning content, refresh the subject-specific knowledge and skills of students, taking into account the transdiciplinarity and contextuality of a competence-centered assignment, while focusing on boosting personal knowledge and values of students.

Text of a competence-centered assignment is quite extensive, includes various numerical data and plenty of reference information (sometimes redundant), and solution of a problem implies the development of own stance on the problem. At the same time, a competence-centered assignment may have multiple solutions, and in this case the goal is to integrate students' knowledge and skills, and to strengthen their ability to find solutions in different subject areas.

Thus, a competence-centered assignment is practice-oriented, draws upon material relevant for students, triggers certain learning activities and fosters metadisciplinary competences of students.

For fostering metadisciplinary competences, the work on competence-centered assignments can be performed in class (with a subject chosen depending on the major field of knowledge germane to a particular assignment) and out of class (during an interdisciplinary optional course). The means of boosting personal knowledge will be a teacher as a source of information and student's own mental activity.

Speaking about teacher as a source of information, it should be noted that the distinctive features of a competence-centered assignment as compared to a typical one, including non-standard presentation of learning content (an extensive text of intricate structure), multiple solutions and variability of a resulting product, confront students with many challenges extending beyond the subject. In this connection, students have a lot of questions concerning both procedural aspects of competence-centered problems and the cultural context of a problem. When getting answers to these questions from a teacher, children gain knowledge about how to approach non-standard tasks; about the multiple possible ways to obtain the target value (when an answer is expressed in numerical form) or the visible, tangible product (a drawing, a dummy, a handicraft) of cultural and educational character.

By engaging their mind, students grow their personal knowledge, which is a reflection of the process of creative thinking and can be represented in three hierarchical levels:

1. transfer of prior knowledge and known ways of action to an unfamiliar situation and their transformation according to the new conditions;
2. combination of prior knowledge and known ways of action;
3. obtaining new knowledge based on the consolidation of prior knowledge and devising new ways of action.

It is important to highlight that the search for and use of own approach to solving the problem is allowed and encouraged, which is not always the case at a usual lesson.

In order to find out the potential of competence-centered assignments for fostering metadisciplinary competences of primary school students we proceeded from the characteristics of metadisciplinary (general educational) skills, such as a strong ability to work with information (cognitive, intellectual skills), and communicative, organizational (regulatory) skills.

Embarking upon analysis of the potential of competence-centered assignments for strengthening metadisciplinary skills, we would like to name these skills and show which types of functional literacy may be obtained by their virtue:

1. Language literacy: a child learns to formulate answers to questions by selecting the right words appropriate to the context in oral speech; learns to correctly build sentences in written speech;
2. Mathematical literacy: a child learns to count in mind and use a calculator when necessary; learns to understand the information presented in numeric form; learns to select and independently create models of different circumstances; learns to build logical chains; learns to build action algorithms appropriate for a situation;
3. Information literacy: a child learns to search for and pick relevant information that he/she needs at a particular time and use different printed sources for that; learns to read different graphic images;
4. Computer literacy: a child learns to apply the safety rules; learns to navigate the Internet when searching for necessary information; learns to use a personal computer for solving design tasks; learns to create presentation texts using Word and Power Point programs; learns to use Adobe Photoshop for processing visual materials.

The work on the competence-centered assignments helps to satisfy cognitive needs of primary schoolchildren, as their texts introduce children to the animal and plant world of our motherland and other countries, geographical objects, structure of the solar system, architectural structures, paintings and sculptures, works of literature.

Texts of competence-centered assignments use the content of both primary school subjects (mathematics, literary reading, Russian language, world around, technology, fine arts), and subjects that will be studied later (biology, geography, geometric design, cartography, metrology, technical drawing, computer science, hygiene of a school student and learning setting), which aim is to build interdisciplinary connections and metadisciplinary competences of primary schoolchildren.

In order to measure the effectiveness of competence-centered assignments for fostering metadisciplinary competences of primary schoolchildren, an experimental study was conducted. Two classes in the same year of study at primary school were selected, one being an experimental class (EC) of 24 children and the second being a control class (CC) of 25 children. In the experimental class, children were working on competence-centered assignments for three years (from the second to the fourth grade) within the frames of an optional interdisciplinary course, while in the control class such work was not carried out. In the final quarter of primary education in both classes comprehensive work with an interdisciplinary focus was performed with an aim to assess the metadisciplinary competences (regulatory, cognitive and communicative).

The results of the experimental study during which the primary schoolchildren were taught to solve competence-centered assignments showed high efficiency of experimental class in achieving the pursued goals, namely, the fostering of metadisciplinary skills; practical application of knowledge and skills obtained at the lessons; acquiring new knowledge and skills with practice orientation. The positive impact of the work carried out in the experimental class was also expressed in a faster grasping of learning content, a qualitative leap in the learning independence of children and the expansion of the general horizon of primary schoolchildren.

5 Conclusion

Thus, the conducted analysis of scientific literature, systematization of materials on the use of competence-centered assignments for fostering metadisciplinary competences and processing of the data obtained through the experiment led us to the following conclusions.

The use of a competence-focused approach in primary education yields the learning outcomes of a new kind, with the focus on the ability and readiness of an individual to solve various problems and implement practice-oriented activities.

Today, as concerns the content of education, one of the pressing issues remains the fostering of metadisciplinary competences. The study on the potential of competence-centered assignments for fostering metadisciplinary competences allowed us to consolidate theoretical evidence and to prove through the experiment the effectiveness of competence-centered assignments for fostering this type of competences of primary schoolchildren.

While agreeing with the assertion about the effectiveness of competence-centered assignments for fostering metadisciplinary competences, we allow for the possibility to make adjustments to the technology for constructing and tackling such assignments. The results obtained in the experimental research indicate a positive dynamic in the fostering of metadisciplinary competences through the competence-centered assignments.

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Primary Paper Section: A

Secondary Paper Section: AM