

Pedagogical Support for Development of Learning Activity Self-regulation in High School Students

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The article describes the author's system of pedagogical support for the development of the learning activity self-regulation in high school students educated in specialized classes. Theoretically, the system is based on the structural-functional approach to the study of self-regulation proposed by V.I. Morosanova. According to its principles, the system was designed not only to develop the skills of the learning activity self-regulation, but also to create conditions for their development. As the main pedagogical means aimed at achieving its goals, the program proposes special master-classes on the development of different levels of self-regulation of educational activities, creating the situations of responsible choice related to the students' personal and professional development and assisting to high school students in making their professional choice, consulting on the plans for their personal and professional development. The study had its purpose to verify the effectiveness of the system developed by the authors. An experimental testing was carried out on a sample of 208 high school students educated in specialized classes of Moscow schools. The research methods were selected to measure the levels of development of the operational and regulatory-personal components of self-regulation (V.I. Morosanova's "Self-regulation Profile of Learning Activity Questionnaire"), as well as the value-semantic level of subjective regulation ("Levels of Development of Personality Subjectivity" by M.A. Shchukina and the methodology of A.A. Azbel, A.G. Gretsov for studying the status of professional identity). The results of a comparative study between the experimental and control groups indicate the effectiveness of the developed system of pedagogical support: on average, the relative increase in the levels of the learning activity self-regulation in the high school students was about 20-30%.

Keywords: self-regulation of learning activities; profile education; psychology of choice; pedagogical support.

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Педагогическое сопровождение развития саморегуляции учебной деятельности старшекласников

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В работе представлена авторская система педагогического сопровождения развития саморегуляции учебной деятельности старшекласников профильных классов. Теоретическим основанием для ее разработки послужил структурно-функциональный подход к изучению саморегуляции В.И. Моросановой. В соответствии с ним система проектировалась не только с целью формирования навыков саморегуляции учебной деятельности, но и с учетом необходимости создания условий для их развития. Основными педагогическими средствами, направленными на достижение целей разработанной программы, выступили специальные занятия по развитию саморегуляции учебной деятельности, создание ситуаций ответственного выбора в отношении своего личностно-профессионального развития и помощь старшекласникам при его совершении, консультационная и разъяснительная работа с опорой на планы личностно-профессионального развития. Целью исследования являлось определение эффективности разработанной авторами системы. Экспериментальная проверка осуществлялась на выборке из 208 старшекласников, обучающихся в профильных классах московских школ. Методы исследования были направлены на измерение степени сформированности операционального и регуляторно-личностного компонентов саморегуляции учебной деятельности (опросник В.И. Моросановой «Стиль саморегуляции учебной деятельности»), а также ценностно-смыслового уровня субъектной регуляции (опросник «Уровни развития субъектности личности» М.А. Щукиной и методика изучения статусов профессиональной идентичности А.А. Азбель и А.Г. Грецова). Результаты сравнительного исследования изучаемых параметров в экспериментальной и контрольной группах свидетельствуют об эффективности применения разработанной системы педагогического сопровождения: в среднем относительное увеличение уровней саморегуляции учебной деятельности старшекласников составило около 20–30%.

Ключевые слова: саморегуляция учебной деятельности; профильное обучение; психология выбора; педагогическое сопровождение.

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Introduction

In Russian and European culture and education, self-regulation has always been recognized as the most important quality of a human being, allowing to achieve the most ambitious goals in various aspects of his/her life activity. The results of many years of research have shown the objective significance and practical value of regulatory competencies for the modern professional. In this regard, it seems particularly relevant to develop programs aimed at the development of regulatory skills at the stage of choosing a profession, in the conditions of learning activities, familiar to high school students.

Self-regulated learning (SRL) has been intensively studied in Western psychology since the 1980s. A significant role in the formation of this field was played by the works of B.J. Zimmerman [33]. Many authors emphasized the importance of personal and even ethical components in the processes of self-regulation [31]. Various approaches to the study of this phenomenon were formed, from metacognitive to social constructivist and a number of others.

In Russian studies, the problem of self-regulation development has also been studied from different methodological positions. The works of N.M. Peysakhov [22] occupy a special place. A.V. Bykov [3] and T.I. Shulga [30] studied volitional regulation of activity. In the works of D.B. Elkonin and V.V. Davydov [4] the formation of adequate self-assessment of learning actions on the part of the student was considered as the most important sign of a high level of development of learning activity. Studies of human subjectivity also confirmed the importance of the problem of self-regulation development (V.I. Slobodchikov [27], A.V. Brushlinsky [2], V.A. Petrovsky [23], V.I. Morosanova [15]).

But, undoubtedly, the most famous scientific field, in the context of which the phenomenon of self-regulation is studied, is currently the structural-functional approach (O.A. Konopkin [9], V.I. Morosanova [17], A.K. Osnitsky [20], etc.). The name of V.I. Morosanova is associated with the development of one of the most famous scientific schools belonging to this field. The researcher distinguishes two levels (practically subsystems) of self-regulation: operational and regulatory-personal (in V.I. Morosanova's terminology - subjective). V.I. Morosanova notes the important role of human self-awareness, or, more precisely, of his regulatory functions, in self-regulation [15]. In this study we will rely on the definition of the levels of self-regulation of learning activity which are accepted in this scientific school: "operational" – the manifestation of individual typical features in the style characteristics of self-regulation of learning activity, "regulatory-personal" - personal qualities that ensure the processes of regulation, "value-semantic" – the manifestation of the regulatory function of the student's self-awareness, his value and motivational orientation in learning activity.

The task of creating the conditions for the development of self-regulation has been considered and solved in both foreign and domestic studies. Methods and forms of development of both operational components of self-regulation of learning activity (subject's efficiency in planning goals, modeling conditions, programming, correcting activity and its results) and its personal components were proposed [24].

Both technologies for training high school students in self-regulation, such as "SREP" (B.J. Zimmerman), and technologies that use elements of such training, for example, the technology of teaching mathematics "IMPROVE" (Z.R. Mevarech, B. Kramarski), have been developed. The mentioned Self-Regulation Improvement Program (SREP) is aimed at supporting the self-motivation of secondary school students, expanding their understanding of metacognitive strategies and helping them to master these strategies [32]. The implementation of SREP involves the work of a special coach. An important principle of this program is the actualization of students' ability to manage their life at school [34].

In many respects, domestic researchers used similar methods and technologies of self-regulation development. The technology of mastering self-regulation skills proposed by A.K. Ositsky is based on the gradual complication of a child's actions: from the simple reproduction of an adult's (teacher's) actions to fully independent implementation of all the links of self-regulation [20].

On the basis of the laboratory of self-regulation psychology of the Psychological Institute of the Russian Academy of Education, programs for the development of personal self-regulation and conscious self-regulation of learning activity were developed and experimentally tested in the conditions of the formative experiment. It is shown that the development of conscious self-regulation can be used as a means of increasing the psychological reliability of students' actions in an exam situation and can contribute to the formation of psychological competencies that allow them to ensure the stability of their results on the exam [24; 28].

M.V. Polyantseva emphasizes the role of conscious goals and the independence of the student in the implementation of certain processes of self-regulation of learning activity. M.V. Polyantseva's model of learning activity formation includes components of personal self-regulation, the extensive use of reflexion and the consideration of emotional and motivational factors [25, p. 10-16]. G.M. Kortunov [10] offers a similar technology, but adapted to the specifics of one academic discipline.

The approach of I.V. Lysenko is significantly different. Relying on the concept of V.V. Serikov [26], she offers a technology based on the use of personally oriented situations for the formation of a subjective experience of self-regulation [12]. The author notes that the formation of self-regulation skills is possible through the formation of students' subjective attitude to each component of self-regulation (goal setting, modeling, self-control, etc.) in combination with the mandatory exercise and testing of their abilities. I.V. Lysenko's model assumes a special technology of "accepting" the goal of learning activity by means of "agreement" of the teacher and the student, creation of personally developing situations requiring the manifestation of students' subjectivity. A certain confirmation of the logic used by I.V. Lysenko in the technology developed by her can be the conclusion of D.A. Leontiev that "choice is an integral part of the most different stages of the self-regulation of activity" [12, p. 95]. [12, c. 95].

The work of E.V. Kamaletdinova, which is devoted to the study of how self-organization of learning activities in specialized education contributes to the formation of subjectivity of high school students, is close to our research. The author interprets self-organization as a principle that is a combination of: 1) the process of organizing learning activity in accordance with its structure; 2) the implementation of the subject position of the student; 3) the special nature of interaction between students and teachers [8, p. 13-15]. The main forms and means that the author used in creating her model were modular learning, individual learning plans, providing students with the opportunity to

choose the means and ways of performing activities, lectures, seminars, collective learning, imitation and game situations [8, p. 18-19].

The publications present very different, in their methodological and theoretical bases, approaches to the formation of the self-regulation of learning activity. Nevertheless, we can identify a number of common points in the works of researchers that are essential for the development of technologies and programs for the development of students' self-regulation:

1. Self-regulation of learning activity, as well as the self-regulation processes in general, can be developed in students only when they rely on their own activity. The teacher can only facilitate this process by creating favorable conditions for it, i.e. by using various forms of pedagogical support. And if at the initial stages of this support the directive presentation of activity samples by the teacher is acceptable, then in the future the process of self-regulation development should be based primarily on the personal and value-semantic structures of the child (adolescent) himself.

2. There are serious reasons to believe that the processes of subjectivity development and the processes of self-regulation development are closely related, and, therefore, due to this fact, the developmental technologies that have been used in relation to each of these phenomena can be extended to the other.

3. Despite the fact that psychologists distinguish different subsystems (levels) of self-regulation, in the educational environment, in everyday learning activities the difference between their manifestations acquires a secondary character. Failure in the performance of learning activities for a student is a much more significant fact than the reasons that led to it (whether it is insufficient motivation or unformed self-regulation methods). Therefore, if we set the task of developing a pedagogical technology, it cannot be limited in its subject to only one level (element) of self-regulation, but must cover them in the aggregate.

Thus, the system of support for the development of self-regulation can be developed only as a system of pedagogical (psychological and pedagogical) support, which implies a complex impact on all subsystems of the self-regulation of learning activity.

In developing our system, we relied on the works of Russian authors who studied pedagogical support (L.A. Maximova, S.A. Shaykhulina [13]) and substantially similar technologies performed within the framework of the scientific schools of O.S. Gazman (N.N. Mikhailova, S.M. Yusfin, et al.), the concept of "individual assistance" by A.V. Mudrik, E.I. Kazakova, the concept of psychological support, including in the formation of universal learning actions (M.R. Bityanova [1]), tutoring (L.A. Emelyanova, M.I. Solodkova, I.D. Borchenko [6], A.E. Metlina [14]).

Our proposed system of pedagogical support of students implies the use of certain pedagogical means, oriented both to the formation of skills of self-regulation of learning activity, and to the creation of conditions for the development of regulatory functions of self-awareness.

Let us outline the mandatory conditions for the successful functioning of the proposed pedagogical system. There are two of them: the use of the model of specialized education based on individual educational plans (every student should have such a real opportunity) by the school, and the formation of an independent consulting structure that would take over the organization of pedagogical support (which includes the preliminary training of teachers and other specialists to work on this program).

Let us narrow down the main principles of the system of pedagogical support for the development of self-regulation of learning activity in students.

1. The organization of special classes on the development of self-regulation of learning activity with students in microgroups organized for each academic discipline (on average from 3 to 5 groups per class). The general logic of these classes is the actualization of all the main stages (planning goals, modeling conditions, programming, correcting activity and its results) of solving typical, first of all, educational tasks.

Due to the specifics of individual subjects, the content of this work can be detailed only to a certain extent. At the initial stages of this work, it is supposed to jointly analyze how the tasks (assignments) are solved by pupils: whether the goals are correctly formulated, the conditions for their realization are highlighted, if possible, steps for their achievement are outlined, etc. If students in the group cannot adequately propose variants of passing each stage, the teacher offers them a sample solution. The technology of mutual learning is actively used - students are invited to explain their actions to the members of the microgroup if their solution was correct. Over time, the use of self-learning increases. One of the functions of the teacher in supporting these groups is to identify difficulties in the formation of self-regulation skills of learning activity in certain students, which is becoming chronic. Such high school students are offered to use the services of the school psychological service.

2. Creating conditions for situations of responsible choice with regard to personal and professional development and assisting high school students in making it. Increasing the degree of responsibility in the situation of choice is directly related to the development of regulatory functions of self-awareness. This direction is realized through explanatory work with both high school students and their parents in order to give additional symbolic significance to the act of choosing a specialization of education. It can also include the use of economic incentives to increase the responsibility of high school students for their decisions.

Explanatory work is carried out by class teachers and school psychologists and is aimed at making high school students realize the importance of forming self-regulation skills for further professional development. At school, the procedure of choosing a specialization is organized as a ceremonial event and is accompanied by additional symbolic actions (a rather long period of preparation, awarding special badges, etc.). Economic stimulation consists in the fact that students are given an opportunity to save family money in case of successful mastering of self-regulation skills - the school provides free attendance of extracurricular education programs.

3. Personal-professional development plans are used as an independent form to actualize distant goals related to professional and personal development and to develop the ability of self-regulation (planning goals, modeling conditions, programming, correcting activity and its results) in relation to learning activities. This type of pedagogical support is implemented mainly in the counseling work of the school psychologist, aimed at students' awareness of their learning activities in the specialized class as an important stage of professional and personal development.

The purpose of this study was to test the effectiveness of the developed system of pedagogical support for the development of self-regulation of learning activities of high school students in the conditions of specialized education in a public school.

Sample

The study involved 208 students of specialized classes in Moscow schools.

The sample consisted of two groups of students: State Budgetary Educational Institution of Moscow "School No. 2087 "Otkrytie" (the control group) and State Budgetary Educational

Institution of Moscow "School 1367" (the experimental group). The distribution of students by specialized classes is presented in Table 1.

Table 1

Specialization	School № 2087 (control)			School № 1367 (experimental)			Total
		Male	Female		Male	Female	
Mathematical (engineering)	27	15	12	27	13	14	
Humanitarian	27	10	17	27	11	16	
Cadet	26	16	10	24	15	9	
Medical (chemical-biological)	27	13	14	23	9	14	
Total	107	54	53	101	48	53	208

When forming the sample, the similarity of curricula of a number of specializations (e.g., Mathematics and Engineering, Chemistry and Biology and Medicine) was taken into account. The composition of specializations is typical for Moscow schools; at the same time, it is diverse enough to extrapolate the findings to other regions. The sample is practically evenly distributed by gender.

Research Methods

Forming the diagnostic complex, we proceeded from the necessity to measure all levels of self-regulation, including the value-semantic one.

To measure the operational and regulatory-personal levels of the self-regulation of learning activity, we used V.I. Morosanova's questionnaire "Style of self-regulation of learning activity, SSUD-M 2013" [16]. [16].

Accordingly, to measure the degree of formation of the operational level we used its scales "Planning" (Pl), "Modeling" (M), "Programming" (Pr), "Evaluation of results" (Er), and regulatory-personal - "Flexibility" (F), "Independence" (I), "Reliability" (R), "Responsibility" (Res).

To diagnose the value-semantic level of self-regulation and correlate it with students' personal and professional development, we used two methods: the questionnaire "Levels of personal subjectivity development, LPSD" by M.A. Shchukina (2004 [29]) and the method of A.A. Azbel, A.G. Gretzov for studying the statuses of professional identity (2004 [5]). The LPSD methodology is based on the idea of personal subjectivity as a psychological quality based on self-management. The definition of subjectivity in this method coincides with the understanding of the formation of regulatory functions of self-awareness, which allows us to use it to diagnose the value-semantic level of the self-regulation of learning activity. The methodology of studying the statuses of professional identity allows us to determine the level of formation of four statuses. For the purposes of our study, we chose one of them, measured by the scale "Formed professional identity". High values on this scale characterize those young men and women who have independently formed a system of knowledge on themselves and their professional values, goals and life beliefs and have determined what they want to achieve.

Results of the Study

The experimental work began in 2019-2020 (the preparation for it - at the end of 2018-2019) and continued in the 2020-2021 academic years. There was some impact on the course of the experimental work due to the pandemic, which resulted in distance learning during March 2019-June 2020 and October 2020-January 2021. However, for most of the school year, high school students studied in a conventional educational setting, and even during the period of distance education in schools, many forms of microgroup work, and especially individual and paired classes were available in the usual mode.

At the beginning of the experimental work, the distributions in the control and experimental groups were compared in order to justify the possibility of using them in the experiment. The mean values of the variables are presented in Table 2. The comparison was carried out for each indicator independently using the Mann-Whitney U criterion. The results of statistics calculation in all cases did not exceed the significance level $\alpha=0.05$, and this allows us to state that there are no significant differences in the observed values of variables, which in turn demonstrates the possibility of using this sample for the experiment.

The numerical values of changes in the main indicators in the control and experimental groups as a result of the application of the developed system of development of self-regulation of learning activity are shown in Table 2.

Table 2

Values of the Main Indicators of Self-regulation of Learning Activity at the Beginning and at the End of the Experiment in the Control and Experimental groups (N=208)

Group	Op		RP		GI		PrId		SUB	
	Start	Finish	Start	Finish	Start	Finish	Start	Finish	Start	Finish
Control	12,01	13,48	10,58	11,32	22,59	24,8	08,54	11,10	153,54	152,92
Experimental	11,50	17,62	9,74	16,97	21,24	34,59	08,68	18,03	146,11	196,00

Symbols. Op - formation of the operational level of regulation (SSUD-M); RP - formation of the regulatory-personal level of regulation (SSUD-M); GI - general level of self-regulation (SSUD-M); PrId - level of professional identity formation (the methodology of A.A. Azbel, A.G. Gretzov); SUB - general level of subjectivity (LPSD). The data is given in absolute values.

Since in Table 2 the data is given in absolute values, for the convenience of visualization we normalized it on a 100-point scale and formed a histogram on its basis (Fig. 1). Quite pronounced differences are visually observed. To test their statistical significance, we used the Mann-Whitney U test for independent samples. The results showed the significance level of differences $\alpha=0.05$.

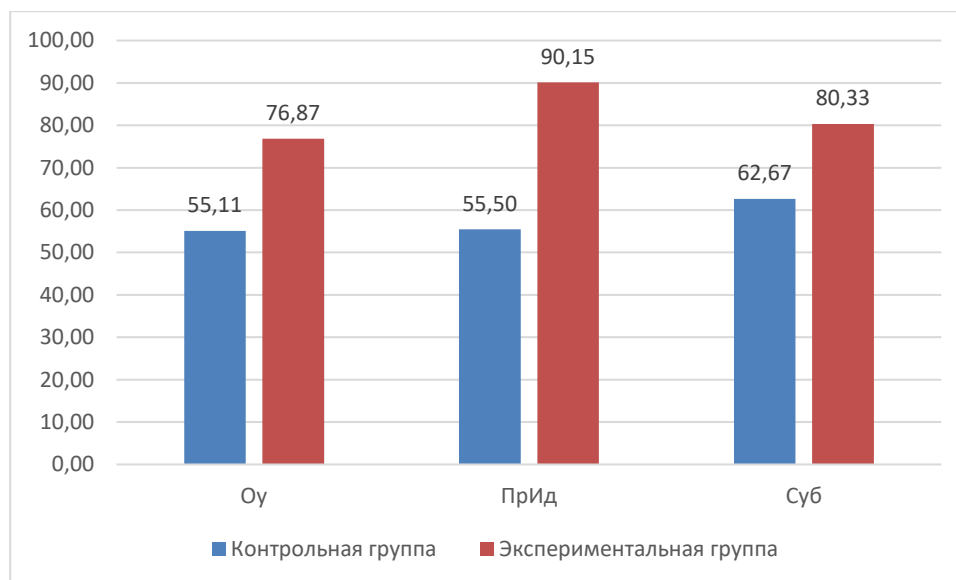


Figure 1. Histogram of the ratio of the values of the main variables (normalized data): Gl - general level of self-regulation; PrId - level of professional identity formation; SUB - general level of subjectivity; data normalized to 100-point scale

Although we did not set the task of investigating gender differences, we compared the distributions of the main variables for students of different genders. When analyzing the differences by gender, it was revealed that the only differentiating parameter is the regulatory-personal level of self-regulation, the indicators of which are higher in boys.

The analysis of the correlation relations between the main variables, on the basis of which we characterized the self-regulation of learning activity, showed that all of them are connected with each other by significant correlations. Moreover, the correlation of the indicator "subjectivity" with the other variables is quantitatively more pronounced: thus, with professional identity it is 0.36, with the operational level of regulation - 0.53, with the regulatory-personal - 0.41. For a sample size of several hundred people, these are very high values. Such correlation values testify to the great role of self-awareness and subjective-personal components in the regulation of learning activity of students of specialized classes.

Conclusion

The proposed system of pedagogical support for the development of the self-regulation of learning activity in specialized classes contributes to the increase of its operational and regulatory-personal levels, as well as the development of value-semantic characteristics of students' self-awareness. The actualization of the value-semantic level of self-regulation of learning activity in high school students is achieved largely due to the organization of situations of personal-professional choice and the creation of conditions that increase the responsibility for it.

The results of the experimental study showed the effectiveness of the developed system in specialized classes of the secondary school. On average, the relative increase in all levels of self-regulation of learning activity amounted to about 20-30% (compared to the control group).

Further research in the development of self-regulation of learning activity can be aimed at studying the organization and functioning of different variants of its pedagogical support depending on different types of educational environments. In general, the study of the problems of the self-regulation of learning activity will remain relevant in the distant future, because it corresponds to the main directions of the development of the educational system.

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