

Conscious Self-regulation and Academic Motivation as Resources for Students to Perform Research Project Work

Varvara I. Morosanova

Psychological Institute of the Russian Academy of Education; Russian Academy of Education, Moscow, Russia
ORCID: <https://orcid.org/0000-0002-7694-1945>, e-mail: morosanova@mail.ru

Elena V. Filippova

Psychological Institute of the Russian Academy of Education, Moscow, Russia
ORCID: <https://orcid.org/0000-0003-3052-0421>, e-mail: profrest@gmail.com

Tatiana G. Fomina

Psychological Institute of the Russian Academy of Education, Moscow, Russia
ORCID: <https://orcid.org/0000-0001-5097-4733>, e-mail: tanafomina@mail.ru

The article presents the results of an empirical study of the relationship between the regulatory competencies of students, different types of academic motivation and successful performance of the research project work. Diagnostics of regulatory competencies was carried out by means of Morosanova's "Self-regulation profile of learning activities questionnaire — SR-PLAQ-M"; academic motivation was assessed using Gordeeva's "Scales of academic motivation of schoolchildren". The diagnostics was carried out at the beginning of the academic year. Criteria-based assessments, set by the expert teachers, were used as indicators of the project work success. The study, performed on a sample of 9th grade students (N=187, 15—16 years old), provided evidence that regulatory competencies and motivation serve as prerequisites for the students' success in research project work. The study allowed to empirically distinguish between the universal and special regulatory competencies. The data analysis revealed the resource role of regulatory competencies in performing an individual research project. It is shown that the general level of the conscious self-regulation development characterizes the universal resources for successful performance of an individual project and is positively associated with all expert criteria for assessment research project success. Special regulatory resources are the modeling of significant conditions and evaluating the results of actions. The study also revealed a mediator role of the regulatory competence of evaluating results in the relationship between the students' academic motivation and the final assessment of the research project.

Keywords: conscious self-regulation; academic motivation; project activity; mediator analysis.

For citation: Morosanova V.I., Filippova E.V., Fomina T.G. Conscious Self-regulation and Academic Motivation as Resources for Students to Perform Research Project Work. *Psikhologicheskaya nauka i obrazovanie = Psychological Science and Education*, 2023. Vol. 28, no.3, pp. 47—61. DOI: <https://doi.org/10.17759/pse.2023280304> (In Russ.).

Осознанная саморегуляция и академическая мотивация как ресурсы выполнения обучающимися проектно-исследовательской работы

Моросанова В.И.

ФГБНУ «Психологический институт Российской академии образования» (ФГБНУ «ПИ РАО»); ФГБУ «Российская академия образования» (ФГБУ «РАО»), г. Москва, Российская Федерация
ORCID: <https://orcid.org/0000-0002-7694-1945>, e-mail: morosanova@mail.ru

Филиппова Е.В.

ФГБНУ «Психологический институт Российской академии образования» (ФГБНУ «ПИ РАО»), г. Москва, Российская Федерация
ORCID: <https://orcid.org/0000-0003-3052-0421>, e-mail: proftest@gmail.com

Фомина Т.Г.

ФГБНУ «Психологический институт Российской академии образования» (ФГБНУ «ПИ РАО»), г. Москва, Российская Федерация
ORCID: <https://orcid.org/0000-0001-5097-4733>, e-mail: tanafomina@mail.ru

Представлены результаты эмпирического исследования взаимосвязи регуляторных компетенций обучающихся, разных видов академической мотивации и успешности выполнения проектно-исследовательской работы. Диагностика регуляторных компетенций осуществлялась с помощью опросника В.И. Моросановой «Стиль саморегуляции учебной деятельности — ССУД-М»; академическая мотивация оценивалась при помощи методики Т.О. Гордеевой «Шкалы академической мотивации школьников». Замер проводился один раз в начале учебного года. В качестве показателей успешности выполнения проекта использовались критериальные оценки, выставленные педагогами-экспертами. Исследование, выполненное на выборке обучающихся 9-х классов (N=187, 15—16 лет), позволило получить свидетельства того, что регуляторные компетенции и мотивация являются предпосылками успешности выполнения обучающимися проектно-исследовательской работы. Эмпирически были выделены универсальные и специальные регуляторные компетенции. Раскрыта ресурсная роль регуляторных компетенций в реализации индивидуального проекта. Показано, что общий уровень развития осознанной саморегуляции характеризует универсальные ресурсы выполнения индивидуального проекта и положительно связан со всеми экспертными критериями выполнения проектно-исследовательской работы. Специальными регуляторными ресурсами выступают моделирование значимых условий и оценивание результатов действий. Обнаружена медиаторная роль регуляторной компетенции оценивания результатов во взаимосвязи академической мотивации и итоговой оценки по проекту.

Ключевые слова: осознанная саморегуляция; академическая мотивация; проектная деятельность; медиаторный анализ.

Для цитаты: Моросанова В.И., Филиппова Е.В., Фомина Т.Г. Осознанная саморегуляция и академическая мотивация как ресурсы выполнения обучающимися проектно-исследова-

тельской работы // Психологическая наука и образование. 2023. Том 28. № 3. С. 47—61. DOI: <https://doi.org/10.17759/pse.2023280304>

Introduction

The modern FSES OOO [1] defines the requirements for educational results, including subject, meta-subject, and personal results. Subject results are based on the assessment of students' achievements in certain subjects within the framework of final assessment. Personal results achievement is not included in the final certification but is the subject of assessment of the schools' educational activities. Evaluation of meta-subject results supposes an assessment of achieving the planned results in the formation of the actions of self-regulatory, communicative, and cognitive universal learning actions. The main procedure for their final assessment is the defense of an individual research project by the student.

A number of studies confirm the effectiveness of project activities as the main tool for the formation of meta-educational results in modern school [9; 7; 20; 21]. Foreign authors also note the effectiveness of project activities in the acquisition of subject knowledge [26], formation of learning skills [31; 33; 34], increasing motivation [23; 34], development of communicative competences [23]. It has also been shown that project-based learning has a significant positive impact on students' academic achievement compared to the traditional learning [29]. Researchers especially appreciate the high efficiency of project activities for schoolchildren in such areas as robotics, programming, informatics, and applied physics [32].

The main pedagogical purpose of the project-research activity is to master the student's research skills as a basis for the formation of universal actions of the self-regulation ensuring assimilation of reality by the student and activating his/her agen-

tive position in the educational process [11; 13]. Foreign researchers point out the following distinctive features of project activity [25]: focus on the educational objectives, co-operation with others, and creation of a product. The composition of learning tasks is determined in accordance with the cycle of project creation and implementation, which includes the following stages [10]: 1) problematization stage; 2) solution design stage; 3) action planning stage; 4) execution stage; 5) summarizing and reflection stage. The measure of success of the project work is not a single assessment made by one teacher, but a criterion assessment by several teachers, which also allows students (based on previously known criteria) to independently assess the result of their work at each stage.

The student should approach the project-research work (here we suppose an individual project in the ninth grade) with a certain set of already formed universal learning actions allowing him/her to independently pass all the stages of the project. Researchers emphasize the actions of the self-regulation as the key universal learning actions. Methodologists and developers of the general education standards (FSES) define them as such actions that ensure the organization of learning activities through goal-setting, planning, forecasting, control, correction, and evaluation. They allow students to achieve success in the project activities [2; 4; 5; 24]. At the same time, researchers report the deficit of their formation in a large percentage of modern schoolchildren [4; 23]. One can observe a situation when students with high learning motivation and a high enough level of development of the self-regulation learning actions, participating in the project activities, improve and develop their com-

petences, while students with a low level of the self-regulation learning actions, even with high intrinsic motivation to carry out a project, cannot always fully engage in the project activities. Their projects often have a formal nature and are limited to simple abstracting of literature sources.

Within the framework of pedagogical approach, some researchers suggest overcoming these difficulties by means of special aids helping the students to structure their work on the project [6], others pay attention to the teachers training and emphasize the need to create special conditions for the gradual assimilation of the project content by students [2; 27]. They also create the school models of self-regulation development in the project activity, which include all participants of the educational process [5]. In addition, there is an author's approach, in which the research project itself acts as not just a set of methods and techniques of learning, but is a student's way to contact the surrounding world [20]. In this sense, quite obvious is the relevance of studying not only successful pedagogical practices and pedagogical aspects of this problem, but also disclosing the psychological component of the formation of the universal learning actions in the project activities.

Our empirical study is based on the provisions of the resource approach to the study of conscious self-regulation of a person [12], verified in the long-term studies of the Self-regulation Laboratory of the Psychological Institute of the Russian Academy of Education. According to this approach, conscious self-regulation is a reflexive psychological tool, which includes a system of the operational-cognitive (planning, modelling, programming, results evaluation) and personal (flexibility, autonomy, responsibility, reliability) levels of the self-regulation. These subsystems, in turn, mobilize primary psychic processes and states (cognitive,

personal, emotional), which act as means of implementing the student's self-regulation to achieve educational goals. It has been shown that conscious self-regulation not only contributes directly to academic performance, but also mediates the influence of cognitive and personal predictors on academic achievement [17; 30]. It has been theoretically and empirically substantiated that development of conscious self-regulation determines both the universal resource of a person for achieving goals in different types of activities and the possibilities of creating special resources of the self-regulation as means of solving more specific tasks [12]. Special and universal resources of students ensuring their success in achieving learning goals have been studied and described.

As a result of empirical studies, it was substantiated: the higher the level of the self-regulation competences development is, the wider are educational opportunities of the students [12]. The studies also scrutinized and described the age specificity of the relationship between self-regulation and academic motivation in different periods of education. It is shown that a high level of self-regulation development in high school students can perform a compensating function in the situation of decreasing academic motivation [14].

We assumed that students' self-regulation competences are a meta-resource contributing to the achievement of meta-subject self-regulation educational outcomes at all stages of the research project activities. At the same time, self-regulation can be a significant resource mediating the influence of students' academic motivation on the project implementation success.

Objective. The study had its purpose to reveal the resource role of the self-regulation competences and learning motivation in the implementation of individual project by students and to identify univer-

sal and special resources of its successful realization.

Research tasks:

— to reveal the specificity of the relationship between the degree of formation of students' self-regulation competences (the general level of conscious self-regulation and its individual characteristics), different types of learning motivation, and the peculiarities of research project implementation;

— to describe special and universal self-regulatory and motivational resources of students that ensure success of their research project;

— to identify the mediating role of self-regulation in the relationship between academic motivation and the final assessment of the project.

Research Methods

Diagnostics of the self-regulation competences of conscious self-regulation was carried out by means of the "Self-Regulation Profile of Learning Activity Questionnaire (SRPLAQ-M)" [16]. The questionnaire consists of 67 statements constituting 8 scales. Of these, 4 scales characterize operational competences: planning goals, modelling significant conditions for their achievement, programming actions, and evaluating the obtained results. The other 4 scales assess personal competences of the self-regulation: flexibility, independence, responsibility, and reliability. These scales make it possible to assess the degree of formation of the competences reflecting typical for a particular student ways of projecting and organizing conscious activity, which are steadily repeated in a variety of educational situations. The integrative index of the questionnaire makes it possible to assess the general level of development of conscious self-regulation of learning activity.

The "Scales of Academic Motivation of Schoolchildren (SAMS)" [3] allowed to assess 8 types of academic motivation: cog-

nitive motivation, achievement motivation, self-development motivation, self-esteem motivation, introjected motivation, parental respect motivation, externalized motivation, and amotivation.

The total score for the project consisted of the following indicators: research score (setting the research goal, ability to analyse preliminary knowledge on the topic), work planning score (detailed description of the work progress), product score (evaluation of the quality of the research product), reflection score (comprehension and interpretation of the research results).

This methodology of individual project assessment was used within the framework of the International Baccalaureate (IB) programme at the basic school level (Middle Years Programme). The maximum possible score for each indicator was 8. The maximum possible final score for the project was 32. Grades for the projects were given by the expert teachers. The students submitted 53% of projects on the natural science and technical topics and 47% of projects on humanitarian topics.

Statistical data analysis included correlation analysis (Pearson coefficient calculation), regression analysis (inclusion method, stepwise selection), moderation-mediation analysis (PROCESS software package, version 4 for SPSS), implemented in accordance with the algorithm and recommendations proposed by Christopher Pritcher and Andrew Hayes [31].

Sample and research design.

During three years, the study involved 9th grade students (N=187) of general education schools in Moscow aged 15—16 years (59 % — boys). The study of self-regulation and motivation was conducted at the beginning of the academic year before the students participated in the project activity. The individual project was not limited thematically and was carried out by each student independently.

Research Results

Before using multivariate statistical methods, the normality of the variables distribution was assessed by means of the Kolmogorov-Smirnov criterion. The obtained results allowed to establish that the data were distributed normally.

At the initial stage, the correlation coefficient was calculated to identify the relationship between the success of project work performance and the indicators of self-regulation and motivation. Significant correlations are presented in Table 1.

The data analysis has revealed statistically reliable positive correlations of self-regulation with motivation indicators on the one hand, and with success of project work performance — on the other hand. Negative correlations were not found. The most pronounced correlations were found between the indicator “Final Project Score” and the indicators of the self-regulation “Planning”, “Modelling”, “Result Evaluation”, “Reliability of regulation”, “General level of self-regulation”, and also with the scales “Cognitive

motivation” and “Achievement motivation”. It is noteworthy that the final score for the project positively correlates with almost all indicators of the self-regulation — both operational and personal, except for the indicators of “Flexibility” and “Programming”.

The correlation analysis showed that both the scores on various criteria of project work assessment and the final project score are related to the level of development of self-regulation, cognitive motivation, and achievement motivation. The obtained results of correlation analysis support the assumption that operational (planning, modelling, result evaluation) and personal (reliability) competences of self-regulation, as well as achievement motivation and cognitive motivation can make a significant contribution to the success of students’ project-research work.

At the next stage of the data processing, multiple regression analysis was conducted in order to identify significant predictors of students’ success in the project-research work, as well as

Table 1

Significant correlations between criteria of project work success and indicators of self-regulation and motivation

Indicators	Criteria of project work assessment				
	Research Score	Planning Score	Product Score	Reflection Score	Final Project Score
Planning (SRPLAQ-M)	.188*	.182*	.211*	.182*	.202**
Modelling (SRPLAQ-M)	.171*	.186*	.199**	.210**	.201**
Result Evaluation (SRPLAQ-M)	.170*	.156*	.193**	.257**	.207**
Flexibility (SRPLAQ-M)		.145*			
Independence (SRPLAQ-M)			.181*		
Reliability (SRPLAQ-M)	.167*		.213**	.19**	.191**
Responsibility (SRPLAQ-M)	.160*	.163*	.160*	.146*	.176*
General SR Level (SRPLAQ-M)	.207**	.199**	.244**	.219**	.233**
Cognitive Motivation (SAMS)	.174*	.212**	.244**	.166*	.210**
Achievement Motivation (SAMS)	.204**	.207**	.252**	.210**	.233**
Self-development Motivation (SAMS)	.153*	.186*	.226**		.187*

Significance level: * — $p < 0.05$; ** — $p < 0.01$.

to find out universal and special competences of the self-regulation, which can predict their success. The dependent variables were the final project score and the described indicators of project performance. As predictors we considered those indicators of motivation and characteristics of the self-regulation that showed significant links with the success of project-research work.

The obtained regression models are statistically significant ($p=0.001-0.004$). Achievement motivation and result evaluation turned to be the significant predictors for the dependent variable "Final project score". According to the obtained model, we can predict that the better the student develops the competence of the evaluation of his own result and the higher is his achievement motivation, the more successfully he will perform the project. Of course, we do not ignore the fact that the level of development of cognitive abilities and learning competence in the subject area also influence the success of project implementation. Obviously, the inclusion of these components in the regression will significantly increase the percentage of explained variance. However, in our case, the contribution of the considered variables

is quite high. It should be noted that when creating regression models where the dependent variables were different indicators of project performance, the significant predictors were achievement motivation, cognitive motivation, competences of simulation and result evaluation.

Let us consider regression models including the general level of conscious self-regulation.

The general level of self-regulation development turned to be the significant predictor for the dependent variable "Final Project Score". When building regression models where the dependent variables were different indicators of project performance, the significant predictors were achievement motivation, cognitive motivation, and the general level of self-regulation.

Thus, the study has shown that a properly organized project activity is impossible without applying the students' competences of the self-regulation. At the same time, the process of project implementation itself stimulates the development of conscious self-regulation, being the basis for developing the general ability for self-regulation. The conducted regression analysis allows to conclude that there are universal and special competences determining the

Table 2

Regression models with inclusion of different components of conscious self-regulation

Dependent variables	R ²	Adjusted R ²	F	Significant predictors	β	Significance
Final Project Score	.279	.078	7.776	Achievement Motivation	.193	.009
				Result Evaluation	.159	.031
Research Score	.204	.042	8.039	Achievement Motivation	.204	.005
Planning Score	.257	.066	6.502	Cognitive Motivation	.181	.014
				Modelling	.148	.044
Product Score	.290	.084	8.462	Achievement Motivation	.217	.003
				Modelling	.148	.044
Reflection Score	.298	.089	8.992	Result Evaluation	.219	.003
				Achievement Motivation	.156	.033

Table 3

Regression models with inclusion of general level of conscious self-regulation

Dependent variables	R ²	Adjusted R ²	F	Significant predictors	β	Significance
Final Project Score	.206	.063	10.635	General SR Level	.233	.001
Research Score	.207	.043	8.293	General SR Level	.207	.004
Planning Score	.212	.045	8.748	Cognitive Motivation	.212	.004
Product Score	.252	.064	12.582	Achievement Motivation	.252	.000
Reflection Score	.219	.048	9.296	General SR Level	.219	.003

students' success in the research project implementation. Special competences include operational simulation and result evaluation, while the general level of self-regulation is a universal resource. Intrinsic motivation, represented by achievement motivation and cognitive motivation, is also a significant factor in performing project-research activities at a high level.

The obtained results became the basis for the hypothesis that conscious self-regulation can mediate the influence of motivation on the effectiveness of a student's project activity. The statement of the supposition in this way is justified by the fact that, firstly, conscious self-regulation and academic motivation may be differently related in various periods of schooling, and secondly, their role in the success of different types of education activities may also vary [14].

To verify this hypothesis, we used the statistical method of mediator analysis. This method allows not only to determine significant causal relationships between variables, but also to identify which variables can act as mediators (mediating variables). Significant mediator effects refer to the fact that the influence of independent variable on the dependent variable is to some extent "corrected" by the mediator. In the context of the research objectives, the dependent variable was the indicator

of individual project success (final project score), the independent variables were indicators of various types of academic motivation. The characteristics of the self-regulation were supposed to be mediating variables.

During the mediator analysis procedure, each of the models was tested separately, i. e. the mediating variables were included into the model sequentially. According to the analysis results, a significant mediator effect was confirmed only for the competence "result evaluation" and only when the independent variables were the indicators of achievement motivation and cognitive motivation. The mediator model including the general level of self-regulation turned out to be insignificant. Statistical parameters of the significant mediator model "Achievement Motivation — Result Evaluation — Final Project Score" are presented in Table 4 (standardized beta coefficients were analyzed).

Mediator effects were assessed by means of the "bootstrap" procedure (N = 5000). Effects are considered significant if the 95% confidence interval does not include zero. In addition, regression coefficients analysis indicates that when a mediator is included in the regression equations, the regression weight of the independent variable decreases but remains significant. In this particular case, partial mediation

Table 4

Regression coefficients of indicators of mediator models

	b	SE	t	p	95% confidence interval	
Achievement Motivation => Final Project Score	.193	.622	2.648	.009	.419	2.872
Achievement Motivation => Result Evaluation	.245	.110	3.466	.001	.167	.600
Achievement Motivation => Result Evaluation => Final Project Score	.160	.402	2.175	.031	.081	1.666
General Effect	.233	.608	3.254	.001	.779	3.180

takes place. That is, both achievement motivation and result evaluation (as a competence of the self-regulation), being significant predictors of project success, are characterized by specific causal relationships. Achievement motivation seems to actualize and initiate students' ability to regulate their own activity, which ultimately contributes to more successful project implementation.

In the next model, the level of cognitive motivation was considered as an independent variable. Statistical parameters are presented in Table 5 (standardized beta coefficients were analyzed). In contrast to the previous model, we can observe a less close relationship between result evaluation and cognitive motivation. But a partial mediator effect was also confirmed.

Discussion

We have obtained results confirming the hypothesis that there are interrelations of the conscious self-regulation components with achievement motivation and cognitive

motivation on the one hand and with success of project work — on the other hand. The results analysis allowed to substantiate our assumption that there are competences of the self-regulation that can act as resources for successful implementation of the students' project activities at different stages of project implementation.

The obtained results indicate that psychological support of project activity will be effective for the development of the competences to ensure successful project implementation. Practically useful is the recommendation for teachers to use the methodology of assessment of self-regulation development at the initial stage of support of the students' project activities [16]. It allows to choose the right strategies for supporting the students at all stages of project work. V.S. Lazarev notes that project activity requires evaluating one's own actions practically at all stages of project implementation [10]. However, most students have not formed the competences of the self-regulation of

Table 5

Regression coefficients of indicators of mediator models

	b	SE	t	p	95% confidence interval	
Cognitive Motivation => Final Project Score	.176	.644	2.433	.016	.296	2.839
Cognitive Motivation => Result Evaluation	.195	.117	2.702	.007	.085	.546
Cognitive Motivation => Result Evaluation => Final Project Score	.172	.398	2.381	.018	.162	1.733
General Effect	.209	.640	2.917	.004	.600	3.129

result evaluating, comparing the achieved result with the designated goal, so special attention should be paid to the development of this competence. Our study made it possible to verify and confirm this fact. In addition, the study of age-specific features of conscious self-regulation indicates that the components of self-regulation are formed unevenly in the process of school education. At the same time, the analysis of the predictors of the self-regulation of academic performance has allowed us to establish that the competence of the self-regulation is a consistently reliable factor of academic performance for the students from 5th to 11th grade [15].

The results we obtained when analyzing the relationship between conscious self-regulation and academic motivation are also interesting. The relationship between intrinsic motivation and conscious self-regulation has been confirmed [8; 15]. The analysis of different theories of self-regulated learning also indicates that self-regulation provides effective management of motivation [22].

For the prospective studies, we would like to point out the potential of the project-research activities both for the development of the competences of the self-regulation and for the formation of productive forms of internal motivation. In this context, we appreciate the position of A.S. Obukhov, who, in his comments on the relationship between meta-cognition and motivation, insists on studying these phenomena in situations of risk, choice, novelty, uncertainty, freedom of initiative action [18]. Project activity has the potential to create such situations, contributing to emergence and formation of educative initiative, intrinsic motivation, purposeful behavior, and perseverance. Our results clearly indicate that in the case of research projects it is the development of the general ability to self-regulation that is a signifi-

cant prerequisite and universal resource for students, for whom the creation and implementation of the project is a new unusual learning situation.

The results obtained in this study are undoubtedly of the fundamental psychological significance, as they empirically verify and replicate for the first time on the material of project activities the previously developed provisions of the resource approach. They postulate that human resources of the self-regulation not only contribute to the productive aspects of achieving educational goals, but also serve as a mechanism for managing, coordination and mediation of the motivational resources and reserves of a person to solve a variety of tasks and life activities.

The prospect of our research is to conduct a formative experiment, which results will be used to develop technologies and methodological recommendations for the teachers on the development of students' self-regulation in the process of preparation and implementation of their project-research work.

Conclusions

1. Motivation and competences of students' self-regulation are positively related to each other and to the success of their project work.

2. Indicators of academic motivation and general level of the self-regulation characterize universal resources of successful implementation of research projects, as they make a significant contribution to the majority of expert assessments of their performance.

3. Competences of the self-regulation as a special resource of project work success are positively related to certain pedagogical criteria for assessment of its implementation. Thus, the levels of development of special competences of the operation simulation of significant conditions of goal achievement, flexibility, and reliability are

positively related to the assessment of the product of research activity as well as the students' reflexivity.

4. Achievement motivation and cognitive motivation are also interrelated with success of students' project work implementation, but their contribution significantly depends on the competence of the results evaluation.

5. The analysis of students' competences can become the basis for assessing the prerequisites for the success of their individual projects even before the start of the project-research activities,

which will help teachers to choose the right strategies for helping students. Support of this kind on behalf of a teacher can be oriented to the development of insufficiently formed competences (e.g., teaching how to correctly evaluate the obtained result at each stage, comparing it with the set task). It can also help the students to effectively engage in project activities and successfully complete the project by involving resources of the self-regulation, which, in turn, will contribute to the development of educational meta-cognitive universal actions.

References

1. Federal'nyi gosudarstvennyi obrazovatel'nyi standart osnovnogo obshchego obrazovaniya [Elektronnyi resurs] [The federal state educational standard of basic general education]. Utverzhden prikazom Ministerstva obrazovaniya i nauki Rossiiskoi Federatsii ot 31 maya 2021 g. № 287. URL: <https://www.garant.ru/products/ipo/prime/doc/401333920/> (Accessed 11.11.2022). (In Russ.).
2. Vakhrushev S.A., Dmitriev V.A. Nekotorye problemy vnedreniya proektnoi deyatel'nosti v shkol'nom obrazovanii [Some problems of implementing project activities in school education]. *Azimuth nauchnykh issledovaniy: pedagogika i psikhologiya [Azimuth of scientific research: pedagogy and psychology]*, 2021. Vol. 10, no. 1(34), pp. 40—44. DOI:10.26140/anip-2021-1001-0008 (In Russ.).
3. Gordeeva T.O., Sychev O.A., Gizhitskii V.V., Gavrichenkova T.K. Shkaly vnutrennei i vneshnei akademicheskoi motivatsii shkol'nikov [Scales of internal and external academic motivation of schoolchildren]. *Psikhologicheskaya nauka i obrazovanie = Psychological Science and Education*, 2017. Vol. 22, no. 2, pp. 65—74. DOI:10.17759/pse.201722020 (In Russ.).
4. Gutorova G.D. Metapredmetnye kompetentsii i otsenka urovnya ikh sformirovannosti u obuchayushchikhsya osnovnoi shkoly [Meta-subject competencies and assessment of the level of their formation among students of the basic school]. *Filologiya i kultura [Philology and Culture]*, 2021, no. 2(64), pp. 239—245. DOI:10.26907/2074-0239-2021-64-2-239-245 (In Russ.).
5. Gushchina Yu.A. Proektnaya deyatel'nost' kak sredstvo razvitiya samoregulyatsii mladshikh podrostkov [Project activity as a means of developing self-regulation of younger adolescents]. *Yaroslavskii pedagogicheskii vestnik [Yaroslavl Pedagogical Bulletin]*, 2022, no. 2(125), pp. 33—42. DOI:10.20323/1813-145X-2022-2-125-33-42 (In Russ.).
6. Individual'nyi projekt: rabochaya tetrad'. 10—11 klassy. Uchebnoe posobie [Individual project: workbook. Grades 10-11. Study guide]. In L.E. Spiridonova, B.A. Komarov, O.V. Markova, V.M. Statsunova (ed.). Saint-Petersburg: KARO, 2019. (In Russ.).
7. Issledovatel'skaya i proektnaya rabota shkol'nikov. 5—11 klassy [Research and project work of schoolchildren. Grades 5—11]. In Leontovich A.V. (ed.). Moscow: VAKO, 2014. 160 p. (Sovremennaya shkola: upravlenie i vospitanie). (In Russ.).
8. Ishmuratova Yu.A., Potanina A.M., Bondarenko I.N. Vklad osoznannoi samoregulyatsii, вовлеченности i motivatsii v akademicheskuyu uspevaemost' shkol'nikov v raznye periody obucheniya [The contribution of conscious self-regulation, involvement and motivation to the academic performance of schoolchildren in different periods of study]. *Psikhologicheskaya nauka i obrazovanie = Psychological Science and Education*, 2021. Vol. 26, no. 5, pp. 17—29. DOI:10.17759/pse.2021260502 (In Russ.).
9. Lazarev V.S. K probleme postroeniya modeli «shkoly budushchego» [On the problem of building a model of the “school of the future”]. *Psikhologicheskaya nauka i obrazovanie = Psychological Science and Education*, 2021. Vol. 26, no. 4. DOI:10.17759/pse.2021260406 (In Russ.).
10. Lazarev V.S. Proektnaya deyatel'nost' uchashchikhsya kak forma razvivayushchego obucheniya [Project activity of students as a form of developing learning]. *Psikhologicheskaya nauka i obrazovanie = Psychological Science and Education*, 2015. Vol. 20, no. 3, pp. 25—34. DOI:10.17759/pse.20 (In Russ.).
11. Leontovich A.V. Ob osnovnykh ponyatiyakh kontseptsii razvitiya issledovatel'skoi i proektnoi

deyatel'nosti uchashchikhsya [About the basic concepts of the concept of development of research and project activities of students]. *Issledovatel'skaya rabota shkol'nikov [Research work of schoolchildren]*, 2003. Vol. 4, pp. 18—24. (In Russ.).

12. Morosanova V.I. Osoznannaya samoregulyatsiya kak metaresurs dostizheniya tselei i razresheniya problem zhiznedeyatel'nosti [Conscious self-regulation as a meta-resource for achieving goals and solving life problems]. *Vestnik Moskovskogo universiteta [Bulletin of the Moscow University]*. Seriya 14. Psikhologiya [Psychology], 2021. Vol. 1, pp. 3—37. DOI:10.11621/vsp.2021.01.01 (In Russ.).

13. Morosanova V.I., Filippova E.V. Regulyatornye resursy v dostizhenii rezultatov proektno-issledovatel'skoi deyatel'nosti obuchayushchikhsya [Regulatory resources in achieving the results of students' design and research activities]. *Psikhologiya samoregulyatsii v kontekste aktual'nykh zadach obrazovaniya [Psychology of self-regulation in the context of actual educational tasks]* (k 90-letiyu so dnya rozhdeniya O.A. Konopkina). Moscow: Psikhologicheskii institut Rossiiskoi akademii obrazovaniya, 2021, pp. 84—89 (In Russ.).

14. Morosanova V.I., Fomina T.G., Ovanesbekova M.L. Vzaimosvyaz' osoznannoi samoregulyatsii, motivatsii i lichnostnykh dispozitsii s uspevaemost'yu shkol'nikov [The relationship of conscious self-regulation, motivation and personal dispositions with school performance]. *Vestnik Rossiiskogo fonda fundamental'nykh issledovaniy. Gumanitarnye i obshchestvennye nauki [Bulletin of the Russian Foundation for Fundamental Research. Humanities and social sciences]*, 2018, no. 2, pp. 124—133. (In Russ.).

15. Morosanova V.I., Fomina T.G., Ovanesbekova M.L. Vozrastnaya spetsifika vzaimosvyazi osoznannoi samoregulyatsii, akademicheskoi motivatsii i lichnostnykh osobennosti uchashchikhsya [Age-specific relationship of conscious self-regulation, academic motivation and personal characteristics of students]. *Teoreticheskaya i eksperimental'naya psikhologiya [Theoretical and experimental psychology]*, 2017. Vol. 10, no. 3, pp. 34—45. (In Russ.).

16. Morosanova V.I. Sozdanie novoi versii oprosnogo metoda «Stil' samoregulyatsii uchebnoi deyatel'nosti — SSUDM» [Creation of a new version of the questionnaire method “Style of self-regulation of educational activity — SSUDM”]. *Teoreticheskaya i eksperimental'naya psikhologiya [Theoretical and experimental psychology]*, 2011. Vol. 4, pp. 5—15. (In Russ.).

17. Morosanova V.I., Fomina T.G. Osoznannaya samoregulyatsiya v sisteme psikhologicheskikh prediktorov dostizheniya uchebnykh tselei [Conscious self-regulation in the system of psychological

predictors of achievement of educational goals]. *Voprosy psikhologii [Questions of psychology]*, 2016. Vol. 2, pp. 124—135. (In Russ.).

18. Obukhov A.S. Sovremennye issledovaniya problemy motivatsii i samoregulyatsii cheloveka v situatsii neopredelennosti i izmenchivosti mira [Modern studies of the problem of motivation and self-regulation of a person in a situation of uncertainty and variability of the world]. *Issledovatel' [Researcher]*, 2019. Vol. 1—2(25—26), pp. 10—21. (In Russ.).

19. Ofitsial'nyi sait Mezhdunarodnogo bakalavriata [Elektronnyi resurs] [Official website of the International Baccalaureate]. URL: <http://www.ibo.org/> (Accessed 06.09.2022). (In Russ.).

20. Savenkov A.I. Psikhologicheskie osnovy issledovatel'skogo podkhoda k obucheniyu [Psychological foundations of the research approach to learning]. Moscow: Prosveshchenie, 2016. 64 p. (In Russ.).

21. Sukhodimtseva A.P., Sergeeva M.G., Sokolova N.L. Proektnyi podkhod k realizatsii metapredmetnogo soderzhaniya obrazovaniya v shkole [Project approach to the implementation of the meta-subject content of education at school]. *Nauchnyi dialog [Scientific dialogue]*, 2017. Vol. 9, pp. 240—258. DOI:10.24224/2227-1295-2017-9-240-258 (In Russ.).

22. Fomina T.G. Kontseptual'nye podkhody k analizu samoreguliruemogo obucheniya v zarubezhnoi psikhologii obrazovaniya [Elektronnyi resurs] [Conceptual approaches to the analysis of self-regulated learning in foreign psychology of education]. *Sovremennaya zarubezhnaya psikhologiya [Modern Foreign Psychology]*, 2022. Vol. 11, no. 3, pp. 27—37. (In Russ.).

23. Aksela M., Haatainen O. Project-based learning (PBL) in practise: Active Teachers' Views of Its Advantages and Challenges. Integrated Education for the Real World: 5th International STEM in Education Conference Post-Conference Proceedings Queensland University of Technology, 2019, pp. 9—16.

24. Annetta L.A., Lamb R., Vallett D., Shapiro M. Project-based learning progressions: Identifying the nodes of learning in a project-based environment. *Contemporary Technologies in Education: Maximizing Student Engagement, Motivation, and Learning*, 2019. pp. 163—181. DOI:10.1007/978-3-319-89680-9_9

25. Brassler M., Dettmers J. How to Enhance Interdisciplinary Competence—Interdisciplinary Problem-Based Learning versus Interdisciplinary Project-Based Learning. *Interdisciplinary Journal of Problem-Based Learning*, 2017. Vol. 11(2). DOI:10.7771/1541-5015.1686

26. Chen C.H., Yang Y.C. Revisiting the effects of project-based learning on students' academic achievement: A meta-analysis investigating moderators. *Educational Research Review*,

2019. Vol. 26, pp. 71—81. DOI:10.1016/j.edurev.2018.11.001
27. Grossman P., Dean C.G.P., Kavanagh S.S., Herrmann Z. Preparing teachers for project-based teaching. *Phi Delta Kappan*, 2019. Vol. 100(7), pp. 43—48. DOI:10.1177/0031721719841338
28. Krajcik J., Shin N. Project-Based Learning. In R. Sawyer (Ed.). *The Cambridge Handbook of the Learning Sciences*. Cambridge Handbooks in Psychology. Cambridge: Cambridge University Press, 2014, pp. 275—297. DOI:10.1017/CBO9781139519526.018
29. Mohamadi Z. Comparative effect of project-based learning and electronic project-based learning on the development and sustained development of english idiom knowledge. *Journal of Computing in Higher Education*, 2018. Vol. 30, no. 2, pp. 363—385. DOI:10.1007/s12528-018-9169-1
30. Morosanova V.I., Fomina T.G., Kovas Y., Bogdanova O.Y. Cognitive and regulatory characteristics and mathematical performance in high school students. *Personality and Individual Differences*, 2016. Vol. 90, pp. 177—186.
31. Preacher K.J., Hayes A.F. SPSS and SAS procedures for estimating indirect effects in simple mediation models. *Behavior research methods, instruments, & computers*, 2004. Vol. 36, no. 4, pp. 717—731.
32. Saad A., Zainudin S. A review of Project-Based Learning (PBL) and Computational Thinking (CT) in teaching and learning. *Learning and Motivation*, 2022. Vol. 78, p. 101802. DOI:10.1016/j.lmot.2022.101802
33. Stefanou C. et al. Self-regulation and autonomy in problem-and project-based learning environments. *Active Learning in Higher Education*, 2013. Vol. 14, no. 2, pp. 109—122. DOI:10.1177/1469787413481132
34. Wu T.T. et al. Application and analysis of a mobile e-book system based on project-based learning in community health nursing practice courses. *Journal of Educational Technology & Society*, 2018. Vol. 21, no. 4, pp. 143—156.

Литература

1. Федеральный государственный образовательный стандарт основного образования, утвержден приказом Министерства образования и науки Российской Федерации от 31 мая 2021 г. № 287 [Электронный ресурс]. URL: <https://www.garant.ru/products/ipo/prime/doc/401333920> (дата обращения: 11.11.2022).
2. Вахрушев С.А., Дмитриев В.А. Некоторые проблемы внедрения проектной деятельности в школьном образовании // Азимут научных исследований: педагогика и психология. 2021. Т. 10. № 1(34). С. 40—44. DOI:10.26140/anip-2021-1001-0008
3. Гордеева Т.О., Сычев О.А., Гижицкий В.В., Гавриченко Т.К. Шкалы внутренней и внешней академической мотивации школьников // Психологическая наука и образование. 2017. Том 22. № 2. С. 65—74. DOI:10.17759/pse.2017220206
4. Гуророва Г.Д. Метапредметные компетенции и оценка уровня их сформированности у обучающихся основной школы // Филология и культура. 2021. № 2(64). С. 239—245. DOI:10.26907/2074-0239-2021-64-2-239-245
5. Гушина Ю.А. Проектная деятельность как средство развития саморегуляции младших подростков // Ярославский педагогический вестник. 2022. № 2(125). С. 33—42. DOI:10.20323/1813-145X-2022-2-125-33-42
6. Индивидуальный проект: рабочая тетрадь. 10—11 классы. Учебное пособие / Л.Е. Спиридонова, Б.А. Комаров, О.В. Маркова, В.М. Стацунова. СПб.: КАРО, 2019.
7. Исследовательская и проектная работа школьников. 5—11 классы / Под ред. А.В. Леонтовича. Современная школа: управление и воспитание. М.: ВАКО, 2014. 160 с.
8. Ишмуратова Ю.А., Потанина А.М., Бондаренко И.Н. Вклад осознанной саморегуляции, вовлеченности и мотивации в академическую успеваемость школьников в разные периоды обучения // Психологическая наука и образование. 2021. Том 26. № 5. С. 17—29. DOI:10.17759/pse.2021260502
9. Лазарев В.С. К проблеме построения модели «школы будущего» // Психологическая наука и образование. 2021. Т. 26. № 4. DOI:10.17759/pse.2021260406
10. Лазарев В.С. Проектная деятельность учащихся как форма развивающего обучения // Психологическая наука и образование. 2015. Т. 20. № 3. С. 25—34. DOI:10.17759/pse.20
11. Леонтович А.В. Об основных понятиях концепции развития исследовательской и проектной деятельности учащихся // Исследовательская работа школьников. 2003. № 4. С. 18—24.
12. Морсанова В.И. Осознанная саморегуляция как метаресурс достижения целей и разрешения проблем жизнедеятельности // Вестник Московского университета. Серия 14. Психология. 2021. № 1. С. 3—37. DOI:10.11621/vsp.2021.01.01
13. Морсанова В.И., Филиппова Е.В. Регуляторные ресурсы в достижении результатов проектно-исследовательской деятельности обучающихся // Психология саморегуляции в контексте актуальных задач образования

(к 90-летию со дня рождения О.А. Конопкина). М.: Психологический институт Российской академии образования, 2021. С. 84—89.

14. Моросанова В.И., Фомина Т.Г., Ованесбекова М.Л. Взаимосвязь осознанной саморегуляции, мотивации и личностных диспозиций с успеваемостью школьников // Вестник Российского фонда фундаментальных исследований. Гуманитарные и общественные науки. 2018. № 2. С. 124—133.
15. Моросанова В.И., Фомина Т.Г., Ованесбекова М.Л. Возрастная специфика взаимосвязи осознанной саморегуляции, академической мотивации и личностных особенностей учащихся // Теоретическая и экспериментальная психология. 2017. Т. 10. № 3. С. 34—45.
16. Моросанова В.И. Создание новой версии опросного метода «Стиль саморегуляции учебной деятельности — ССУДМ» / В.И. Моросанова, А.В. Ванин, И.Ю. Цыганов // Теоретическая и экспериментальная психология. № 4. 2011. С. 5—15.
17. Моросанова В.И., Фомина Т.Г. Осознанная саморегуляция в системе психологических предикторов достижения учебных целей // Вопросы психологии. 2016. № 2. С. 124—135.
18. Обухов А.С. Современные исследования проблемы мотивации и саморегуляции человека в ситуации неопределенности и изменчивости мира // Исследователь/Researcher. 2019. № 1—2(25—26). С. 10—21.
19. Официальный сайт Международного бакалавриата [Электронный ресурс]. URL: <http://www.ibo.org/> (дата обращения: 06.09.2022).
20. Савенков А.И. Психологические основы исследовательского подхода к обучению. М.: Просвещение, 2016. 64 с.
21. Суходимцева А.П., Сергеева М.Г., Соколова Н.Л. Проектный подход к реализации метапредметного содержания образования в школе // Научный диалог. 2017. № 9. С. 240—258. DOI:10.24224/2227-1295-2017-9-240-258
22. Фомина Т.Г. Концептуальные подходы к анализу саморегулируемого обучения в зарубежной психологии образования [Электронный ресурс] // Современная зарубежная психология. 2022. Том 11. № 3. С. 27—37.
23. Aksela M., Haatainen O. Project-based learning (PBL) in practise: Active Teachers' Views of Its Advantages and Challenges // Integrated Education for the Real World: 5th International STEM in Education Conference Post-Conference Proceedings Queensland University of Technology. 2019. P. 9—16.
24. Annetta L.A., Lamb R., Vallett D., Shapiro M. Project-based learning progressions: Identifying the nodes of learning in a project-based environment // Contemporary Technologies in Education: Maximizing Student Engagement, Motivation, and Learning. 2019. P. 163—181. DOI:10.1007/978-3-319-89680-9_9
25. Brassler M., Dettmers J. How to Enhance Interdisciplinary Competence—Interdisciplinary Problem-Based Learning versus Interdisciplinary Project-Based Learning // *Interdisciplinary Journal of Problem-Based Learning*. 2017. Vol. 11(2). DOI:10.7771/1541-5015.1686
26. Chen C.H., Yang Y.C. Revisiting the effects of project-based learning on students' academic achievement: A meta-analysis investigating moderators // *Educational Research Review*. 2019. Vol. 26. P. 71—81. DOI:10.1016/j.edurev.2018.11.001
27. Grossman P., Dean C.G.P., Kavanagh S.S., Herrmann Z. Preparing teachers for project-based teaching // *Phi Delta Kappan*. 2019. Vol. 100(7). P. 43—48. DOI:10.1177/0031721719841338
28. Krajcik J., Shin N. Project-Based Learning / In R. Sawyer (Ed.) // *The Cambridge Handbook of the Learning Sciences*. Cambridge Handbooks in Psychology. Cambridge: Cambridge University Press, 2014. P. 275—297. DOI:10.1017/CBO9781139519526.018
29. Mohamadi Z. Comparative effect of project-based learning and electronic project-based learning on the development and sustained development of english idiom knowledge // *Journal of Computing in Higher Education*. 2018. Vol. 30. № 2. P. 363—385. DOI:10.1007/s12528-018-9169-1
30. Morosanova V.I., Fomina T.G., Kovas Y., Bogdanova O.Y. Cognitive and regulatory characteristics and mathematical performance in high school students // *Personality and Individual Differences*. 2016. Vol. 90. P. 177—186.
31. Preacher K.J., Hayes A.F. SPSS and SAS procedures for estimating indirect effects in simple mediation models // *Behavior research methods, instruments, & computers*. 2004. Vol. 36. № 4. P. 717—731.
32. Saad A., Zainudin S. A review of Project-Based Learning (PBL) and Computational Thinking (CT) in teaching and learning // *Learning and Motivation*. 2022. Vol. 78. P. 101802. DOI:10.1016/j.lmot.2022.101802
33. Stefanou C. et al. Self-regulation and autonomy in problem-and project-based learning environments // *Active Learning in Higher Education*. 2013. Vol. 14. № 2. P. 109—122. DOI:10.1177/1469787413481132
34. Wu T.T. et al. Application and analysis of a mobile e-book system based on project-based learning in community health nursing practice courses // *Journal of Educational Technology & Society*. 2018. Vol. 21. № 4. P. 143—156.

Information about the authors

Varvara I. Morosanova, Corresponding Member of the Russian Academy of Education, Doctor of Psychology, Professor, Head of the Department of Psychology of Self-regulation, Psychological Institute of the Russian Academy of Education, Moscow, Russia, ORCID: <https://orcid.org/0000-0002-7694-1945>, e-mail: morosanova@mail.ru

Elena V. Filippova, PhD in Psychology, Senior Researcher, Department of Psychology of Self-regulation, Psychological Institute of the Russian Academy of Education, Moscow, Russia, ORCID: <https://orcid.org/0000-0003-3052-0421>, e-mail: proftest@gmail.com

Tatiana G. Fomina, PhD in Psychology, Leading Researcher, Department of Psychology of Self-regulation, Psychological Institute of the Russian Academy of Education, Moscow, Russia, ORCID: <https://orcid.org/0000-0001-5097-4733>, e-mail: tanafomina@mail.ru

Информация об авторах

Моросанова Варвара Ильинична, член-корреспондент РАО, доктор психологических наук, профессор, заведующая лабораторией психологии саморегуляции, ФГБНУ «Психологический институт Российской академии образования» (ФГБНУ «ПИ РАО»), г. Москва, Российская Федерация, ORCID: <https://orcid.org/0000-0002-7694-1945>, e-mail: morosanova@mail.ru

Филиппова Елена Валерьевна, кандидат психологических наук, старший научный сотрудник лаборатории психологии саморегуляции, ФГБНУ «Психологический институт Российской академии образования» (ФГБНУ «ПИ РАО»), г. Москва, Российская Федерация, ORCID: <https://orcid.org/0000-0003-3052-0421>, e-mail: proftest@gmail.com

Фомина Татьяна Геннадьевна, кандидат психологических наук, ведущий научный сотрудник лаборатории психологии саморегуляции, ФГБНУ «Психологический институт Российской академии образования» (ФГБНУ «ПИ РАО»), г. Москва, Российская Федерация, ORCID: <https://orcid.org/0000-0001-5097-4733>, e-mail: tanafomina@mail.ru

Получена 17.01.2023

Принята в печать 03.04.2023

Received 17.01.2023

Accepted 03.04.2023