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**THE INTELLIGENCE LEVEL AS A FACTOR IN THE
EFFECTIVENESS OF FINAL CERTIFICATION (OGE)**

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Abstract

The article deals with the influence of cognitive abilities on the success of passing the final certification by schoolchildren. Based on the experimental study carried out by the authors of the research, the influence of the intellect development level on the results of the basic state examination is emphasized. The study of the structure of the 9th grade students intellect was conducted on the basis of Orekhovo-Zuyevo schools, Moscow region in 2017-2018. The research was conducted according to the R. Amthauer intelligence structure test, which allows in-depth study of the structural and level characteristics of the intellect. The procedure involved monitoring the results of the OGE delivery. It was found that cognitive difficulties during examinations are associated with a low learner’s intelligence level. The low level of cognitive abilities development also affects the features of perception, information processing, inability to apply the acquired knowledge and operate with the system of the subject scientific concepts during the examinations. Significant correlations between certain operations of thinking and examination marks in subjects have been found. The data can be applied in the field of teaching theory and technology, for psychological and pedagogical support of students’ cognitive development.

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Keywords: Intellect, cognitive abilities, basic state examination.



1. Introduction

Reforms in the Russian education system, affecting its structure, methodology, technologies, final control, cause serious changes in various aspects of learning. One of these changes is the introduction of the OGE (the main state examination), which contains certain requirements for the preparation and passing examinations. At the same time, the requirements for the organization, conditions of training students for the exam are becoming tougher from year to year. It should be noted that the final school examinations in the form of test assignments differ from the traditional ones, both in preparation and in the procedure and conditions of the conduct.

- 1.1. It is known that one of the OGE goals is to objectify the training level of graduates in general education institutions, the succession of general and vocational education, and also to increase the accessibility of higher and secondary vocational education, but in spite of this, examinations in this format cause a lot of discussion among educators, schoolchildren and parents. Since the OGE and the EGE (Unified State Examination) are the main forms of passing final certification in educational organizations and entrance exams - in professional institutions, the problems of intensive training boot and the choice of the further professional graduate's education are connected with final certification. It is noted that often students starting from grade 9, when preparing and passing the OGE, are experiencing difficulties associated not only with the expectation of forthcoming exams, the opportunity to realize themselves, but also by choosing a profession, which is the cause of psychological discomfort, anxiety and fears.
- 1.2. Without detracting from the importance of procedural and the more personal difficulties, there is a clear need to study the difficulties of cognitive abilities, related to the characteristics of perception, processing of information during examinations, the specifics of working with test tasks, insufficient knowledge, inability to apply the knowledge gained in lessons and operate the system of scientific concepts of the subject.

2. Problem Statement

A considerable number of works have been devoted to the research of various psychological and pedagogical aspects for the final certification, psychological characteristics of graduates influencing on the success of educational activity and the passing of exams (Verbitskaya, 2017; Yeremina, 2007; Morosanova, Fomina, & Kovas, 2014 and etc.). It should be noted that in the focus of researchers' attention, mainly is the final certification of eleven-graders, the information concerning exam tests in the format of the OGE is not numerous. However, if the EGE is held only for the graduates of the eleventh grades, then the OGE includes all the ninth graders completing their education at school.

Innovative processes affecting the final certification of trainees clearly raise the issue of the difficulties faced by graduates at the examinations. Studying the procedural difficulties for conducting the final certification, as well as personal, conditioned by the peculiarities of perception of the extra ordinary

situation at the exam, his subjective reactions and position, the lack of the opportunity to gain the support of adults, one should not forget the difficulties of cognitive ones.

Since, often graduates, demonstrating high academic achievements in the subject, show insufficient effectiveness of passing the EGE in psychologically difficult conditions. The majority of information concerns the personal characteristics of students, which affects the results of the final certification. For example, Yeremina (2007), examining the influence of the psychological characteristics on the schoolchildren personality, on the success of passing the final school examinations in different forms (EGE and traditional exam), emphasizes the role of motivation for achieving success of school graduates. It is noted that for a successful passing of a traditional examination, the graduate needs to have only a tendency to strive for success (a positive expression of motivation), and for the Final state examination - a high motivation to achieve success. Also, the high level of claims and self-esteem, the high degree of expression by school-graduates their motivation for the mark, contribute to the increase in the effectiveness of the final attestation. The graduates' low level of self-esteem negatively influences the results of examinations, since they do not fulfill the tasks of medium and high level of complexity, as well as high level of claims and low self-esteem, due to personal devaluation of the activities is the result of their failing at the exam. High personal anxiety of graduates at the examinations does not allow them to quickly adapt and mobilize in the situation of passing the EGE (Yeremina, 2007).

Morosanova and Filippova (2009) show the role of conscious self-regulation in mediating the influence of cognitive and personal predictors, ensuring the reliability of students' actions in the psychologically stressful situation of the EGE. The high evaluation result of the exam is provided by both a high level of knowledge and the development of conscious self-regulation, which is not only a successful passing the exam predictor, but also a mediator that reduces the negative impact of evaluation anxiety on its results. Based on the foreign researchers work on self-regulation (Baumeister, 2000; Kuhl, 2000), the authors emphasize (as a promising direction) the need to study conscious self-regulation in learning activity (Morosanova, Fomina, & Kovas, 2014).

It is out of question, that the cognitive level of development determines the success of the actualization of knowledge and is related to the effectiveness of the OGE delivery. Modern research of the knowledge effective actualization is connected with the various technologies, didactic systems and approaches (Volkova, 2015; Nesterova & Ratanova, 2016), models of learning (Budrina, 2017), didactic means (Kholodnaya & Gelfman, 2016), cognitive activity of the person ("Poznavatel'naya aktivnost' i pamyat", 2010), levels of material processing (Craik, 2002) on the effectiveness of cognitive processes. In addition, there are studies of the relationship between cognitive development and the success of the Russian language learning on the effectiveness of the education system functioning: in less favorable educational conditions, only the nonverbal intellect is associated with the success of training, and in the more favorable - working memory is updated along with the nonverbal intellect (Verbitskaya, 2017).

- 2.1. It should be noted that the most important component of the test tasks successful execution is a high level of attention shifting, since in the test tasks the principle of mosaicism is realized, that is, the questions of alternation from different areas on the examination subject. The level of memory development is also important, as the process of organization, preservation and

reproduction of the past experience in activity. Often the mental state affects the concentration and quality reproduction of the learning material. In addition, the level of natural memory development, the formation of mnemonic techniques and the regulatory mechanisms of mnemonic abilities have a significant impact on the effectiveness of educational material reproduction (Osinina, 2015). The transformation of the educational material, its reduction, the absence of its complete forgetting, additions and distortions are related to objective laws that can accompany the knowledge of actualization during the passing of the final certification. The depth of processing of the text, the specificity of the introductions and additions are determined by the nature and level of mnemonic actions development (Cheremoshkina & Osinina, 2016). The absence of errors during delayed actualization at the exam is predetermined not only by the availability of intellectually capacious ways of processing the material (for example, structuring), but also by the maturity of the regulatory mechanisms. The effectiveness of the memorized material structuring is proved, in contrast to associations and strong points. The results obtained in the studies by Cheremoshkina and Osinina (2018) indicate that any processing of a memorized material has an effect on the specificity of the delayed reproduction. At the same time, the intellectual capacity of reception is manifested both at the level of conscious reproduction and at the level of a relatively unconscious recall of information in the process of solving problems with its use (Cheremoshkina & Osinina, 2018).

- 2.2. Examinations lasting 3-4 hours, contribute to a decrease in efficiency, concentration of attention and a memory productivity. Therefore, it becomes important to inform graduates with appropriate methods of processing memorable material, psychotechnical skills of self-control and self-regulation, which will improve the efficiency of both preparation and passing exams.

3. Research Questions

In this regard, the study of students cognitive abilities and their impact on the success of the final school examination is becoming more urgent.

- 3.1. How does the cognitive abilities system affect the final attestation?
- 3.2. Are there cognitive difficulties associated with perception peculiarities, information processing during examinations, the specifics of working with tests, the inability to apply the acquired knowledge and operate with the system of scientific concepts of the subject, the level of the student's intellect development?

4. Purpose of the Study

Purpose of the Study is the research of interrelation between the schoolchildren's intelligence indicators and the main state examination effectiveness.

5. Research Methods

- 5.1. Theoretical analysis and generalization of the main theoretical and methodological aspects of the intelligence study, available in the literature data on the main factors affecting the effectiveness of passing exams;
- 5.2. Empirical study of the students intellect structure of the 9th graders in Orekhovo-Zuyevo schools; monitoring of the OGE results;
- 5.3. Mathematical methods for studying the relationship between intelligence indicators and exam marks of students.

The study examined the interrelations between the intellect indicator of schoolchildren and the effectiveness of passing the main state examination, as well as the relationship between the indicators of the thinking operations and the success of the individual subjects delivery. The study involved 121 ninth-graders at the age of 15-16 years from the secondary MOU SOSH № 2, MOU SOSH №20, MOU SOSH №26 of Orekhovo-Zuyevo, Moscow region, Russia.

The study of intelligence was carried out using the intelligence test of R. Amthauer, which allows in-depth study of the intellect structural and level characteristics. Its use makes it possible to assess the ability for natural, social, mathematical, technical sciences, foreign languages, entrepreneurship, and to predict the success of training and further professional activity. The test results were correlated with the final scores obtained during the main state examination. Mathematical processing was carried out by applying the correlation analysis according to the rs-criterion of Spearman in the program “Statistica”.

6. Findings

The research results of the relationship between the intelligence indicators and the exam marks of students are presented in Table 01.

Table 01. Interrelation of intelligence indicators and examination marks of students

Subject Subtest	Russian Language	Mathematics	Foreign Language	Biology	Geography	Social Sciences	Physics	Chemistry	Informatics	Literature
Logical selection	0,35	0,11	0,22	0,68	0,19	0,55	0,21	0,29	0,58	0,26
Definition of common features	0,16	0,14	0,14	0,38	0,21	0,23	-0,01	0,37	0,52	0,54
Analogies	0,37	0,16	0,48	0,75	0,26	0,38	-0,79	0,07	0,45	-0,54
Classification	0,34	0,33	0,26	0,37	0,31	0,46	0,02	-0,09	0,47	0,82
Count	0,19	0,24	0,01	0,61	0,31	0,24	0,27	-0,32	0,56	0,77
Number series	0,12	0,19	-0,09	0,62	0,4	0,23	0,4	0,01	0,42	-0,77
Selecting shapes	-0,05	-0,05	-0,16	0,57	0,19	0,15	-0,59	-0,1	-0,42	-0,27
Cubes	-0,01	-0,05	-0,11	0,30	-0,04	0,05	0,07	0,37	0,39	-0,77
Memorizing words	0,19	0,26	0,27	0,20	0,15	0,27	0,46	0,31	0,36	-0,26
General IQ	0,31	0,27	0,13	0,79	0,47	0,47	0,28	0,22	0,71	0,00

Note: in bold type of the table, significant correlations for the Spearman rs- criterion

- 6.1. The effectiveness of the final certification is mainly influenced by the student's cognitive abilities.
- 6.2. The general level of intelligence development is related to the effectiveness of such subjects delivery as the Russian language, mathematics, biology, geography, social studies, informatics ($p < 0,05$).
- 6.3. Certain operations of thinking determine the success of the OGE delivery.

6.3.1. The operations of thinking "logical selection", "analogy", "classification", "memorization of words" are associated with the efficiency of the Russian language delivery ($p < 0,05$).

6.3.2. Such an object in the OGE format, like mathematics, directly correlates with such thinking operations as "counting", "classification" and "remembering words" ($p < 0,05$).

The obtained data seems logical, since the "count" (arithmetic subtest) is oriented toward the level of mathematical thinking development, "classification" - mathematical generalization and inference, analysis and synthesis in mathematics. According to the research conducted, "remembering words" also plays an important role in the performance of the subject test tasks.

6.3.3. The success of passing the OGE in biology with ninth-graders is connected with the greatest number of correlations ($p < 0.05$) with intelligence operations: "logical selection" (awareness), "defining common traits" (elimination of superfluous), "analogies", "classification" (definition general), "count" (arithmetic), "numerical series" (definition of patterns), "choice of figures" (geometric composition).

Probably, these components of verbal and non-verbal intelligence, in addition to the knowledge of the subject, are necessary for the effective delivery of biology as a system of sciences that studies living beings and their interactions with the environment, i.e. all aspects of life. The stock of elementary knowledge and horizons (awareness), the ability to operate with verbal concepts, the possibility of abstraction, the identification of common features ("the definition of common features", "analogies," "classification," "choice of figures"), the determination of the essential features of objects and phenomena, the ability to infer are necessary not only for mastering, but also for the successful delivery of the natural science disciplines. The level of ninth-graders scientific concepts formation is also important for the system (awareness), which is partly related to the cultural level of the latter. As for the correlation between the "mathematical" operations of thinking and passing the "biology" exam, the "mathematical" features of the intellect, the propensity for logical inference are additional aspects of the success in biology in the format of the OGE.

6.3.4. The propensity to analytical and synthetic activity, the ability to abstract, the generalization of compared objects, the ability to isolate significant abstract characteristics, are necessary components in the OGE delivery in informatics (operations: "logical selection", "definition of common features", "count"). A significant correlation between the "count" and the examination mark in computer science is logical, since mathematical operations are

relevant to computer science, as a science of methods, processes of collecting, storing, transferring, analyzing and evaluating information using computer technology.

6.3.5. When passing the final certification in social science, inductive thinking, the supply of elementary knowledge and their successful actualization, correlation with certain information, the expansion of existing knowledge, generalization, comparison of objects, etc. ("logical selection", "analogies", "classification", "memorizing words") become very important ($p < 0.05$).

6.3.6. The success of passing the exam in geography by the ninth-graders correlates ($p < 0.05$) with the operation of "classification" thinking (definition of the general), as the ability to generalize in the system of scientific concepts, the distribution of any objects, phenomena according to classes, groups, common features. Also, a significant correlation between the examination mark in geography and the subtests "count" and "number series" was found, since numeracy skills are required to solve specific geographic tasks and perform test tasks.

6.3.7. An interesting inverse correlation connection was found between the exam marks in the subject of physics and the subtest of the "analogy" technique. Perhaps the ability to make assertions and inferences, the property identifications of one object in comparison with another on the basis of their similarity, the establishment of similarities in certain relations of objects, phenomena, concepts in general, as an important feature of verbal-logical thinking, defines the effectiveness passing the disciplines revealing the laws of nature, structure and motion of matter.

6.3.8. The study did not reveal significant correlations between individual intelligence indicators and such subjects as "literature", "chemistry", "foreign language". We can assume that the lack of correlation links is due to a small number of participants in research who chose these subjects (4, 11, 15 schoolchildren, respectively) for delivery.

6.4. Cognitive difficulties during the OGE are associated with the learner's low level intellect development, as well as inability to apply the acquired knowledge and operate with the system of scientific concepts of the subject during the examination.

7. Conclusion

The results of the review of the OGE successful passing the students with different levels of intelligence development complement the scientific understanding of the relationship between the cognitive characteristics of graduates and the effectiveness of passing the final attestation for both pedagogical and age psychology, and also for the psychology of intelligence and the psychology of abilities. Also, the data obtained in the course of the research can be applied in the field of theory, methodology and technology of teaching. It should be noted that the results of the study will make it possible to formulate a number of recommendations for information and teachers psychological support, targeted assistance to students and their parents, both at the stage of psychological and pedagogical support of training, and at the stage of passing the final attestation.

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References

- Baumeister, R.F., Exline, J.J. (2000). Self-control, morality, and human strength. *Journal of Social and Clinical Psychology*, 19(1), 29–42.
- Budrina, E.G. (2017). Gender characteristics of intelligence and academic achievement of younger schoolchildren. *Procedia - Social and Behavioral Sciences*. 237, 1390-1397.
- Cheremoshkina L.V., Osinina T.N. (2016). Zakonomernosti vosproizvedeniya uchebnogo teksta na materiale longityudnogo issledovaniya [Regularities of the educational text reproduction on the material of longitudinal research]. *Psikhologiya obucheniya*, 12, 12-25 [in Rus].
- Cheremoshkina, L.V., Osinina, T.N. (2018). Zakonomernosti aktualizatsii znaniy po materialam longityudnogo issledovaniya [Laws of the knowledge actualization on the basis of longitudinal research]. *Izvestiya Rossiyskoy Akademii obrazovaniya*, 2, 79-92 [in Rus].
- Craik, F.I.M. (2002). Levels of processing: Past, present... and future? *Memory*, 10, 305-318.
- Kholodnaya, M.A., Gelfman, E.G. (2016). Razvivayushchiye uchebnyye teksty kak sredstvo intellektual'nogo vospitaniya uchashchikhsya [Developing educational texts as a means of students intellectual education]. M.: Izd-vo «Institut psikhologii RAN», 200 pp. [in Rus].
- Kholodnaya, M.A., Gelfman, E.G. (2016). Development-focused educational texts as a basis for learners' intellectual development in studying mathematics (det technology). *Psychology in Russia: State of the Art*, 9 (3), 24-37.
- Kuhl, J. (2000). A functional-design approach to motivation and self-regulation: The dynamics of personality systems interactions. In: M. Boekaerts, P.R. Pintrich, M. Zeidner (Eds.), *Handbook of self-regulation*. San Diego: Academic Press, 111–169.
- Morosanova, V.I., Filippova, E.V. (2009). Izucheniyе regulatorynykh osnov psikhologicheskoy uspehnosti uchashchikhsya na ekzamene [Studying the regulatory basis for the psychological success of students at the exam]. *Vestnik RUDN. Seriya Psikhologiya i pedagogika*, 4, 37–43 [in Rus].
- Morosanova, V.I., Fomina, T.G., Kovas, Yu. V. (2014). The relationship between regulatory, intellectual and cognitive characteristics in students who are successful in mathematics. *Psikhologicheskie Issledovaniya*, 7(34), 11. <http://psystudy.ru>.
- Nesterova, O.V., Ratanova, T.A. (2016). Razvitiye intellekta na nachal'nykh etapakh obucheniya [The development of intelligence at the initial stages of learning]. *Mir psikhologii*, 1, 137-147 [in Rus].
- Osinina, T.N. (2015). Longityudnoye issledovaniye vosproizvedeniya uchebnogo materiala [Longitudinal study of the educational material reproduction]. *Vestnik Tomskogo gosudarstvennogo pedagogicheskogo universiteta*, 6 (159), 50-55 [in Rus].
- Poznavatel'naya aktivnost' i pamyat' (2010). [Cognitive activity and memory]. Pod red. N.I. Chuprikovoy; Uchrezhdeniye RAO «Psikhologicheskii institut». 2-ye izd., ispr. i dop. M.: MPSI, 224 pp. [in Rus].
- Verbitskaya, L. A. (2017). Kognitivnyye osnovy uspehnosti obucheniya russkomu yazyku: krosskul'turnoye issledovaniye [Cognitive basis for the success of the Russian language teaching: cross-cultural research]. In L.A. Verbitskaya, YU.P. Zinchenko, S.B. Malykh, T.N. Tikhomirova (Eds.) *Voprosy psikhologii*. 1, 26–40 [in Rus].
- Volkova, E.V. (2015). Dinamika strukturnoy organizatsii pamyati na predmetnuyu informatsiyu v podrostkovom i yunosheskom vozrastakh [Dynamics of the structural memory organization for subject information at adolescence age]. *Mir psikhologii*, 2, 221-232 [in Rus].
- Yeremina, L.YU. (2007). Psikhologicheskiye osobennosti lichnosti shkol'nikov i ikh vliyaniye na uspehnost' sdachi shkol'nogo ekzamena [Psychological features of schoolchildren personality and their impact on the success of passing the school exam]: Diss. ... kand. psikhol. nauk. M., 246 pp. [in Rus].