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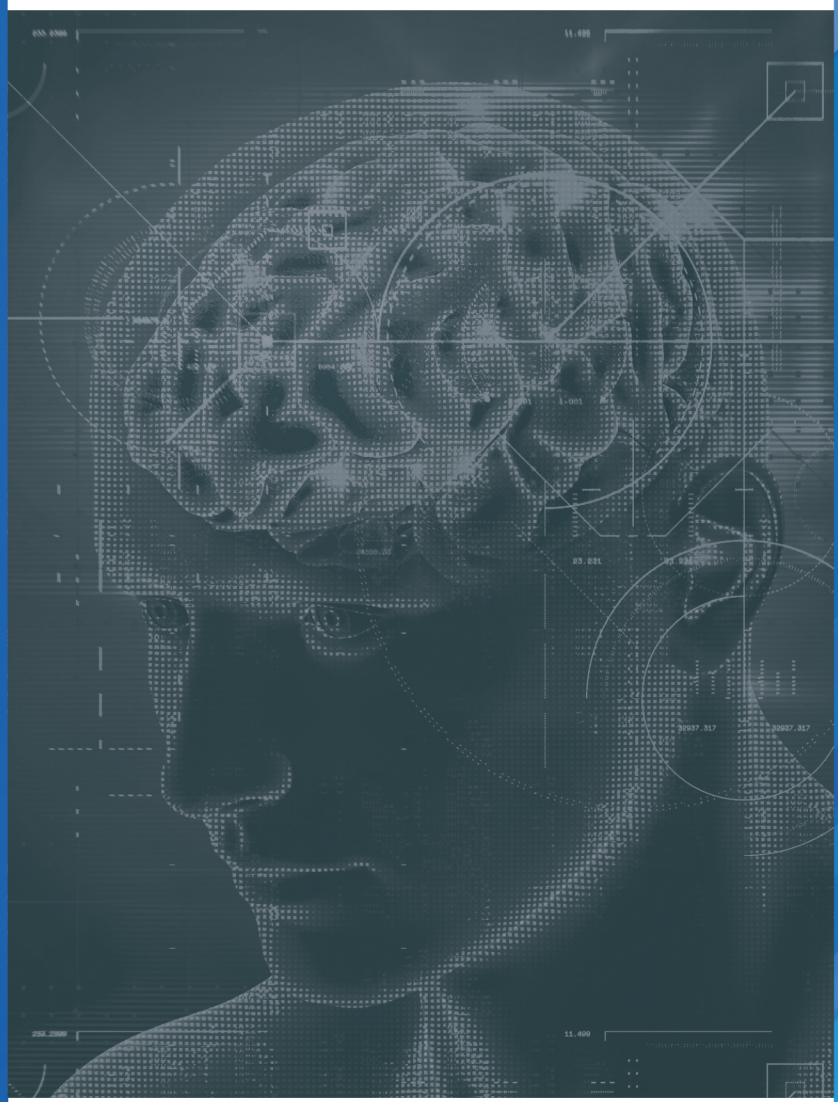

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Natalya A. Nikitenko

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Mailing Address:
14, Belorusskaya St.,
Togliatti,
Russia, 445020
Phone: **(8482) 44-91-74**
E-mail:
vektornaukitgu@yandex.ru

Website:
https://vektornaukipedagogika.ru

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CONTENT

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ПЕДАГОГИЧЕСКИЕ НАУКИ

ПСИХОЛОГИЧЕСКИЕ НАУКИ

PEDAGOGY

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Regional model for developing functional literacy in a digital educational environment: concept, implementation, and effectiveness assessment

Viktor A. Akopyan, PhD (Pedagogy), Associate Professor,
Minister of Education of the Samara Region
Ministry of Education of the Samara Region, Samara (Russia)

E-mail: ava1977@mail.ru ORCID: https://orcid.org/0009-0004-4839-9302

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Abstract: The civilizational transition generates an objective societal need for the development of functional literacy as a key factor for national security and individual success. In response to this need, a dynamic and adaptive model for developing functional literacy is proposed. Its primary advantage is the ability to integrate the relevant regional context and flexibly respond to the challenges of instability and rapid socio-cultural changes. The role of the regional digital educational environment (DEE) in fostering functional literacy among students was examined, using the Samara Region as an example. Monitoring results of students' functional literacy conducted in 2019 revealed insufficient development of global competencies and creative thinking. To address this issue, the DEE of the region was leveraged to enhance educational quality: students were engaged in project-based activities, their analytical skills were developed, and they were offered contextual tasks simulating real-life situations. Resources of the regional system of supplementary education were actively utilized. Over a four-year period, annual monitoring demonstrated that by 2022, the proportion of students achieving high results increased to 60 % compared to 19.8 % in 2019, representing more than a threefold improvement. These findings indicate the positive potential of using the DEE to create a multifunctional regional educational environment that develops both personal and academic competencies. A key prospect of the study is the transition from episodic monitoring to a continuous formative assessment system based on the DEE, enabling near real-time collection and analysis of educational outcomes at all levels – from individual students to municipalities – for prompt adjustment of the educational process.

Keywords: functional literacy; regional digital educational environment; DEE; global competencies; creative thinking; conceptual model; information systems; monitoring of learning outcomes; digital technologies in education.

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INTRODUCTION

Methods for Assessing Functional Literacy

Within the national project "Education", one of the priority goals is defined as Russia's entry into the top ten countries of the world in terms of the quality of general education. The achievement of this goal is possible only with consistent development and purposeful formation of students' functional literacy. Recent global restrictions associated with the beginning of Russia's special military operation in Ukraine have had a significant and multifaceted impact on the field of education, expressed, in particular, in the temporary suspension of Russia's participation in a number of international studies that assess students' educational achievements and provide a comparative analysis of educational system quality across different countries. Until 2022, three international studies of functional literacy were conducted in Russia: TIMSS (Trends in Mathematics and Science Study) – an international monitoring study of the quality of school mathematics and science education in grades 4 and 8[1]; PIRLS (Progress in International Reading Literacy Study) – an international study of reading literacy and text comprehension in grade 4[2]; PISA (Programme for International Student Assessment) – an international comparative study of education quality assessing the knowledge and skills of 15-year-old students[3]. Currently, Russia uses only the annual national assessment modelled on PISA (conducted by FIOKO – the Federal Institute for Education Quality Assessment[4]). In our research, we rely on PISA, since it has played an important role in shaping the country's educational policy.

[1] *International Results – TIMSS 2023. IEA TIMSS AND PIRLS. URL: https://timss2023.org/results/.*

[2] *TIMSS and PIRLS Home. URL: https://pirls.bc.edu/.*

[3] *Programme for International Student Assessment (PISA). OECD. URL: https://www.oecd.org/en/about/programmes/pisa.html.*

[4] *Activities to Assess the Quality of Education. FIOKO: Federal Institute for Education Quality Assessment. URL: https://fioco.ru/ru/osoko.*

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Functional Literacy

Functional literacy is an individual's ability that enables the effective application of theoretical knowledge in practice. A.A. Leontiev wrote: "A functionally literate person is someone who is able to use all the knowledge, skills, and abilities acquired throughout life to solve the widest possible range of everyday tasks in various spheres of human activity, communication, and social relations" [1, p. 35]. The concept of functional literacy emerged almost half a century ago and initially referred to a set of reading and writing skills necessary for addressing real-life tasks [2–4]. Later, the content of the concept underwent changes. Today, functional literacy is understood as a person's ability to interact with the external environment and to adapt and function within it as quickly as possible [2; 5; 6]. A high level of functional literacy at the present stage is a prerequisite for successful adaptation to the surrounding world, a guarantee of self-realization, and, consequently, life satisfaction. The concept of functional literacy highlights the distinction between the formal acquisition of knowledge and skills during education and the ability to apply them in everyday situations. Within the educational process in Russia, the general notion of functional literacy includes six domains: reading literacy, mathematical literacy, scientific literacy, financial literacy, creative thinking, and global competences.

Russia's Participation in PISA

Russian school students consistently demonstrate high results in the international TIMSS and PIRLS studies, which focus on assessing subject knowledge in grades 4 and 8. In 2019, fourth graders ranked 6th in mathematics and 3rd in science in TIMSS, while eighth graders ranked 5th and 6th, respectively. In PIRLS, Russian fourth graders perform even more successfully, traditionally occupying leading positions[5]. However, in PISA, which assesses 15-year-old students, Russia holds only average positions (around 30th place)[6], creating a paradoxical picture. This gap is explained by fundamental differences in the content of these studies: TIMSS tests mastery of the school curriculum, while PISA evaluates the ability to apply knowledge in solving practical, non-routine tasks that go beyond standard classroom situations. For example, the decline in Russian students' financial literacy in 2018 compared to 2015, according to the authors [7], may be attributed to several factors. First, there was a recorded decrease in reading literacy, which could have affected task performance. Second, the transition to computer-based testing and the increase in the number of open-ended questions created additional difficulties, since producing extended responses on a keyboard proved less familiar than handwriting. One cannot also exclude the influence of digital communication practices, which foster habits of concise and clichéd expressions (the chat effect and the Twitter effect). In addition, the new 2018 tasks referred to unfamiliar social contexts and required the use of built-in calculators and multi-step cognitive operations, which posed an extra challenge for Russian students [7].

Digital Educational Environment

Modern education faces the necessity of integrating digital technologies, driven by new economic realities and the need to develop digital competences. However, this process is accompanied by a set of challenges, including dependency formation, insufficient socialization, decreased critical evaluation of information, clip thinking, low motivation, high workload for teachers, the risk of transforming learning from a blended format that includes physical activity into work conducted exclusively with electronic devices, as well as digital inequality [8–10].

The existing problem of digital inequality, according to the concept [11], has a three-level structure, where the first level concerns differences in access to technical infrastructure, the second is related to disparities in digital competences, and the third reflects opportunities for the practical use of digital technologies. Later, the experience of the Department of Digital Education at Herzen State Pedagogical University showed that in education the causes of the first and second digital divides are similar to those identified, while the third digital divide manifests itself as methodological, connected with teachers' difficulties in adopting new values and with the expansion of the range of goals of modern education [12]. An empirical study of pedagogical goal-setting, involving 148 educators (school teachers and university instructors), revealed four levels of adaptation to the digital environment. Most respondents demonstrated the first and second levels, corresponding to minimal changes in pedagogical practice, whereas the fourth level, which presupposes significant transformation of goal-setting in line with the opportunities of the digital environment, was almost absent. Digital tools are used mainly for automating existing processes rather than transforming learning. This indicates that the issues of adopting new values and expanding the goals of modern education have not yet been sufficiently realized in pedagogical practice [12]. This confirms the existence of a profound methodological gap: teachers generally neither recognize nor employ the innovative potential of the digital environment to achieve new educational outcomes, which represents a key barrier to the development of modern education.

Despite all the challenges, the digital educational environment offers significant opportunities for the development of modern education, including the creation of individual learning trajectories, the expansion of access to non-formal education, and the provision of flexibility in the learning process. The advantages also include the possibility of studying regardless of location, deeper individual work, and a wide variety of educational resources [13]. The flexibility and diversity of the digital environment create conditions for personalized learning and students' educational self-realization; however, the implementation of

[5] *TIMSS and PIRLS DATABASES. URL: https://timssandpirls.bc.edu/databases-landing.html.*

[6] *PISA Results. FIOKO: Federal Institute for Education Quality Assessment. URL: https://fioco.ru/Contents/Item/Display/2201684#_ftn1.*

the digital educational environment should be accompanied by corresponding changes in curricula that take into account students' needs for socialization and physical activity, as well as the development of critical information perception and independent thinking [13].

The creation of the digital educational environment represents a disruptive innovation, marking the emergence of a fundamentally new educational ecosystem. Within this transformation, networked learning, according to the authors [14], will take on the character of a "great game" of everyone with everyone, where knowledge, as the product of this activity, will be filled with personal meaning and acquire significant social potential. Hybrid learning, from this perspective, may serve as an effective tool for mitigating the consequences of "shock educational policy" and for bridging the gap between theoretical knowledge and practical application [14]. Contemporary approaches to the organization and management of the learning process indicate that the new didactics of educational interactions is still at an early stage of development. At the same time, digitalization is not a universal solution to the problems that have been accumulating over a long period and have become especially evident in the past 15–20 years under the influence of factors such as the COVID-19 pandemic [14].

Thus, the digital transformation of education is a complex, multidimensional process that requires a balanced approach, taking into account both innovative opportunities and potential risks to students' health and cognitive development, as well as the need to overcome the methodological gap within the teaching community.

The aim of the study is to develop a conceptual model for the formation of students' functional literacy within the digital educational system.

METHODS

Rationale for Assessment Periods

For the comparative analysis of the dynamics of students' functional literacy levels, two key time points were selected: 2019 and 2022. The choice of 2019 as the baseline period is explained by the fact that it represents the last "stable" pre-pandemic academic year. During this period, the educational process was conducted exclusively in face-to-face format with the traditional use of digital technologies, which makes its data a representative reference point reflecting the initial state of the education system before the forced mass digitalization.

The year 2022 was chosen as the final period, since by that time the region had not only completed adaptation to the new conditions but had also purposefully implemented and tested the proposed regional model for the formation of functional literacy using the digital educational environment. This made it possible to assess not the short-term effects of the emergency transition to distance learning, but the stable results of targeted systemic work in the new educational reality.

Since 2020, in the Samara Region:

– all general education institutions have been implementing a regional extracurricular program (170/340 hours per year) aimed at developing students' functional literacy, focused on achieving planned outcomes in accordance with the structural components of different types of functional literacy as defined by PISA;

– in order to evaluate the compliance of the interaction between regional centers (RCs) and district schools in the development of functional literacy skills with the requirements of the regional program for functional literacy formation, the Institute for the Development of Education conducts a methodological audit of the activities of resource centers of the territorial administrations of the Ministry of Education and Science of the Samara Region (analytical report on the results of the methodological audit of regional centers, Digital Regional Educational Center, Center for Information Technologies);

– design seminars are held with specialists of territorial administrations, regional centers, and school principals (July 6, 2021; July 9, 2021; July 13, 2021; August 2, 2021, etc.);

– professional development programs are implemented for teachers and management teams (https://clck.ru/32VTC6, https://clck.ru/32VTCj, https://clck.ru/32VTDV, https://clck.ru/32VTEA, https://clck.ru/32VTEu, etc.);

– professional development of educators is organized on the basis of the Academy of the Ministry of Education of the Russian Federation.

The data for 2024 are not included in the present analysis, since at the time of the study the monitoring results for the specified period were still at the stage of collecting and verifying primary statistical information. The inclusion of unverified or preliminary data could have reduced the reliability of the conclusions.

Research Sample

Students aged from 15 years 3 months to 16 years 2 months participated in the 2019 and 2022 monitoring, which corresponds to international standards for assessing functional literacy (PISA). In the Russian education system, most students of this age group study in grade 9.

The sampling was carried out on the principles of representativeness: both urban and rural educational institutions of different types (general education schools and specialized secondary schools: gymnasiums, lyceums) were included. This ensured reliability and the possibility of extrapolating the identified patterns to the entire student population of the region and beyond.

Testing periods

Testing in grade 9 was conducted online during the following periods:

– November 27, 2019 – November 29, 2019, total participants: 29,108 students; control sample: 1,200 students;

– October 17, 2022 – October 28, 2022, total participants: 28,521 students; control sample: 2,931 students.

Testing methods

To ensure the possibility of obtaining objective results, diagnostic and assessment procedures in the Samara Region were carried out using the Regional Educational Testing

System (ROST) – the ROST module "Automated Education Resource Management System" (ASU RSO). ROST is designed for creating educational tests, administering testing, and analysing the results obtained from student assessments. This module is integrated into the information systems "Setevoy Gorod. Obrazovanie" (Net City. Education) and "NetSchool".

For diagnostics, PISA-format tasks adapted to the conditions of the Russian digital educational environment were used, in accordance with the "Methodology and Criteria for Assessing the Quality of General Education in General Education Organizations Based on the Practice of International Studies of Student Achievement". This methodology was approved by Order No. 590 of the Federal Service for Supervision in Education and Science and Order No. 219 of the Ministry of Education of the Russian Federation dated May 6, 2019.

All tasks were designed in accordance with the three-component model (Fig. 1):

– context – real-life situations, social interaction, educational process (completing learning tasks using the digital educational environment, developing self-directed learning skills);

– content area – understanding and using information, solving practical problems, communication and collaboration;

– competence area – skills in searching for and processing information, using digital tools for analysis and interpretation, evaluation and adjustment of solutions.

The regional monitoring of functional literacy included three domains: reading literacy, mathematical literacy, and scientific literacy. In the reading literacy block, the context set the reading situation, the content area included the type of text and its structure, and the competence area encompassed types of cognitive activity (searching for information, interpretation, evaluation). In the mathematical and scientific literacy blocks, the context described a real-life or academic problem, the content area included the corresponding subject knowledge, and the competence area involved actions necessary to connect the context with the subject content and arrive at a solution (model selection, data interpretation, evaluation of conclusions).

Each student completed a set of tasks aimed at assessing their ability to apply knowledge in real-life situations.

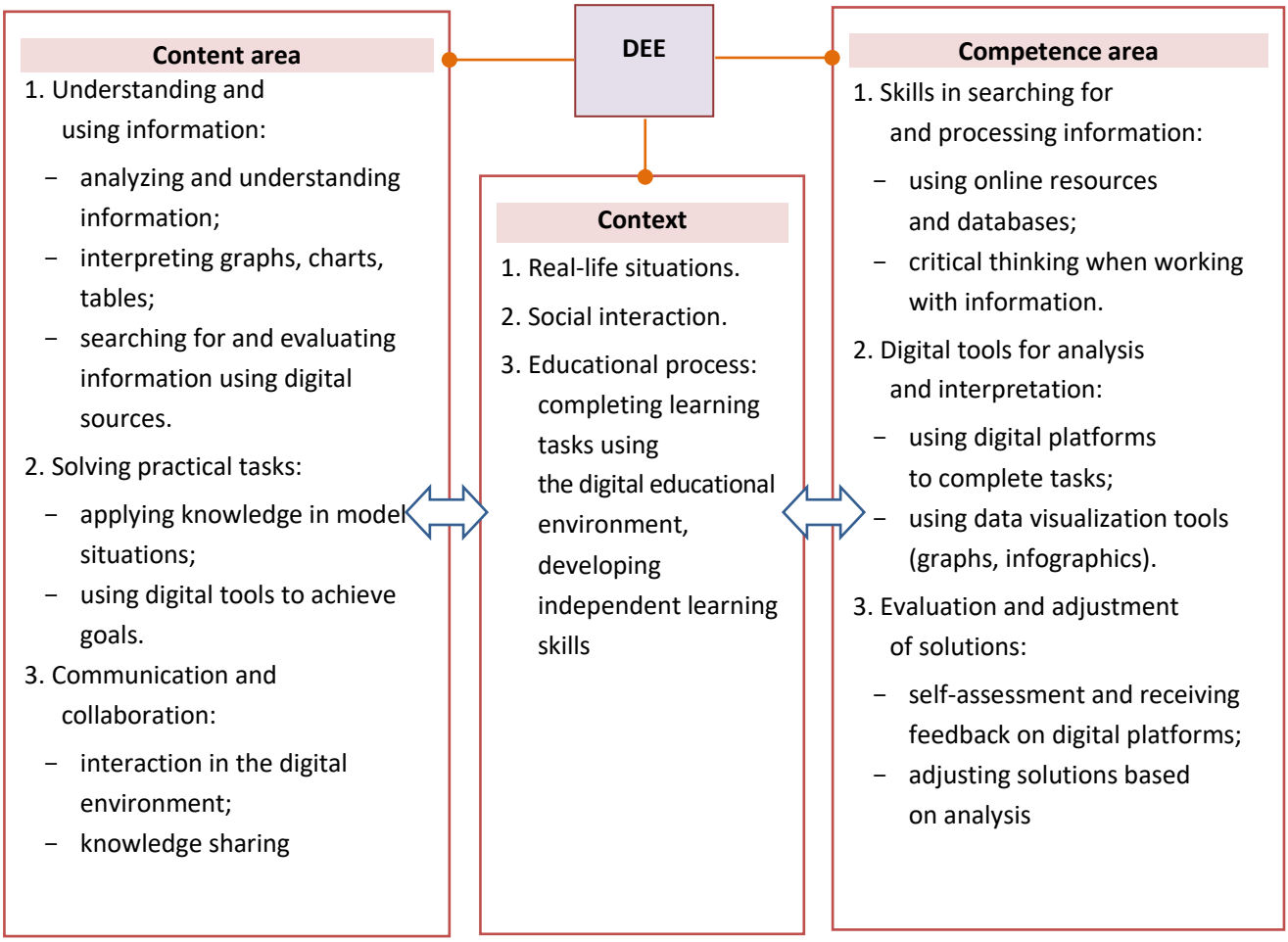

Fig. 1. *Conceptual model for the formation of functional literacy in the digital educational environment*
Рис. 1. *Концептуальная модель формирования функциональной грамотности в цифровой образовательной среде*

Assessment Framework

The total score obtained for all tasks was converted, according to a standard scale, into the level of formation of a particular type of functional literacy. Five levels of functional literacy were distinguished in the study:

1) low – the student demonstrates minimal skills; individual tasks are completed fragmentarily; inability to solve practical tasks independently;

2) below basic – insufficient level of basic skills; some correct actions may occur, but there is no consistency or stability;

3) basic (threshold) – minimally sufficient level for successful learning and participation in social life; ability to solve standard tasks relying on the provided context;

4) proficient – confident mastery of subject-specific and cross-curricular skills; successful solving of more complex tasks; transfer of knowledge to new situations;

5) high – well-developed analytical and critical skills; ability to independently solve complex and non-routine tasks.

The threshold (basic) level is of particular importance, as achieving it is the minimally necessary condition for further successful learning and social adaptation.

Thanks to the use of a scale based on the average indicators of a standardized sample, the task options made it possible to identify students with different levels of functional literacy development.

RESULTS

Conceptual model for the formation of functional literacy in the digital educational environment

The formation of functional literacy in the digital educational environment is considered through the lens of four complementary approaches:

– systemic: the digital educational environment is viewed as a hierarchical, self-organizing system, where integrity is ensured through comprehensive access to content, adaptability through analytical modules, structure through task typology, and hierarchy through levels (individual → grade → school → region);

– competence-based: six domains of functional literacy and their cross-curricular integration are enshrined in the Federal State Educational Standard for General Education (FGOS OO);

– activity-based: knowledge is acquired through solving practical tasks and social interaction;

– digital: digital tools are regarded as mediators between student activity and content.

The introduction of digital technologies and the formation of a unified educational ecosystem in schools and vocational education institutions enable teachers to apply new approaches to teaching, fostering students' independence and analytical thinking. The digital educational environment encompasses a set of digital tools and infrastructure aimed at enhancing the efficiency of learning, improving interaction among participants in the educational process, and ensuring equal access to educational content. The digital educational environment is built on the basis of state and regional information systems, with educational institutions equipped with specialized classrooms furnished with modern technology to provide access. Interaction among participants within the digital environment makes the learning process more flexible and accessible, while also ensuring its effective organization through interactive content and progress monitoring, which ultimately improves the quality of learning and preparation for professional activities (Fig. 1).

The systemic approach to the tasks of the digital educational environment in the educational process implies viewing the digital educational environment as an integrated system, where each element and its functions are interconnected and interdependent, contributing to the achievement of key educational goals.

Access to content can be regarded as a basic function that supports other elements of the system, such as monitoring and participant interaction. This creates an integrated information space in which each student and teacher has access to the resources necessary for effective learning and the achievement of educational goals. This component serves as the foundation for the interaction of all parts of the system and ensures consistency in approaches to learning. The inclusion of functional literacy monitoring systems corresponds to the principles of adaptability and dynamism, allowing for the consideration of individual student results, tracking their progress, and identifying areas that require improvement.

The dynamism of the system is manifested in its ability to update data in a timely manner, generating relevant information about student progress and adjusting educational trajectories based on the obtained results. Digital content on functional literacy becomes an integrated component that is developed and supported by various elements of the digital educational environment, such as interactive tasks and assessment materials.

Let us consider these features using the example of the modules "Global Competencies" and "Creative Thinking", which have appeared in Russian practice relatively recently as separate components of functional literacy. An analysis of regulatory documents shows that the Russian education system is oriented toward achieving unity of goals and requirements, which provides the necessary conditions for the formation of students' global competence. The tasks in this area correspond to the key goals and values formulated in the Federal State Educational Standard of Basic General Education[7]. The assignments are designed with regard to their cognitive, value-based, and activity orientation and are aimed at raising awareness of issues of globalization, sustainable development, and intercultural communication. The subjects of the invariant part of the general education curriculum include the study of these topics, which reflects the integration of global challenges into the educational process. In addition, working with digital platforms enables students to effectively achieve personal educational outcomes, such as "mastery of information skills: the perception and

[7] *On the approval of the Federal State Educational Standard of Basic General Education: Order of the Ministry of Education of the Russian Federation dated May 31, 2021 No. 287. Official publication of legal acts. URL: http://publication.pravo.gov.ru/Document/View/0001202107050027.*

creation of informational texts in various formats, including digital ones, taking into account the purpose of information and its target audience"[8].

The level of development of creative thinking is assessed based on the ability to generate diverse and original ideas, refine, evaluate, and select them. It should be noted that the activation of such cognitive skills as critical, analytical, and creative thinking, as well as the ability to work effectively with information, serves as an important factor in the formation of students' global competence. An approach that includes the development of these skills makes it possible to formulate tasks for fostering global competence and creative thinking more precisely, while also ensuring the opportunity for an objective assessment of achieved results through the use of digital platforms. This, in turn, contributes to the effective application of academic subjects and the implementation of interdisciplinary interaction.

The proposed conceptual model represents an integrated hierarchical framework for developing functional literacy within the regional digital educational environment and fulfills both methodological and operational functions.

Methods and Technologies for Developing Functional Literacy in the Digital Educational Environment

Building on the model described above, the development of functional literacy within the digital educational environment does not occur automatically but requires a targeted approach. This process is implemented through a set of techniques: modelling practical situations, project-based and research activities, and adaptive assessment. During lessons that incorporate digital technologies, practical situations are simulated in which functional literacy skills become both relevant and essential. This approach provides students with opportunities to develop and strengthen their abilities not only during classes and classroom activities but also in the course of project and research work.

Within the framework of the federal project "Digital Educational Environment", schools actively employ digital technologies and tools, creating a universal space for learning. The integration of various educational resources on digital platforms enables a comprehensive approach to the development and assessment of functional literacy, which includes diagnostic procedures, digital content, and a wide range of online tools for the interaction of all participants in the educational process. Particular attention in the context of the digital educational environment is devoted to the implementation of project-based activities and situational tasks aimed at developing functional literacy.

Digital technologies and access to task banks[9] provide students with resources for solving problems aimed at the practical application of knowledge in research and applied activities. The monitoring and assessment systems for functional literacy integrated into the digital educational environment platforms make it possible to effectively track students' level of preparation, promptly identify gaps, and adjust learning trajectories. Students are given the opportunity to solve research and applied problems oriented toward the practical use of knowledge.

To diagnose the level of formation of functional literacy across different domains, it is advisable to use comprehensive tasks in their entirety, as this allows for a more accurate assessment of students' abilities. The tasks for evaluating each component of functional literacy are grouped into thematic blocks (analogous to the PISA study). Each such block represents the description of a real-world problem situation and a series of interconnected questions related to it. In order to complete the tasks, students are required to apply knowledge from various school subjects. The sequential completion of the questions makes it possible to engage more deeply with the given conditions, which contributes not only to the acquisition of new knowledge but also to the development of functional skills.

In the formative component, the use of tasks does not necessarily imply the study of all aspects of a comprehensive assignment – students may be given tasks of varying levels of complexity in accordance with their individual abilities. Teachers have access to a function that allows them to select blocks of questions depending on the results of preliminary diagnostics. The content component of the tasks is presented within a number of subject areas established by the systems (conceptual frameworks) of global and creative competence for school-age students. A portion of the tasks, including versions of diagnostic assessments, has been developed specifically for the organization of school-based monitoring and helps teachers and administrators track the level of development of functional literacy[10]. The open bank of tasks can be used in the educational process in several ways (Table 1).

Tasks placed in open banks can be presented both in digital and paper format. The digital versions are supplemented with interactive elements (external models, audio files, etc.), which expands the possibilities of their application. A distinctive feature of such tasks is their multi-level structure and variability, thanks to which they can perform the function of so-called "transformer tasks." This term

[8] *On the approval of the Federal State Educational Standard of Basic General Education: Order of the Ministry of Education of the Russian Federation dated May 31, 2021 No. 287. Official publication of legal acts. URL: http://publication.pravo.gov.ru/Document/View/0001202107050027.*

[9] *Open banks of the Russian Electronic School. URL: https://fg.resh.edu.ru.*

Federal State Budgetary Scientific Institution "Institute for Content and Teaching Methods". URL: http://skiv.instrao.ru/bank-zadaniy/.

Federal State Budgetary Scientific Institution "Federal Institute for Pedagogical Measurements". URL: https://oge.fipi.ru/bank/.

Prosveshcheniye Media Library. URL: https://dev.media.prosv.ru/fg/.

[10] *Kovaleva G.S., Loginova O.B., ed. Creative Thinking. Methodological Recommendations for the Development of Students' Functional Literacy in Grades 5–9 Using the Open Task Bank on the Digital Platform. Moscow: Institute for Strategy of Education Development, 2021. 119 p. URL: https://www.sev-iro.ru/files/20.10.2022-metodicheskie-rekomendatsii-po-formirovaniyu-kreativnogo-myshleniya-obuchayushchikhsya-5-9-klassov-s-ispolzovaniem-otkrytogo-banka-zadaniy-na-tsifrovoy-platforme.pdf.*

Table 1. *Ways of using open bank tasks in the learning process*
Таблица 1. *Способы использования заданий открытого банка в учебном процессе*

Category	Examples of activities	Goals and objectives	Digital educational environment technologies and resources
Extracurricular activities	"Functional Literacy: Learning for Life"	Developing interest in the subject, fostering practical skills and knowledge	Use of interactive platforms, access to learning materials and tasks
Co-curricular events	Marathons, quests, competitions	Strengthening team spirit, fostering reading, mathematical, financial, and scientific literacy	Platforms for conducting events online (videoconferencing, chats), open task bank
Elective and project courses	Project-based activities, vacation schools	Deepening knowledge within the course, developing research skills	Online platforms for project work, access to digital libraries and interactive courses
Personal development activities	Class meetings, debates, discussions	Developing civic responsibility, critical thinking skills, and social interaction	Digital resources for discussions, resources for simulating situations
In-school monitoring and diagnostics	Testing, diagnostics	Assessing the current level of functional literacy, identifying areas for improvement	Russian Electronic School (RESh), Automated Education Resource Management System (ASU RSO) for automated monitoring and testing

refers to universal tasks that the teacher can flexibly adapt depending on the level of functional literacy formation of students: vary the level of difficulty, change the format of presentation (from basic to extended), and use different contexts. As a result, one and the same task can be transformed and serve as a tool both for basic training and for the in-depth development of students' competencies

Thus, each lesson is supported by the digital educational environment with comprehensive tasks that include texts in various formats along with related assignments, while the main evaluation criterion is mastery of the system of learning activities and the ability to solve learning and problem-solving tasks. The assessed component of competence determines the methods and criteria of evaluation, while the system used allows students to be distributed into groups depending on the degree of their understanding of the issue, rather than solely by the category of their answers. This approach provides a more accurate assessment of the level of material acquisition.

Regional Practice of Using the Digital Educational Environment

In the Samara Region, the development of functional literacy is actively supported through supplementary education. Students are engaged in project activities and mini-research projects, which contribute to the development of their analytical abilities. To foster digital literacy and digital culture, resources of centers established within the framework of the national project "Education" are used, such as the children's technology park "Quantorium – 63 Region"[11], the "IT-Cube" center[12], and the "Tochka Rosta" (Growth Point)[13] education centers.

The children's technology park "Quantorium" has a capacity of 2,000 students, while the mobile technology park "Quantorium" can accommodate 1,100 students. Since 2019, more than 300 "Tochka Rosta" centers have been opened in the Samara region, attended by over 82,000 school students. "Tochka Rosta" centers, established on the basis of rural schools and in small towns, offer training in a wide variety of areas, including:

– Natural sciences – advanced study of physics, chemistry, and biology using modern laboratory equipment (digital sensors, microscopes, robotics kits);

– Technology – programming, basics of robotics, 3D modelling, and work with VR/AR technologies;

– Humanities – media journalism, creation of school television studios, project-based activities;

[11] *Samara Quantorium – a place of remarkable events and vibrant life. URL: https://kvantorium63.orgs.biz/.*

[12] *IT-Cube. Samara Regional Center for Children's and Youth Technical Innovation. URL: https://juntech.ru/podrazdeleniya/it-cube.*

[13] *"Tochka Rosta" Centers. Center for Continuous Professional Development and Pedagogical Excellence. Samara Regional Institute for Education Development. URL: http://master.sipkro.ru/tochka-rosta/.*

– Mathematics – development of logic and algorithmic thinking.

In addition to the federal network of centers, other formats are also actively developing in the region, for example:

– Regional center for identifying, supporting, and developing the abilities and talents of children and youth "Vega" – an analogue of the federal center "Sirius". The center operates in three main areas: science, arts, and sports. It organizes specialized sessions, competitions, and provides support for gifted children;

– Youth Innovation Creativity Center (CMIT) – a network of workshops aimed at supporting technical creativity and small-scale innovative entrepreneurship among young people;

– Specialized competence centers based at colleges and universities in cooperation with "WorldSkills Russia", which serve as training platforms for school and university students in specific professional competencies (for example, Web Design, Network Administration, Graphic Design).

Work is being carried out in the area of cooperation between schools and universities in the Samara Region, where lecturers, professors, and students organize clubs and elective courses for schoolchildren.

Samara University holds an annual Open Day for school students with tours and master classes[14], and also annually organizes or takes part in organizing school Olympiads (academic competitions). In the 2025–2026 season, 23 Olympiads[15] are being held with its participation.

In Samara, the supplementary engineering education system includes the Children's Technical School "Engineering Power", which offers programs for children aged 7 to 12 (grades 1–5). The programs aim to develop a systemic polytechnic worldview and engineering thinking in primary school children. The "Engineering Power" Technical School teaches computer literacy, programming, construction, design, and project-based activities[16].

"School for Mentors" is a project that has been implemented at Togliatti State University since 2022 as part of student project activities. The aim of the project is to broaden the proactive outlook of school students, provide training in mentoring, and develop and implement new pedagogical methods.

Some of the project's activities include:

– "Pedagogical Holidays" – a pre-professional educational intensive program for school students;

– "MentorFEST: School Project" – an annual regional competition.

"MentorFEST" serves as a platform for demonstrating students' creative potential, research skills, and teamwork abilities. In 2025, the competition featured five sections: "Pedagogy", "Technical and Natural Science Creativity", "Journalism and Sociology", "Foreign Language", and "History and Regional Studies"[17].

The set of activities covers both the school and vocational education levels (Table 2). At the school level, all general education institutions have introduced the extracurricular course "Functional Literacy: Learning for Life", which enables students to integrate the skills necessary for the effective application of knowledge in everyday life[18]. At the level of secondary vocational education, the curriculum of the discipline "General Competencies of a Professional" has incorporated the thematic module "Functional Literacy", aimed at developing applied skills in demand in professional activities. The implementation of these activities actively employs modern technologies and information systems.

Results of the Empirical Study

A comparative analysis of the 2019 and 2022 monitoring results shows that 15–16-year-old students in the region have significantly increased their level of functional literacy (Fig. 2).

The 2019 regional monitoring revealed the following results: a low level was identified in 60.7 % of the tested students; below basic – 19.5 %; basic (threshold) – 15.5 %; proficient – 4.3 %; and high – 0 %, with no student reaching this level.

The analysis of the 2019 regional monitoring data showed that the vast majority of students (80.2 %) demonstrated a level of functional literacy below the basic threshold: 60.7 % of students had a low level, and another 19.5 % had a below-basic level. In other words, more than four-fifths of the tested students in 2019 did not possess the minimally necessary set of competencies for effectively addressing real-world tasks and challenges. The absence of students at the high level indicates that the existing educational system was not only unable to ensure mass quality but also incapable of identifying and developing talented students capable of complex, creative, and non-standard solutions within the framework of functional literacy.

The 2022 regional monitoring revealed the following results: low level – 4.3 %; below basic – 35.6 %; basic (threshold) – 42.1 %; proficient – 17.7 %; high – 0.3 % (Fig. 2).

There is an evident radical change in the distribution structure of students. While in 2019 a critically low level dominated (60.7 %), by 2022 the majority of students (42.1 %) were concentrated at the basic (threshold) level, indicating mass acquisition of the minimally necessary competencies. The system has shifted from a state of crisis to a state of stability. However, despite these obvious improvements, only 18 % of students in total demonstrate levels above basic. This highlights the need for continued

[14] *Open Days. Samara University. URL: https://ssau.ru/priem/school/dod.*

[15] *Olympiads of Samara National Research University named after Academician S.P. Korolev. Apply Online. URL: https://samara.postupi.online/vuz/samarskij-universitet/olimp-list/.*

[16] *Children's Technical School "Engineering Power". Engineering Power. URL: https://shkola.insila.ru/o-nas/.*

[17] *TSU Recognized the Best School Projects. Togliatti State University. URL: https://www.tltsu.ru/news/v_tgu_otmetili_lucsie_skolnye_proekty.*

[18] *Functional Literacy: Learning for Life (Basic General Education). Moscow: Institute for Strategy of Education Development, 2022. 137 p. URL: https://edsoo.ru/wp-content/uploads/2023/08/ВУД_Программа-курса-внеурочной-деятельности.-Функциональная-грамотность-ООО_Новая.pdf.*

Table 2. *Digital educational environment of the Samara Region in the context of activities for developing functional literacy*
Таблица 2. *Цифровая образовательная среда Самарской области в контексте мероприятий по формированию функциональной грамотности*

Activities for developing functional literacy	Description
Course "Functional Literacy"	"Prosveshchenie" media library
Module in Secondary Vocational Education	Electronic bank of practice tasks
Regional monitoring	Russian Electronic School (RESh)
Testing on the task bank platform	Integration into ASU RSO
Diagnostic tasks in functional literacy	Access to educational resources
Seminars for educators	Methodological support for educators
Provision of teaching materials	Automation of monitoring
Extracurricular courses	Support for assessment and analysis of results

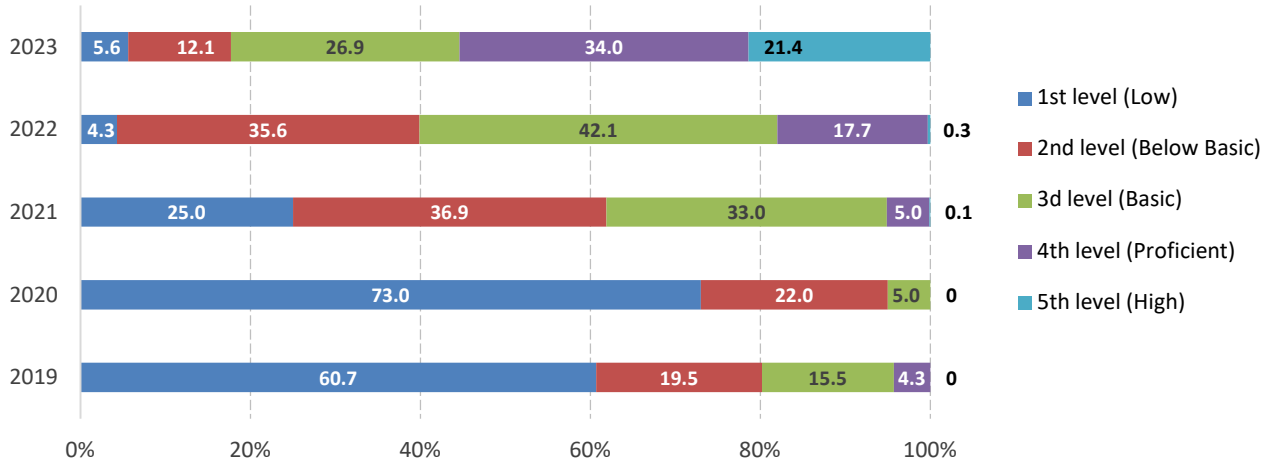

Fig. 2. *Results of the regional monitoring of functional literacy in the Samara Region, 2019–2023*
Рис. 2. *Результаты регионального мониторинга функциональной грамотности в Самарской области в 2019–2023 гг.*

efforts in individualized learning, the development of creative thinking, and advanced forms of information processing.

DISCUSSION

The study results convincingly demonstrate that the implementation of a digital educational environment, which provides access to interactive materials, testing systems, and digital content, expands opportunities for developing students' functional literacy, contributing to the enhancement of the competencies necessary in the modern world. Since 2019, the functional literacy level of students in the Samara Region has steadily increased, with the exception of 2020 (Fig. 2). The decline in functional literacy in 2020 can likely be attributed to the challenges associated with COVID-19 pandemic restrictions. The school system endured the COVID-19 pandemic but faced a number of difficulties that required adaptation to distance learning. The pandemic disrupted the functioning of educational systems, primarily due to the inability to organize full-fledged distance learning because of internet limitations in remote areas and problems with students' technical equipment. Insufficient technical preparedness of the teaching staff was also observed: the transition to a remote format was sudden, and neither educators nor students were ready for it. However, research [15] indicates that the decline in students' academic performance may have a multifactorial nature.

Alongside the two-year period of the coronavirus pandemic, the rapid development of information and communication technologies worldwide at the turn of the 2010s also had a significant impact. Theoretical analysis confirms that active use of digital technologies in the educational process correlates with certain cognitive changes. Empirical data indicate a decline in memory quality, attention span, the ability to work with complex texts, and mental arithmetic [16–18]. The emergence of fragmented (clip-based) thinking and the reduction in the volume of fundamental knowledge create systemic conditions for a sustained decrease in performance in international assessments of educational quality, such as PISA [8–10].

Conducting testing and regional monitoring is a significant component in the development of functional literacy. The platform of the electronic training task bank provides regular assessment of students' functional literacy levels, allowing for objective testing and real-time tracking of results. The same goal is supported by diagnostic tasks conducted through the automated system "Russian Electronic School" (RESh). According to the authors [19], regional monitoring can serve as a tool for coordinating educational changes in situations where textbooks and manuals do not contain a sufficient number of complex contextual tasks, and curricula across different subjects remain fragmented. Such monitoring creates a space for interaction among teachers and helps identify deficits that hinder the functional mastery of subjects. A key requirement is that monitoring be conducted without stress – that is, without the status of a formal exam, without impact on students' final grades, and without punitive measures against educators. Only under these conditions, and with recognition of the importance of the results by the education community, can the concept of functional literacy acquire practical meaning through discussions, experimental modules, and new lesson formats [19].

However, the effective implementation of digital tools faces a significant methodological challenge. The main barrier to achieving innovative effects in a digitally enhanced educational environment is the so-called third digital divide [11]. This phenomenon manifests in educators transferring traditional teaching methods into the new digital educational reality without a substantial revision of their methodological foundations. Instead of transforming the educational process in accordance with the potential of digital technologies, there is a mechanical adaptation of familiar pedagogical approaches, which limits the possibility of realizing the innovative potential of the digital environment. This methodological divide hinders the formation of a new educational paradigm necessary for preparing individuals to live in a digital world [12].

The regional digital educational environment plays a crucial role in the development of functional literacy, providing educators and students with access to educational resources, supporting the assessment and analysis of results through automated testing systems, and enabling teachers and educational institutions to access up-to-date instructional materials. Successful development of functional literacy is possible only when the actions of school leadership, educators, and parents are coordinated, and when students themselves possess the necessary psychological readiness [20]. Thus, the regional digital educational environment facilitates the achievement of targeted educational objectives, ensures a unified approach to developing functional literacy, and allows for rapid adaptation to the requirements of educational standards and regulations.

The positive dynamics observed in the annual monitoring of the functional literacy level of students in the Samara Region demonstrate that the targeted use of the regional digital educational environment is a powerful tool for personalizing learning and developing practice-oriented competencies. The current objective is shifting from "eliminating lag" to "ensuring advanced development," focusing on increasing the proportion of students achieving higher levels, which represents the ultimate goal of preparing a competitive individual in the modern world.

The prospects for the development and use of the regional digital educational environment in the Samara Region are seen in the transition from merely addressing the tasks of diagnosing and developing functional literacy to creating an integrated digital educational system that ensures the advanced preparation of students for contemporary challenges. The accumulated datasets on the dynamics of each student's educational outcomes within the digital educational environment enable predictive analytics, the construction of individualized developmental trajectories, and the automated selection of corrective educational materials. Another current task is the creation and continuous updating of a library of digital educational content (cases, simulators, project-based tasks) that integrates the regional component, including the economy, ecology, and culture of the Samara Region. The development of the digital educational environment will be ineffective without targeted work with educators. In the future, the establishment of a system of methods aimed at enabling educators to master digital tools for creating individualized educational ecosystems for students is anticipated. Thus, the prospective development of the digital educational environment in the Samara Region is connected not only with expanding technological capabilities but also with profound pedagogical transformation, centered on personalization, advanced analytics, and the creation of relevant digital educational content.

CONCLUSIONS

1. Annual regional monitoring of functional literacy demonstrated that by 2022 the share of students with proficient and high levels of functional literacy increased to 18 % compared to 4.3 % in 2019; thus, over four years this indicator improved more than fourfold. A significant outcome was the emergence, in 2022, of students with outstanding results (0.3 %), indicating the creation of conditions for students to progress to a higher level of functional literacy.

2. A regional model was proposed, establishing an integrated cycle of "context – content – competency domain," uniting six areas of functional literacy with the capabilities of the Automated Education Resource Management System (ASU RSO, ROST module); the effectiveness of the proposed model has been empirically confirmed. The implementation of a digital educational environment, providing access to interactive materials, testing systems, and digital

content, expands opportunities for developing students' functional literacy, contributing to the continuous enhancement of competencies required in modern society.

3. The analysis of the effectiveness of implementing the digital educational environment demonstrated the importance of the regional component for the development of functional literacy, as well as for creating a personalized and flexible educational space that supports the achievement of educational objectives.

4. The prospects for developing the digital educational environment in the Samara Region are associated with the transition from mere diagnostics to a system of advanced preparation based on predictive analytics, the creation of up-to-date digital content with a regional component, and systematic training of educators to work in new conditions. Further development is determined not only by technological capabilities but also by the depth of pedagogical transformation toward personalized education.

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Региональная модель формирования функциональной грамотности в цифровой образовательной среде: концепция, апробация и оценка эффективности

Акопьян Виктор Альбертович, кандидат педагогических наук, доцент,
министр образования Самарской области
Министерство образования Самарской области, Самара (Россия)

E-mail: ava1977@mail.ru ORCID: https://orcid.org/0009-0004-4839-9302

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Аннотация: Цивилизационный переход порождает объективную потребность общества в формировании функциональной грамотности как ключевого фактора национальной безопасности и индивидуальной успешности. В ответ на эту потребность предлагается динамическая и адаптивная модель формирования функциональной грамотности. Ее ключевое преимущество – способность интегрировать актуальный региональный контекст и гибко реагировать на

вызовы нестабильности и высокую скорость социокультурных изменений. Исследована роль цифровой образовательной среды (ЦОС) региона в формировании функциональной грамотности у школьников (на примере Самарской области). Результаты мониторинга сформированности функциональной грамотности учащихся образовательных учреждений, проведенного в 2019 г., показали недостаточный уровень развития глобальных компетенций и креативного мышления. В целях решения проблемы были использованы возможности ЦОС региона для повышения качества образования: учащихся образовательных учреждений Самарской области вовлекали в проектную деятельность, развивали их аналитические способности, предлагали решать контекстные задачи, моделирующие реальные ситуации. Были активно задействованы ресурсы региональной системы дополнительного образования. В течение четырех лет ежегодно отслеживались результаты работы, которые показали, что к 2022 г. доля учащихся с высокими результатами выросла до 60 % по сравнению с 2019 г. (19,8 %), другими словами, показатель улучшился более чем втрое. Это позволило сделать вывод о положительных перспективах использования ЦОС для создания многофункциональной образовательной среды региона, развивающей личностные и учебные компетенции. Ключевой перспективой исследования является переход от эпизодического мониторинга к системе непрерывного формирующего оценивания на основе ЦОС, что позволит в режиме, близком к реальному времени, собирать и анализировать образовательные результаты на всех уровнях системы (от отдельного школьника до муниципалитета) для оперативной корректировки образовательного процесса.

Ключевые слова: функциональная грамотность; цифровая образовательная среда региона; ЦОС; глобальные компетенции; креативное мышление; концептуальная модель; информационные системы; мониторинг учебных достижений; цифровые технологии в образовании.

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TOGLIATTI STATE UNIVERSITY

Togliatti State University is a participant in the Priority-2030 program of strategic academic leadership, a flagship university in the Samara region, a center for innovative and technological development of the region.

Togliatti State University was created in 2001 by merging Togliatti Polytechnic Institute (founded in 1951 as a branch of Kuibyshev Industrial Institute) and Togliatti branch of Samara State Pedagogical University (founded in 1987).

Togliatti State University today

– More than 22,000 students of all modes of study.

– Ten institutes implementing more than 170 higher education programs for 25 integrated groups of training areas, advanced technologies research institute, Zhiguli Valley Institute of Additional Education, military training center.

– 38 resource centers with up-to-date facilities and equipment created since 2011.

– Accreditation in eight systems for standard testing, research, and engineering.

– Main areas: advanced digital, intelligent manufacturing technologies, robotic systems, advanced materials and design methods, environmentally friendly and resource-saving energy engineering, personalized medicine, countering industrial threats.

University main achievements

– Ongoing project and professional practical activity was introduced for 100 % of full-time undergraduate/specialist students.

– Four mega-grants were implemented according to the Resolutions of the Government of the Russian Federation dated April 9, 2010 No. 219 and No. 220 – three laboratories in the field of physical materials science and nanotechnology (with the invitation of leading scientists), as well as an innovation technology center were created. The latter was transformed into a university innovation technopark.

– A member of the extraterritorial scientific and educational center "Engineering of the Future".

– An initiator of the formation of eight consortiums, which brought together 69 organizations, including 36 universities, six scientific partners, among which there are three organizations of the Russian Academy of Sciences.

– A twice winner of the RF Government award in the field of quality (2009, 2019).

– An Online Higher Education System promoted under the Rosdistant brand was created. The project is the winner of the Project Olympus competition of the Analytical Center under the Government of the Russian Federation in the Project Management in the System of Higher Education and Science nomination (2019).

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Content and technologies of training propagandists for Internal Affairs Agencies

Igor A. Kravtsun, adjunct of the postgraduate course
St. Petersburg University of the MIA of Russia, St. Petersburg (Russia)

E-mail: kravia52@gmail.com ORCID: https://orcid.org/0009-0007-1818-7888

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Abstract: Amid the growing destructive influence of social media and the spread of fake news, traditional propaganda methods require re-evaluation and adaptation. The issue of training personnel capable of effectively conducting information and propaganda activities within the Russian Ministry of Internal Affairs has become particularly relevant. The aim of this study was to develop and pilot a professional development programme for Internal Affairs Agencies personnel responsible for propaganda work. A total of 187 participants were involved, including 100 Internal Affairs Agencies officers, 30 active propagandists, and 57 participants in the advanced training course. Data collection methods included questionnaires, the projective technique "Incomplete Sentences", entrance and exit testing, and the analysis of practical cases. The developed programme comprises five thematic modules designed to develop both theoretical knowledge and practical skills in propaganda activities. Pilot results demonstrated a significant increase in participant competencies: the average post-training test score rose from 9.5 to 13 out of 15 (p<0.001), and the proportion of participants with a high level of preparedness increased from 29.8 % to 84.2 %. Notably, substantial progress was achieved in the identification of fake information (from 39 % to 97 % correct responses) and in conducting counter-propaganda activities (from 47 % to 96 %). These results indicate the high effectiveness of the developed methodology and its potential to enhance the quality of propaganda work within law enforcement agencies.

Keywords: information and propaganda activities; Internal Affairs Agencies; professional development; information counteraction; fake news; counter-propaganda.

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INTRODUCTION

Amid the transformation of the information space and the rise of hybrid threats, the professional training of Internal Affairs Agencies personnel responsible for information and propaganda work has become increasingly important. According to research in the field of information and psychological influence, contemporary propaganda activities in the law enforcement sphere require not only an understanding of ideological foundations, but also the mastery of digital technologies, consideration of the cognitive specifics of information perception, and proficiency in methods of countering disinformation [1].

The analysis of existing studies makes it possible to identify several key problems in this field. First, there is a lack of a unified concept for training the personnel units of Internal Affairs Agencies responsible for information and propaganda work (hereinafter – propagandists) [2–4]. Second, the transformation of media consumption, driven by the growing influence of social networks, messengers, and news aggregators, as well as the increasing amount of time spent online, requires propagandists to master digital tools and understand the specifics of how modern audiences perceive information[1]. Third, the issue of evaluating the effectiveness of propaganda materials produced by Internal Affairs Agencies personnel remains unresolved [5].

Of particular interest is the study [6], which examines the effect of social conformity, cognitive biases, and technological solutions for digital propaganda (including the use of bots, Big Data, and paid-user tactics). According to the author [6], the influence of political propaganda in the digital environment will increase over time, and within one or two generations the digital space may become the primary arena of propaganda competition. The achievement of a dominant position of the digital environment for propaganda is possible primarily due to the development of its technological base, which is analysed in detail in study [7]. This includes technological solutions for digital propaganda such as the use of neural network algorithms and digital actants for targeted influence on mass consciousness, as well as psychological aspects of the perception of propaganda messages (the echo chamber effect and the polarisation of society through managed discussions). The author [7] is strongly convinced that current transformations in the field of digital technologies create significant potential for

[1] *Electronics Hub researched average screen time in 45 countries. Timeweb Community.ru. URL: https://timeweb.com/ru/community/articles/electronics-hub-issledovali-srednee-ekrannoe-vremya-v-45-stranah.*

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computational propaganda conflicts in the digital environment between global actors. According to the author, such conflicts include confrontations between geopolitical opponents with advanced digital infrastructures and the necessary technologies, including artificial intelligence [7]. While the focus on technological aspects is central, it does not diminish the importance of psychophysiological mechanisms of perception. As shown in studies on multimedia perception, the combination of visual, auditory, and olfactory stimuli can enhance the emotional impact of content, which may be employed in digital propaganda to shape targeted behavioural responses [8].

The modern challenges of the information age require Internal Affairs Agencies not only to ensure the high professional training of their personnel, but also to foster strong civic and patriotic qualities, as well as a conscious stance amid the complex contradictions of contemporary society. Addressing this task is entrusted to information and propaganda work, which is aimed at strengthening the ideological resilience of personnel and building public trust in the law enforcement system. In the context of the widespread dissemination of diverse and often unreliable materials across information networks, traditional methods of propaganda require reconsideration and adaptation to new realities. This, in turn, necessitates the improvement of the training system for propaganda personnel, both within the framework of professional education and through advanced training programmes for employees responsible for propaganda activities in Internal Affairs Agencies units.

The relevance of developing the content and technology of training propagandists is determined by several factors. First, until recently, the training of propagandists in educational institutions was not carried out in a targeted manner. For example, a corresponding 108-hour course is offered at St. Petersburg University of the Ministry of Internal Affairs of Russia within the Faculty for Personnel Work, where responsibilities extend far beyond organising propaganda. In practice, positions of propagandists in units are often assigned to employees without specialised training in this area. Second, the transformation of media consumption[2], associated with the growing influence of social networks, messengers, and news aggregators, requires propagandists to master digital tools and understand the specifics of how modern audiences perceive information. Third, the intensification of destructive information influence, including the spread of fake news and manipulative technologies, poses to Internal Affairs Agencies the task of developing knowledge, skills, and competencies in counter-propaganda activities [9]. Fourth, effective propaganda activity in the law enforcement sphere must be based on a deep understanding of the socio-psychological mechanisms through which information affects personnel perception [10; 11].

The analysis of scientific literature has revealed a significant gap in existing research – the absence of a methodologically grounded professional development programme for propagandists of Internal Affairs Agencies, one that would integrate theoretical knowledge with practical skills of working in the digital environment. This problem is particularly acute in the context of the special military operation, where the quality of propaganda work largely determines the moral and psychological state of personnel.

The objective of this study is to develop and test a professional development programme for Internal Affairs Agencies personnel responsible for propaganda work.

METHODS

The study was conducted using a comprehensive approach that included an analysis of regulatory and legal documents governing information and propaganda work in Internal Affairs Agencies, as well as empirical methods of data collection. The main regulatory document defining the objectives and forms of propaganda activities was Order No. 500 of the Ministry of Internal Affairs of Russia, "On the Approval of the Regulation on the Procedure for Organising Moral and Psychological Support for the Activities of Internal Affairs Agencies of the Russian Federation"[3].

The empirical part of the study included a questionnaire survey of personnel and the pilot testing of the programme. A total of 187 respondents participated in the study, divided into three groups:

– group 1 – personnel of Internal Affairs Agencies units (investigators, operatives, and district police officers), 100 participants, who took part in a questionnaire designed to identify the level of understanding of key terms (propaganda, disinformation, fake news, etc.) and to assess practical difficulties;

– group 2 – propagandists directly engaged in information and propaganda work in the units, 30 participants, who took part in a survey consisting of 12 open-ended questions aimed at analysing media consumption and attitudes toward information;

– group 3 – participants of professional development courses under the programme "Content and Technology of Information and Propaganda Work in the Internal Affairs Agencies" (hereinafter – the Programme), 57 participants, who took part in the pilot testing of the training Programme. They underwent entry and exit testing to assess the dynamics of professional competence development (15 questions) and were also assessed using the projective technique "Incomplete Sentences".

[2] *How much time do Russians spend on the Internet? Inclient.ru. URL: https://inclient.ru/time-user-internet-russia-stats.*

[3] *Order of the Ministry of Internal Affairs of Russia dated August 27, 2024 No. 500 "On the Approval of the Regulation on the Procedure for Organizing Moral and Psychological Support for the Activities of the Internal Affairs Agencies of the Russian Federation". Konsultant-Plyus: spravochno-pravovaya sistema. URL: https://www.consultant.ru/document/cons_doc_LAW_486292/620779d24d715222a3f234164c68723cfe511797/.*

Questions for analysing media consumption and attitudes toward information among Internal Affairs Agencies personnel:

1. How much time per day do I spend on the Internet (including all devices)?
2. How do I assess the reliability of information on the Internet?
3. In my work, I have encountered tasks related to propaganda…
4. To persuade or re-persuade people for me is…
5. The main difficulties I have faced when persuading others are…
6. The direction of propaganda and persuasion for me is…
7. If I had the opportunity to learn more about propaganda methods, I would…
8. I believe that effective propaganda should…
9. When I hear the term "propaganda," the first thing that comes to mind is…
10. To improve my persuasion skills, I need…
11. I assess the impact of propaganda on society as…
12. If I were tasked with preparing a propaganda material, I would…

RESULTS

1. The Programme "Content and Technology of Information and Propaganda Work in the Internal Affairs Agencies"

The Programme included training sessions with participants on five topics:

1) The content of the concepts: information and propaganda in political and educational work within Internal Affairs Agencies units";
2) Socio-psychological conditions for effective propaganda";
3) Psychological conditions for the perception of propaganda materials by Internal Affairs Agencies personnel";
4) Forms and methods of information and propaganda work in Internal Affairs Agencies";
5) Organisation of counter-propaganda and debunking fake news".

In order to specify the practical component of each class session, case studies were developed on ten topics: "Concepts of information and propaganda work," "Image of the Internal Affairs Agencies," "Problems of the Internal Affairs Agencies," "Russophobia," "Special military operation," "The Fifth Column," "History of propaganda," "Fake news," "Counterpropaganda," and "Contemporary ideological struggle."

1.1 The first topic: "The content of the concepts: information and propaganda in political and educational work within the Internal Affairs Agencies"

This topic is focused on the conceptual understanding of the basic categories of information and propaganda work within the system of the Ministry of Internal Affairs of Russia. Particular attention was drawn to the fact that a propagandist in the Internal Affairs Agencies performs not only an informational but also an educational function, especially under conditions of heightened social tension, politicised discourses, and the extreme challenges of the modern era. Unlike traditional educators working with depoliticised subjects, a propaganda specialist in law enforcement faces the task of shaping worldview orientations that touch upon fundamental issues such as the meaning of professional service, civic identity, and the value foundations of statehood.

The theoretical component of the session involves a comprehensive analysis of the concept of "information" as a general scientific category, with particular emphasis on its legal and regulatory interpretation. Considerable attention is devoted to the professional competencies of propagandists, specifically their ability to identify in normative legal acts those provisions that facilitate the achievement of educational and socialisation objectives. At the same time, the session underscores the necessity of maintaining a balance between the ideological dimension and the ethical responsibility associated with the creation of propaganda content.

The central focus of the session is the examination of propaganda as a distinct type of information that carries ideological content and is aimed at shaping public consciousness. In the context of political and educational work within the Internal Affairs Agencies, emphasis is placed on its role in clarifying the decisions of the country's leadership and the ministry, as well as in ensuring understanding and support for state policy in the field of security. The typology of propaganda is analysed in detail, with a distinction drawn between constructive forms (mobilising, patriotic, positive, creative, explanatory) and destructive forms (manipulative, false, destabilising, destructive). Special attention is given to the purposes behind the creation of propaganda materials and the interests of the groups that prepare them.

After the theoretical part of the session, the group is divided into subgroups of 4–5 participants to complete practical tasks.

The practical part of the session is conducted using interactive methods. At the initial stage, participants are asked to independently formulate definitions of key concepts, followed by a group discussion.

The following pedagogical techniques are applied during the session:

– case method with analysis of specific examples of propaganda materials;
– group work for comparative analysis of domestic and international experience;
– visualisation of results through the creation of comparative tables;
– reflective discussion of identified patterns.

During the discussion, a system of visual assessment of participant activity is employed using coloured markers: blue stickers are assigned for accurate and complete answers, green for answers requiring minor correction, and orange indicates a lack of verbal participation. The use of an individualised approach, providing participants with additional opportunities to contribute through guiding questions and personal prompts, gradually engages previously passive participants in the discussion, thereby ensuring equitable participation of all group members in the educational process. This method contributes to increased overall engagement and fosters an environment where each participant has the opportunity to express themselves.

1.2. The second topic: "Socio-psychological conditions for effective propaganda"

Its content includes the following issues:

– social and psychological factors influencing the effectiveness of propaganda: analysis of the target audience, its social and cultural characteristics, as well as psychological mechanisms that enhance propaganda impact;

– features of working with adults (andragogy): pre-existing beliefs, value orientations, and attitudes toward phenomena, events, and ideas that are the focus of propaganda efforts;

– distribution of levels of conviction across different audiences (convinced, supportive, doubtful, indifferent) [12].

The objective of the second topic is to develop participants' systematic understanding of the socio-psychological mechanisms underlying effective propaganda work and to cultivate practical skills for adapting propaganda messages to the characteristics of different target audiences.

The practical part of the session is based on interactive teaching methods aimed at developing participants' skills in analysing the audience and adapting propaganda messages. The group is divided into subgroups of 4–5 participants, each working on a specific case that involves role distribution among participants and subsequent simulation of various socio-psychological scenarios. During the case discussions, particular attention is paid to the technique of distinguishing different types of audiences according to their level of conviction – from active supporters to categorical opponents of the propagated ideas.

During the sessions, it is particularly emphasised that effective propaganda work within the Internal Affairs Agencies should be based on the principles of proactive information dissemination. This entails providing personnel with verified information on key issues before they encounter interpretations in open sources, and, if conflicting information has circulated in networks or as rumours, conducting explanatory work to clarify the facts.

An important component of the session on the second topic is the development of participants' practical skills in public speaking and conducting discussions. Each participant is provided in advance with materials to prepare a brief propaganda presentation, which is then analysed by the entire group. During the analysis, particular attention is paid to aspects such as the emphasis of key points, use of emotional tone, and techniques for maintaining audience attention. After receiving feedback, participants are given the opportunity to adjust their presentations and demonstrate the newly acquired skills again.

The concluding part of the session is devoted to reflecting on the social significance of propaganda work as a tool for shaping civic engagement, patriotic values, and professional solidarity among personnel of the Internal Affairs Agencies. It is emphasised that even within a limited timeframe, it is possible to foster participants' motivation for further self-improvement in this area.

1.3. The third topic: "Psychological conditions for the perception of propaganda materials by Internal Affairs Agencies personnel"

It begins with a theoretical introduction, in which the main psychological concepts of information perception are presented. Particular emphasis is placed on analysing the factors underlying the formation of trust in information and the mechanisms of cognitive distortions. During the discussion, it is highlighted that the process of information perception is multi-stage: even when personnel have doubts about the reliability of information, they tend first to familiarise themselves with its content and only then seek additional verification through alternative sources or consultations with colleagues. The discussion with participants also focuses on identifying the primary channels through which information is perceived.

The practical part of the session includes diagnostic testing using adapted questionnaires (for example, methods for determining perception modalities—auditory, visual, kinesthetic), as well as case simulations with examples of propaganda materials. Participants are asked to analyse which content elements (text, image, sound) attracted their attention first and to complete experimental tasks comparing reactions to the same material presented in different formats (video, infographics, audio message).

During group work, various formats of informational messages are simulated, followed by an assessment of their effectiveness for different psychological types. Particular attention is paid to techniques for adapting content to specific perceptual characteristics and to methods for emotionally engaging the audience.

1.4. The fourth topic: "Forms and methods of information and propaganda work in Internal Affairs Agencies"

The topic is aimed to identify the optimal combination of traditional and modern digital technologies for propaganda impact within the Internal Affairs Agencies system. The practical work with participants began with comprehensive questionnaire surveys. During the sessions, particular attention was paid to the comparative analysis of the effectiveness of various propaganda formats, including posters, leaflets, informational bulletins, and video materials for internal screens.

The practical sessions are based on the principles of interactivity and include several specific forms of work. As part of the discussion of real propaganda campaigns, participants are asked to analyse concrete examples from contemporary Internal Affairs Agencies information and propaganda practice. For instance, they examine case studies on countering fake news during mass events or algorithms for refuting false information regarding law enforcement activities. During short simulation exercises, participants assume the roles of unit managers responsible for personnel work, where they must respond promptly to simulated crisis information situations: a surge of negativity on social media, the spread of disinformation among personnel, or the urgent need to communicate the agency's official position.

1.5. The fifth topic: "Organisation of counter-propaganda and debunking fake news"

The topic places particular emphasis on developing participants' systematic understanding of counter-propaganda as a comprehensive set of measures aimed at neutralising destructive informational influence. The theoretical component

of the session explores the essence of counter-propaganda in the context of Internal Affairs Agencies activities, highlighting its importance for protecting personnel from hostile ideological influence and maintaining the stability of the law enforcement system. Special attention is given to the legal aspect, particularly the provisions of Article 13.15 of the Code of Administrative Offenses of the Russian Federation, which defines fake information as knowingly false data disseminated under the guise of truthful reports.

The practical part of the session focuses on the analysis of contemporary information security challenges, with particular attention to Russia's position as one of the countries most vulnerable to cyberattacks. During the discussion, the psychological mechanisms of the impact of fake information are examined in detail (participants are recommended to consult sources [13; 14]), including features of cognitive perception, the tendency to consume negative content, and the phenomenon of "information blindness" (participants are recommended to consult source [15]). Issues of information-psychological security for Internal Affairs Agencies personnel are also addressed (participants are recommended to consult sources [16; 17]).

The training comprises several interrelated components. The theoretical part is aimed at developing knowledge of the psychological mechanisms of information perception, manipulative influence techniques, and the legal foundations for countering disinformation (participants are recommended to consult sources [18–21]). The practice-oriented component involves the analysis of real cases of information attacks, mastering fact-checking tools, and developing algorithms for counter-propaganda response. The reflective component enables participants to evaluate the effectiveness of various counter-propaganda methods and to develop skills in critical analysis of media content.

Particular attention is given to the methodology of working with social networks and messaging platforms as primary channels for the dissemination of disinformation. Participants are instructed on the characteristic features of fake information: emotional saturation, simplified cause-and-effect constructions, appeals to stereotypical notions, and the absence of references to authoritative sources. An analysis of "colour revolutions" in neighbouring countries is conducted to clearly demonstrate the destructive consequences of eroding trust in governmental authorities (participants are recommended to consult sources [22; 23]).

The concluding part of the session is devoted to developing concrete recommendations for integrating the acquired knowledge into everyday professional activities. Emphasis is placed on the importance of continuously enhancing information literacy and critical thinking, both among the personnel themselves and within the units they supervise. Particular attention is given to the need for systematic efforts to explain the nature and mechanisms of destructive informational influence at all levels of professional training within the Ministry of Internal Affairs of Russia.

2. Diagnostic Tools

A system of criteria and indicators was developed for the comprehensive assessment of participants' professional competencies.

Theoretical knowledge was assessed on a 15-point scale: 0–5 points corresponded to a low level (fragmentary knowledge), 6–10 to a medium level (basic understanding with errors), and 11–15 to a high level (systematic knowledge).

Practical skills were assessed through case study solutions according to three criteria: depth of analysis (0–2 points), practical applicability (0–2 points), and creativity (0–1 point). For depth of analysis, 0 points indicated a superficial approach without argumentation, 1 point indicated partial argumentation, and 2 points indicated a comprehensive analysis with an evidence base. Practical applicability was assessed as follows: 0 – abstract proposals, 1 – partially feasible ideas, 2 – concrete and implementable solutions. Creativity was evaluated as 0 for formulaic approaches and 1 for original approaches.

The projective technique "Incomplete Sentences" allowed for the analysis of changes in attitudes toward propaganda and the depth of understanding of terminology.

Group work was assessed based on participation activity (0–3 points) and quality of argumentation (0–2 points).

Diagnostics were conducted in three stages: initial (testing, case studies, projective technique), ongoing assessment after each topic (discussions, situational tasks), and final evaluation (retesting, comprehensive case study). All data were recorded in individual participant cards and processed using IBM SPSS Statistics 27, with calculation of means, standard deviation, paired Student's t-test, and Pearson correlation coefficient to assess the dynamics and effectiveness of the training.

3. Pilot Testing of the Programme

3.1. The first topic: "The content of the concepts: information and propaganda in political and educational work within Internal Affairs Agencies units"

It involved the analysis of the case study "Special military operation," aimed at developing participants' analytical skills through group work and discussion. Participants, divided into groups of 4–5, analysed possible arguments "for" and "against" the initiation of the operation, after which they presented their conclusions for a plenary discussion.

During the discussion, participants concluded that the arguments in favour of initiating the special military operation were more substantial and convincing. Analysis of the presented reasoning indicated that the position justifying the necessity of the operation was based on a combination of factors, ranging from immediate military threats to long-term geopolitical risks. Participants paid particular attention to the concentration of Ukrainian forces near the borders of the DPR and LPR, which was considered a real risk of conflict escalation. Facts relating to the actions of radical

groups and the consequences of hostilities in Donbass since 2014 were also perceived as significant arguments. Furthermore, participants noted the preventive nature of the operation in the context of NATO expansion and potential nuclear threats.

Critical arguments, although considered, were not substantiated in as much detail and during the discussion largely amounted to Western propaganda theses without supporting evidence. Ultimately, participants concluded that the decision to initiate the special military operation was driven by the need to protect Russia's national interests and security, as well as to prevent a larger-scale conflict.

During the case discussion, a characteristic dynamic of group work was observed: at the initial stage, most participants were restrained in expressing their own positions. However, as the most active participants began presenting their viewpoints with reasoned arguments supported by analysis and factual evidence, a productive discussion environment emerged. This created the conditions necessary for engaging the remaining participants, who gradually moved from passive observation to substantive dialogue, significantly increasing both the intensity and quality of the discussion.

Working with the case helped participants not only develop analytical and argumentative skills but also form a comprehensive understanding of the cause-and-effect relationships underlying key political decisions. The sessions enabled participants to gain a clear understanding of fundamental concepts and to change their initially negative attitude toward propaganda as a professional tool. Through the lens of its educational function, it was demonstrated that ethical propaganda, based on principles of transparency and alignment with audience interests, is an essential element of the professional socialisation of Internal Affairs Agencies personnel. The practical significance of the topic was reflected in participants' development of the ability to critically analyse informational materials and understand the mechanisms of ideological influence, which form the basis of professional competence for propagandists. As a result, distinctions between domestic and foreign propaganda were formulated (Table 1).

3.2. The second topic: "Socio-psychological conditions for effective propaganda"

The topic involved a comparative analysis of propaganda work under the conditions of the special military operation (SMO) and during peacetime, revealing significant differences in approaches and audience expectations. Under the SMO, the emphasis shifts toward mobilisation rhetoric, simplification of messages for rapid comprehension, enhanced emotional impact (through patriotic narratives and heroic imagery), and countering hostile propaganda. Timeliness and adaptability of content, as well as its alignment with current objectives, are critically important. In peacetime, propaganda is more systematic and long-term, focusing on the formation of stable values, legal education, and the prevention of destructive ideas. More complex formats (analytical materials, discussions) are acceptable, and the tone of messages is less directive.

During practical sessions with participants, detailed examples of information and propaganda work with Internal Affairs Agencies personnel serving in liberated territories were examined. Analysis of practice and discussions with active specialists showed that the most effective forms of

Table 1. *Comparison of domestic and foreign propaganda (compiled by participants), n=57*
Таблица 1. *Сравнение отечественной и зарубежной пропаганды, (составлено слушателями), n=57*

Domestic propaganda	Number of participants	Foreign propaganda	Number of participants
Main goals			
Consolidation of society	51	Promotion of liberal values	52
Protection of state interests	52	Russophobia	50
Fostering patriotism	48	Combating ideological opponents	47
Methods			
Centralised system	54	Decentralised system	53
Use of historical narratives	50	Emphasis on "freedom of information"	43
Target audiences			
Country's population	55	Citizens of other countries	50
Diasporas	44	International organisations	52
Allied states	47		

work were brief, emotionally charged materials emphasising the heroism and professionalism of Internal Affairs Agencies personnel operating under difficult conditions, the historical significance of the ongoing special military operation, as well as the personal example of commanders and positive instances of interaction with the local population. Particular attention was given to specific cases in which promptly prepared video materials – including front-line reports, interviews with personnel serving in liberated territories, and footage of restored social infrastructure – were shown to personnel and reliably enhanced the morale and psychological state of military and law enforcement staff, reinforcing their confidence in the successful completion of assigned tasks.

In peacetime, as demonstrated by the case studies analysed during the sessions, more analytical formats are effective – such as expert roundtables, discussion clubs, and individual conversations that allow for consideration of the specific characteristics of personnel. Particular attention during the sessions was given to the issue of insufficient effectiveness of explanatory work within the troops and Internal Affairs Agencies units. Numerous examples were examined in which personnel, lacking timely and comprehensive information from immediate supervisors, had to rely on contradictory messages from social media and mass media. In particular, the situation regarding statements by Western politicians about alleged ongoing negotiations to resolve the conflict was analysed in detail; in the absence of professional clarifications from propagandists, these statements naturally raised questions among law enforcement personnel. Analysis showed that such informational injections, when not promptly refuted and properly explained within the system, indeed have a negative impact on the morale and psychological state of personnel, undermining trust in the command and reducing motivation.

Particular discussion arose around techniques for working with different types of audiences. It was noted that propaganda has the greatest effect when targeting the undecided segment of the audience, whereas attempts to persuade staunch opponents often prove ineffective. In this context, strategies for identifying like-minded individuals and relying on them were considered, as well as techniques for neutralising aggressive opponents through the use of humour and raising the intellectual level of the discussion.

Reflection at the end of the session showed that familiarisation with modern propaganda techniques in itself has significant motivational potential, encouraging personnel to adopt a more conscious and professional approach to fulfilling their responsibilities in working with staff.

3.3. The third topic: "Psychological conditions for the perception of propaganda materials by Internal Affairs Agencies personnel"

It generated considerable interest among participants in issues related to individual informational needs and behavioural characteristics in the digital environment.

The results of identifying the primary channels of information perception showed that more than half of the participants were of the visual type. This underscores the need for active use of visual formats (infographics, videos, presentations), visualisation of complex concepts and data, development of specialised templates for visual presentation of materials, and consideration of this characteristic when preparing educational manuals and methodological materials.

Analysis of the results of group assignments revealed significant differences in information perception depending on participants' psychological characteristics. It was found that participants with an analytical mindset (23 out of 57) demonstrated better results when working with structured data and logical arguments but experienced difficulties with emotionally charged materials. Practically oriented participants (20) more effectively assimilated information through concrete examples from professional practice, actively engaging in role-playing exercises, but required additional support for theoretical generalisations. Emotionally sensitive participants (14) showed high engagement when working with materials containing personal stories and examples but needed a special approach when complex theoretical concepts were presented. These differences highlight the necessity of a differentiated approach to the training of propagandists, combining various information delivery formats to ensure maximal learning effectiveness across all categories of participants.

The most challenging tasks for participants were those related to identifying manipulative techniques in information presentation. During the discussion, particular interest was shown in the mechanisms underlying the formation of the "primacy effect" when assessing the credibility of information.

The practical significance of these results lies in their potential use to enhance the precision of informational influence, optimise content delivery formats, and develop personalised approaches to working with personnel. Participants particularly emphasised the value of the acquired knowledge for their professional activities, highlighting the need for further in-depth study of the psychological mechanisms of information perception and methods for countering manipulative techniques.

3.4. The fourth topic: "Forms and methods of information and propaganda work in Internal Affairs Agencies"

Comprehensive surveys revealed that participants spend an average of 5–6 hours per day in the digital environment, with 50 out of 57 respondents identifying Telegram as their primary messenger for receiving information. These data indicate the deep integration of digital technologies into the professional activities of Internal Affairs Agencies personnel and underscore the need to adapt the training process to contemporary media realities.

Traditional methods, including posters, leaflets, informational bulletins, and videos for internal screens, demonstrated consistent effectiveness in terms of long-term impact and the ability to concentrate key messages. At the same time, work with modern digital technologies, particularly Telegram channels and social media, showed advantages in the speed of information dissemination and the level of audience engagement.

Analysis of participants' practical work revealed that more than half of the respondents experienced difficulties in

identifying reliable channels for obtaining information intended for subsequent dissemination within units. This problem is particularly acute on the Telegram messenger, where official and questionable information sources coexist. During the sessions, it was determined that the main reasons for this situation are: the absence of a unified departmental list of recommended information sources; insufficient training of personnel in media literacy; the high dynamism of the information landscape; and the difficulty of verifying information under conditions of information overload.

To address these issues, participants were provided with specific recommendations, including a list of verified propaganda channels that have proven to be reliable sources of information. These included:

– *"Propagandist's Notebook"* (methodological materials for propaganda work);

– *"ZA PRAVDU"* (analysis of current events from a patriotic perspective);

– *"Kornilov"* (military-political analytics);

– *"War on Fakes"* (analysis of disinformation campaigns);

– *"World Today with Yuri Podolyaka"* (international politics and security).

During the practical review of the proposed cases, a table was created together with the participants for propagandists to assess the effectiveness of their messages (Table 2).

3.5. Fifth topic: "Organisation of counter-propaganda and debunking fake news"

A comprehensive assessment of participants' initial level of training yielded the following results. The conducted entrance test (15 multiple-choice questions) and analysis of practical assignments showed that 19 out of 57 participants (approximately one-third) demonstrated a distorted or incomplete understanding of the basic concepts of counter-propaganda and the mechanisms of disinformation dissemination.

As part of the practical session on analysing fake news, an interactive discussion was conducted to identify key patterns in the perception of disinformation. The participants (51 out of 57) admitted that they had opened deliberately false news at least once, citing emotionally charged headlines (37 participants), curiosity (33 participants), and the viral nature of the content (27 participants) as reasons. The analysis revealed that the most effective fake news exploits cognitive biases (including the "truth effect" from repeated exposure), emotional triggers (fear, outrage), and simplified cause-and-effect relationships. Thirty-six participants reported instances of initially believing false information, with an average recognition time of 2–3 minutes of active reading. The discussion highlighted major vulnerability factors, including stereotypical thinking, trust in "convenient" information, and a lack of critical analysis under conditions of information overload. Participants actively engaged in examining why false news is more appealing, emphasising its emotional intensity and alignment with simplified psychological perception patterns.

4. Results of the Empirical Study

The survey aimed at assessing the participants' understanding of key terms (propaganda, disinformation, fake news, etc.) as well as practical challenges revealed significant gaps in comprehension of essential informational categories. Over 70 % of respondents experienced difficulties differentiating concepts such as information, disinformation, propaganda, agitation, counter-propaganda, manipulation, fake news, resonance technologies, and destructive

Table 2. *Guide for propagandists assessing the effectiveness of their messages*
Таблица 2. *Руководство для пропагандистов, оценивающих эффективность своих сообщений*

Criterion	Description	Importance
Target audience	Identification and segmentation of the audience for maximum effectiveness	High
Message content	Clarity, conciseness, and persuasiveness of the message	High
Emotional tone	Use of emotions to enhance impact	High
Distribution channel	Selection of optimal channels to reach the target audience	Medium
Frequency of repetition	Repetition of the message to reinforce it in consciousness	Medium
Information source	Selection of reliable and authoritative sources	High
Visual elements	Use of images and videos to attract attention	Medium
Call to action	Specific instructions or calls to action to engage the audience	Medium
Feedback	Collection and analysis of audience responses to adjust strategy	High
Relevance of topic	Alignment of the message with current events and trends	Medium

content, even though many of these terms have long beenpart of the professional lexicon and are widely used in the context of intensified information confrontation, including countering Russophobic ideological narratives. The method of emotional resonance is not new, yet its application has become particularly relevant under current conditions.

The propagandists themselves noted a problem: they lack sufficient proficiency with modern digital platforms and tools. This hinders their ability to quickly find reliable information, verify it, and effectively adapt content for work with personnel. Many do not know where and how to locate verified data, or which resources and verification methods to use to ensure that materials are not only persuasive but also accurate. The greatest deficiencies were identified in the following areas:

– creating informational content for personnel for propaganda purposes;

– criteria for selecting reliable sources of information beyond official documents and legal acts;

– use of modern tools and technologies for conducting propaganda work with personnel;

– psychological aspects of information perception and increasing trust in propaganda materials;

– methods for countering fake messages and algorithms for conducting counter-propaganda activities in Internal Affairs Agencies.

It was also found that the overwhelming majority of respondents have a negative attitude toward propaganda materials, perceiving them as imposed and manipulative. At the same time, the respondents recognise the high significance of propaganda in society.

The data obtained indicated the need for a systematic modernisation of professional development programmes for propagandists. In this context, an experimental pilot Programme of additional professional education was developed and partially tested.

The results of the empirical study demonstrated the high effectiveness of the developed propagandist training Programme for the Internal Affairs Agencies. Initial diagnostics revealed significant knowledge gaps: the average score on the entrance test was only 9.5 out of 15, with 8 out of 57 participants showing a low level of preparation. The greatest difficulties were observed in identifying manipulative techniques (39 % correct answers), understanding cognitive biases (42 %), and grasping the essence of counter-propaganda (47 %) (Table 3).

After completing the training, significant progress was observed: the average score increased to 13 out of 15 (Table 3), while the number of participants with a high level of competence rose from 17 to 48 (out of 57), and the low-level group was completely eliminated. The greatest improvements were recorded in the following areas: identification of fake information (correct responses increased from 39 % to 97 %), content verification methods (from 42 % to 94 %), and counter-propaganda activity algorithms (from 47 % to 96 %).

Statistical analysis (t=12.37, p<0.001, d=1.87) confirmed the high significance of the results. The study convincingly demonstrated that a comprehensive approach, combining theoretical training with practical exercises, effectively develops the professional competencies of propagandists within the Internal Affairs Agencies system.

Of particular interest are the results of the practical case analyses, which were evaluated according to three criteria: depth of analysis (0–2 points), practical applicability (0–2 points), and creativity of solution (0–1 point). The most illustrative outcomes were as follows: for the case "Special military operation," the average score increased from 1.2 to 2.7; for the task "Positive propaganda of Russia," from 0.8 to 2.4; and for the case "Internal Affairs Agencies image," score increased from 0.5 to 2.1 points.

A qualitative analysis using the projective method "Incomplete Sentences" revealed significant changes in the professional mindset of the participants. At the initial stage, 47 % of associations with the term "propaganda" were negative; after the training, 89 % of definitions reflected a positive connotation (constructive propaganda). Correct understanding of the essence of counter-propaganda was demonstrated by 52 out of 57 participants (compared to 22 at the entry stage), and the number of participants showing readiness for practical implementation of the acquired knowledge increased from 14 to 44.

Statistical analysis confirmed the significance of the obtained results. A paired t-test demonstrated a high degree of reliability in the differences between the entry and exit assessments (t=12.37, p<0.001). Cohen's d (d=1.87) indicates a large practical effect of the training. A strong correlation

Table 3. *Comparative results of entrance and exit tests*
Таблица 3. *Сравнительные результаты входного и выходного тестирований*

Indicator	Entrance test	Exit test
Average score (out of 15)	9.5	13
Low level (0–5 points)	8 participants	0 participants
Medium level (6–10 points)	32 participants	9 participants
High level (11–15 points)	17 participants	48 participants

between theoretical knowledge and success in solving practical cases (r=0.82) further confirms the comprehensive nature of the competencies acquired.

Of particular importance is the observed development in key competencies: systematic understanding of propaganda technologies (31 participants at a high level), practical skills in information verification (33 participants), and critical analysis of media content (30 participants). These findings indicate that the Programme not only facilitates the acquisition of theoretical knowledge but also fosters practice-oriented competencies essential for effective professional performance.

DISCUSSION

The study yielded significant findings with both theoretical and practical implications for the training of propagandists in the Internal Affairs Agencies. Analysis of the data indicates that the training programme proved highly effective in enhancing professional competencies among personnel responsible for information and propaganda activities. The most notable improvements were observed in participants' understanding of propaganda as a professional tool. Results demonstrate a shift from predominantly negative perceptions of propaganda (47 % negative associations at the beginning of the training) to a positive reinterpretation (89 % after completion), reflecting a substantial transformation in the perception of propaganda – from skepticism to recognition of its importance as an instrument for fostering ideological resilience among personnel.

A comparative analysis with previous studies [24; 25] indicates that the proposed Programme differs significantly from traditional approaches to training personnel responsible for managing staff in Internal Affairs Agencies units. Unlike existing methods, which primarily emphasise theoretical aspects, the Programme implements a comprehensive practice-oriented approach, integrating classical ideological training techniques with modern digital technologies.

The practical implementation of the Programme demonstrated its effectiveness in developing participants' systematic understanding of information influence mechanisms and their ability to critically analyse media content. These results are of significant value for improving the professional training system within the Russian Ministry of Internal Affairs. The proven effectiveness of the proposed approach supports its recommendation for integration into the educational process, which is expected to enhance the quality of propaganda work within law enforcement agencies and strengthen their ideological capacity.

The high effectiveness of the training can be attributed to several factors. First, the programme combines foundational knowledge about the nature of propaganda with practical skills in creating propaganda content and countering disinformation. Second, special attention is given to digital technologies, including social media, messaging platforms, and data analysis tools. Third, the use of interactive teaching methods – case studies, role-playing exercises, and group discussions – promotes not only knowledge acquisition but also a deeper understanding of propaganda activities.

A key finding of the study was the identification of major challenges in the current training of propagandists. The greatest difficulties reported by personnel concern information verification (particularly on Telegram), the creation of effective content for social media, and the psychological impact on target audiences. These results underscore the need for further development of the training system, including the establishment of departmental standards for information work and a registry of verified sources.

The practical significance of this study lies in the potential for the developed Programme to be successfully integrated into the educational process of higher education institutions within the Ministry of Internal Affairs of Russia. Its implementation is expected to enhance the quality of propaganda work, strengthen the moral and psychological resilience of personnel, and foster public trust in law enforcement agencies. This is particularly relevant in the context of the special military operation, where the effectiveness of informational influence largely determines the success of operational and service tasks.

It is also necessary to acknowledge certain limitations of the study. First, the sample of 57 participants requires further testing of the Programme on a larger audience. Second, long-term observations are needed to assess the durability of the results obtained. Third, the rapidly changing information environment necessitates the continuous updating of the training content.

Promising directions for further research may include the development of methods for integrating artificial intelligence into media content analysis, the creation of a system for evaluating the effectiveness of propaganda materials, and an in-depth study of the cognitive mechanisms underlying information perception by Internal Affairs Agencies personnel.

The developed Programme not only addresses existing gaps in the training of propagandists but also introduces innovative approaches aligned with the challenges of contemporary information warfare. Implementing the proposed methodology is expected to significantly enhance the effectiveness of information and propaganda activities within law enforcement agencies. The author hopes that this study will make a substantial contribution to the advancement of professional training systems for Internal Affairs Agencies personnel.

CONCLUSIONS

Practice-oriented training methods demonstrated the highest effectiveness in preparing propagandists. The analysis of specific cases, such as coverage of the special military operation, countering fake news, and shaping a positive image of the Internal Affairs Agencies, led to a significant improvement in participants' performance.

Interactive training formats, including group discussions, role-playing exercises, and projective techniques, facilitated not only the acquisition of knowledge but also a shift in participants' attitudes toward propaganda as a professional tool.

The study revealed that personnel face significant challenges in working with digital platforms, particularly in identifying reliable information sources and producing

effective content for social media. In this context, priority areas include enhancing media literacy, developing departmental standards for information management, and establishing a registry of verified sources.

The developed Programme has demonstrated its effectiveness and can be recommended for implementation in the educational processes of Russian Ministry of Internal Affairs institutions. Its adoption is expected to enhance the quality of propaganda work, strengthen the ideological resilience of personnel, and foster public trust in the law enforcement system amid contemporary informational challenges.

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Содержание и технология подготовки пропагандистов для органов внутренних дел

Кравцун Игорь Андреевич, адъюнкт адъюнктуры
Санкт-Петербургский университет МВД России, Санкт-Петербург (Россия)

E-mail: kravia52@gmail.com ORCID: https://orcid.org/0009-0007-1818-7888

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Аннотация: В условиях роста деструктивного влияния социальных сетей и распространения фейковых новостей традиционные методы пропаганды нуждаются в переосмыслении и адаптации. Особую актуальность приобретает вопрос подготовки кадров, способных эффективно осуществлять информационно-пропагандистскую деятельность в системе МВД России. Цель исследования – разработка и апробация программы повышения квалификации для сотрудников ОВД, ответственных за пропагандистскую работу. В исследовании приняли участие 187 чел., включая 100 сотрудников подразделений ОВД, 30 действующих пропагандистов и 57 слушателей курса повышения квалификации. Для сбора данных использовались анкетирование, проективная методика «Неоконченные предложения», входное и выходное тестирование, а также анализ практических кейсов. Разработанная программа включает пять тематических блоков, направленных на формирование как теоретических знаний, так и практических умений пропагандистской работы. Результаты апробации показали значительное повышение уровня компетенций слушателей: средний балл по итоговому тестированию вырос с 9,5 до 13 из 15 возможных (p<0,001), а доля слушателей с высоким уровнем подготовки увеличилась с 29,8 до 84,2 %. Особенно значительный прогресс был достигнут в области идентификации фейковой информации (с 39 до 97 % правильных ответов) и ведения контрпропагандистской работы (с 47 до 96 %). Полученные результаты свидетельствуют о высокой эффективности разработанной методики и ее потенциале для повышения качества пропагандистской работы в правоохранительных органах.

Ключевые слова: информационно-пропагандистская работа; органы внутренних дел; повышение квалификации; информационное противодействие; фейковые новости; контрпропаганда.

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THE PUBLISHING CENTER

The Publishing Center (until November 1, 2011 – the Editorial and Publishing Center) is a structural subdivision of Togliatti State University, which takes an important place in providing the educational process with high-quality instructional, educational, methodological, and scientific literature.

TSU Publishing Center today

– Publishing center includes an editorial office and a printing shop. In recent years, the base of computer equipment, printing and post-printing equipment has been almost completely updated.

– It publishes books and electronic textbooks for students, graduate students, lecturers, and specialists in almost all branches of modern scientific knowledge, as well as popular science and reference literature, fiction, books of reports (papers) of conferences. Published literature corresponds to all areas of the educational cycles of the university disciplines.

– A considerable volume of printing job is the prompt execution of promotional and information products.

– The publishing center team is a collaboration of highly skilled professionals with wide work experience and young motivated employees.

– Publishing center employees participate in practical seminars to become acquainted with new opportunities in the field of printing technologies and equipment, as well as with advanced materials for digital printing.

Main areas of activity

– Publication of paper-based educational and scientific literature, production of electronic educational and scientific aids.

– Implementation of editorial and publishing cycle stages: editing, production of original layouts, replication, pre-printing and post-printing treatment.

– Methodological and advisory work with the university departments on the issue of educational and scientific publications.

– Interaction with the Russian Book Chamber on the assignment of ISBNs to publications issued by Togliatti State University.

– Preparation of publications issued by Togliatti State University for state registration and sending of statutory copies.

– Markup of papers published in the TSU journals in the Articulus program to place on the eLibrary platform.

Main achievements

– The results of the work were awarded with diplomas of the winners of the annual interregional and all-Russian University Book competitions.

– Publishing center regularly participates in the academic book exhibition of publishing activities "University – Science – City".

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Technology for organizing mathematical problem solving using the concept of stage-by-stage development of mental actions and criteria-based assessment when training future mathematics teachers

Olga V. Makeeva, PhD (Physics and Mathematics),
assistant professor of Chair of Higher Mathematics
Ulyanovsk State Pedagogical University, Ulyanovsk (Russia)

E-mail: mov_ulspu@mail.ru ORCID: https://orcid.org/0000-0003-4345-2296

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Abstract: Mathematical knowledge, due to the specific nature of its acquisition through problem solving, plays a special role in the development of various forms of thinking. When solving mathematical problems through the interiorisation of heuristic techniques, a cultural form of creative thinking is formed. The acquisition of analytical heuristics can be influenced by specific methods of organizing the learning process. This paper describes a tool for organizing the teaching of mathematical problem solving as a process aimed at developing guidelines – heuristics – according to the third type of orientation of P.Ya. Galperin's theory of the stage-by-stage development of mental actions. The paper presents the results of a formative experiment on the acquisition of the proposed framework (the scheme for organizing mental activity, hereinafter referred to as the OMA) by future mathematics teachers while studying the integral calculus of one variable functions. Using the Mann–Whitney *U*-test, statistically significant differences in the levels of development of the Problem Setting Analysis heuristic were obtained in the control and experimental groups. Due to the small number of groups, a qualitative analysis of the experimental results was conducted. The feasibility of using the OMA framework to implement a strategy of complete acquisition and formative assessment is demonstrated. As it is hypothesized, the systematic use of the OMA framework in teaching to solve problems implements a third-type orientation teaching method and is appropriate for training maths teachers.

Keywords: teaching to solve mathematical problems; theory of stage-by-stage development of mental actions; third type of orientation; formative assessment; full acquisition; mathematics teacher education; integral calculus of one variable functions.

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1. INTRODUCTION

The problem of mastering mathematics as a subject of study has a long history. Each new generation of students brings its own unique characteristics to the problematic area. These characteristics are related to the specific state of the educational environment, its dependence on the sociocultural environment, and the level of technological development, and therefore require immediate study.

In current environment, with the rapid development and use of electronic calculators, the ability to discover the meaning and significance of mathematical knowledge is a non-trivial challenge. For Generation Z students, the so-called digital natives, it is necessary to "construct" an understanding of mathematical text as a specially organized process. The acquisition of a course in mathematics supposes the transformation of "ready-made" mathematical knowledge recorded in textbooks, reference books, and information systems into knowledge that is "emerging" [1]. A traditional mathematical problem is a "dynamic" structure for representing mathematical knowledge in this sense. It contains a direct appeal to the problem solver in the form of a question and creates opportunities for discursive analysis of the problem situation. It is worth recognizing that in today's information richness, the educational process in its traditional form does not fully realize these opportunities – in most cases, students do not develop a model of mathematical activity[1].

The theoretical basis for the study was the activity theory of the psyche by A.N. Leontiev (1903–1979) [2], which had a significant influence on Russian pedagogy. In the context of the problem under study, of particular interest is the development of its provisions in the theory of educational activity by D.B. Elkonin (1904–1984) and V.V. Davydov (1930–1998), which laid the foundations for

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[1] *Makeeva O.V., Foliadova E.V. Math teacher for generation Z: mastering the mathematical content by constructing knowledge bases. Razvitie obshchego i professionalnogo matematicheskogo obrazovaniya v sisteme natsionalnykh universitetov i pedagogicheskikh vuzov: sbornik materialov 40-go Mezhdunarodnogo nauchnogo seminara prepodavateley matematiki i informatiki universitetov i pedagogicheskikh vuzov. Bryansk, IP Khudovets R.G. Publ., 2021, pp. 416–419. EDN: KMLXNL.*

the activity-based approach in education [3; 4]. The ideas of L.S. Vygotsky (1896–1934) on the relationship between learning and mental development [5] can be considered as a unified theoretical basis for various systems of developmental learning.

The works of P.Ya Galperin (1902–1989) [6] find their origins in the research of A.N. Leontiev and his followers. Based on the orienting basis in the doctrine of activity, the scientific school of P.Ya. Galperin developed a theory of the stage-by-stage formation of mental actions. This is a theory of learning as the transition of external activity to the internal plane in the course of interiorisation, which describes the processes and conditions for the formation of meaningful actions to generate the subject's knowledge – ideas and concepts about objects and their connections [7]. These include the active orientation of the subject in the conditions of the action, where the third type of orientation (complete and generalized orienting basis of action) has fundamental importance; the presence of means of action as tools of mental activity (standards, measures, signs); understanding the process of the emergence of images of perception and thinking as the transition of external actions to the plan of operations carried out in the mind. The theory of P.Ya. Galperin is well known in Russian psychology and pedagogy; it has received wide international recognition and continues to be developed in recent research [8; 9]. Education built on its principles is more effective than traditional system, as it manages the process of developing mental actions, including the qualities of actions. Positive examples include educational programs for primary schools [6]. However, this approach is not actively used in the modern system of higher pedagogical education.

The study of psychological and pedagogical mechanisms of learning is inextricably associated with the problem of assessing the results of educational activity. Currently, the criteria-based assessment system, which is essentially formative assessment, has become quite widespread. This system is based on a six-level taxonomy of educational goals [10] developed in 1956 by the American psychologist of learning methods Benjamin Samuel Bloom (1913–1999). In the 1960s, in collaboration with the American psychologist John Bissell Carroll (1916–2003), he formulated the idea of complete acquisition. It is based on the hypothesis that complete material acquisition is accessible to every student. To achieve this, learning outcomes must be selected as an invariant, an unchangeable parameter of the educational process. The formulation of educational goals can be carried out through the description of learning outcomes expressed in the actions of students. Assessment criteria are determined by the objectives of the educational work and represent a list of the types of actions the student carries out and must master during the work. In certain situations, such a procedure is quite naturally constructed and operationalized. Currently, the formative assessment system is quite widespread abroad at all levels of education. However, for Russian schools and especially universities, this assessment strategy remains innovative [11].

The study deals with the training of future maths teachers. It focuses on the problem of organizing the process of solving educational mathematical problems that is adequate to the psychological characteristics of the process of thinking and aimed at developing a model of mathematical activity.

The goal of the study is to improve the effectiveness of developing subject-methodological competencies in future maths teachers through the development and implementation of a problem-solving teaching tool that implements P.Ya. Galperin's concept of the third type of orientation and the principles of formative assessment.

2. METHODS

2.1. The Study Tool and Theoretical Background

To organize learning activities for solving mathematical problems, in which learning corresponds to the third type of orientation and students are provided with criteria for assessing their achievements, the author developed a special structure – the Instructional Framework for Organizing Mental Activity when Solving Mathematical Problems (OMA Framework) (Table 1) [1]. The framework is intended to externalize and reflect in external speech processes that, with developed problem-solving skills, occur in a condensed form in the mind.

2.2. Objective and Hypothesis of the Experiment

To study the capabilities of the OMA Framework as a tool for organizing orientation and teaching it as an analytical heuristic, the author conducted a formative experiment. The purpose of the experiment was to investigate the potential of students to master the Problem Setting Analysis (PSA) heuristic technique (Table 1, part 1) under the guidance of a teacher through regular and meaningful use of the OMA Framework while solving problems during classroom learning. It is assumed that the systematic use of the OMA Framework in teacher-guided classroom learning has a statistically significant effect on students' mastering of the PSA heuristic technique.

2.3. Sample and Procedures

The experiment participants were first-year students majoring in 44.03.05 Pedagogical Education with two training profiles: "Mathematics. Foreign Language" (MFL, 16 students) and "Mathematics. Economics" (ME, 19 students). They were not informed that the instructor was conducting the experimental work.

2.4. Organization of Experimental Conditions

In the MFL group (the experimental group), problem solving was organized using the OMA framework. It was presented at the very beginning of learning the topic and was repeatedly updated in the process of the work. At each lesson, under the instructor's guidance, students collectively analyzed the problem conditions (Table 1, part 1). The framework was not fully utilized for all the tasks examined. In the ME group (control group), teaching problem solving was conducted in a traditional format (without using a scheme) – as commented problem solving.

Table 1. *Instructional scheme for organizing mental activity when solving mathematical problems (OMA Framework)*
Таблица 1. *Инструкционная схема организации мыслительной деятельности при решении математических задач (схема ОМД)*

A student is able to	**1. Mathematical problem setting analysis**		
	1	name	the object of study
	2	formulate	the subject of study
	3	outline	the answer to the problem (possible variants of the results of object's research)
	4	identify	the research object components
	5	characterize	the research object components in accordance with the requirements of research subject
	2. Problem solving		
	1	formulate	the key idea of problem solving (technique of object research)
	2	select	problem solving "tools" (methods of object research)
	3	comment on	the application of "tools" at each step of problem solving (process of object research)
	4	formulate	an answer to the problem (result of object research)
	5	identify	the stages of problem solving (structure of object research)
	3. Problem solving analysis		
	1	check	the correctness of each step in problem solving (correctness of the process of object research)
	2	assess	the completeness of the solution to the problem (completeness of object research)
	3	assess*	the rationality of the solution to the problem (rationality of the process of object research)
	4	formulate**	conclusions on problem solving (comprehensive results of object research)
	5	analyze***	the possibility of transferring the results of problem solution (uniqueness of the research object)

*Note. * Assessing the rationality of a solution involves comparing alternative solution options or its individual elements.*

*** Formulating conclusions on the solution involves identifying generalized solution techniques. This is performed when first encountering a certain problem type. Subsequently, the identified technique becomes a "ready-made" tool for analyzing the conditions of the problem.*

**** Analyzing the possibility of transferring solution results involves studying the "solution stability" when varying the characteristics of the problem object and is essentially an additional research task. This is performed when first encountering a certain problem type.*

*Примечание. * Оценка рациональности решения предполагает сопоставление альтернативных вариантов решения или отдельных его элементов.*

** Формулировка выводов по решению предполагает выделение обобщенных приемов решения. Выполняется при первой встрече с некоторым типом задач. В дальнейшем выделенный прием становится «готовым» инструментом анализа условия задач.*

*** Анализ возможности переноса результатов решения предполагает исследование «устойчивости решения» при варьировании характеристик объекта задачи и по существу является дополнительной исследовательской задачей. Выполняется при первой встрече с некоторым типом задач.*

2.5. Time Parameters and Content Context

The experiment was conducted in natural conditions of a classroom setting, for 46 academic hours, during which students studied the integral calculus of one real variable functions within a Mathematical Analysis course. The course included 18 h for learning theoretical material, 20 h of problem-solving practice, and 8 h of assessment in the form of individual, independent student work.

2.6. Rational for the Choice of Subject Material

The subject material allowed clearly demonstrating the possibilities of using the scheme both in general and specifically in the first part covering the condition analysis. Each type of integrals considered during the course of integral calculus of one real variable functions requires the solver to identify a new component and/or its characteristic within its structure. Thus, when moving from indefinite integrals to definite and improper integrals, the "integration domain" component is added. When moving from definite integrals to improper integrals, the properties of the "integration domain" or "subintegral function" components change – boundedness gives way to unboundedness.

2.7. Assessment and Data Collection System

The control tests stipulated in the schedule served as the control stages of the experiment. The proportions of the maximum possible result expressed in points were used as quantitative information that reflected the level of development of the analytical Problem Setting Analysis heuristics. Step-by-step completion of a special assignment for analyzing the condition (Table 1, part 1) and the problems included in the control tests were assessed.

2.8. Limitations of the Study

Conducting the experiment within a real educational process imposed its own limitations. When summing up the results, only the results of those students who did not miss a single class were taken into account. Therefore, the conclusions of the study are based on the results of small samples: 5 people in the experimental group (MFL, 16 people) and 7 people in the control group (ME, 19 people). This significantly limited the possibilities of using quantitative analysis when processing the results.

2.9. Statistical Methods of Analysis

Preparatory Part of the Experiment

The homogeneity of the experimental and control group samples was tested using the Mann–Whitney *U*-test based on the results of an independent assessment of the level of preparation (the sum of the Unified State Exam scores for university admission). The hypothesis of the absence of statistically significant differences in the level of preparation of students in the experimental and control groups was confirmed at a significance level of p=0.05.

Main part of the experiment

The Mann–Whitney *U*-test was used to test the hypothesis that the values of the Problem Setting Analysis indicator differ in the experimental and control groups, with this indicator being higher in the experimental group.

Final part of the experiment

Based on the results of the work of the groups at three control stages, changes (shift) in the Problem Setting Analysis indicator were studied. The hypothesis being tested is that the change in the indicator is not random. The Wilcoxon rank-sum test was used to test this hypothesis. The hypothesis was not statistically significantly supported in either group.

2.10. Qualitative Analysis

Due to the small size of the groups, the study of the dynamics of the Problem Setting Analysis indicator was conducted through a qualitative analysis of the graphical presentation of the experimental results. Radar plots were used to compare individual results with the mean obtained after combining the groups.

3. RESULTS

3.1. Testing the hypothesis about differences in the PSA Indicator

Based on the results of the first control stage of the experiment (Test No. 2 on the topic "Integration of Different Classes of Functions"), the principal hypothesis of no significant differences in the PSA indicator between the experimental and control groups was confirmed at a 5 % significance level. At the second control stage of the experiment (Test No. 3 on the topic "Definite Integrals"), differences in the PSA indicator values between the experimental and control groups were confirmed at a 1 % significance level. The third control stage of the experiment (Test No. 4 on the topic "Improper Integrals") revealed statistically significant differences in the PSA indicator values between the experimental and control groups at a 5 % significance level.

3.2. Comparison of Total Average and Individual Results

At the first control stage of the experiment, the average PSA indicator value was 0.57. The individual scores of all experimental group participants except one (No. 4) exceeded the average. Two participants (No. 1 and 5) achieved the maximum possible score of 1. The score of participant (No. 4), who did not exceed the average, was very low, at 0.15 (Fig. 1).

Three participants in the control group (No. 7, 8, and 10) achieved scores above the average. Their scores differed only slightly from the average, at 0.6. The minimum score of the control group participant (No. 11), who did not exceed the average, was zero (Fig. 1).

At the second control stage of the experiment, the average value of PSA indicator was 0.5. The individual scores of all experimental group participants exceeded 0.6. None of the participants achieved the maximum possible score. The best score was 0.89. Participant No. 5, who achieved the absolute maximum score of 1 at the first control stage (Fig. 2), achieved the highest score.

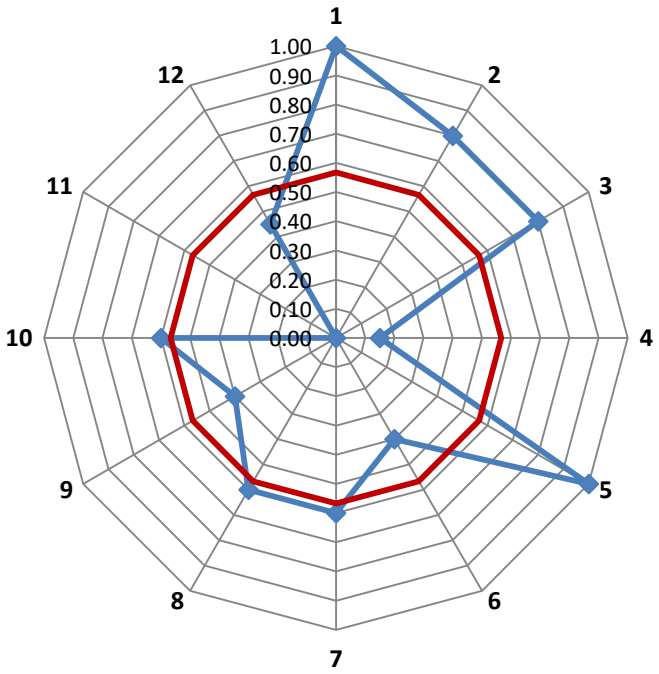

Fig. 1. *Diagram of individual results and the average value of the Problem Setting Analysis indicator at the 1st stage of the experiment.*
Numbers 1–5 indicate participants in the experimental group, and 6–12 indicate participants in the control group
Рис. 1. *Диаграмма индивидуальных результатов и среднего значения показателя «Анализ постановки задачи» на 1-м контрольном этапе эксперимента.*
Цифрами 1–5 обозначены участники экспериментальной группы, 6–12 – участники контрольной группы

Two participants in the control group (No. 7 and 10) achieved scores above the average. These scores were slightly different from the average, reaching 0.56 and 0.61, respectively. Both scores were achieved by participants who also exceeded the average score at the first control stage of the experiment. The lowest score of the control group participant (No. 12), who did not exceed the average score, was 0.17. This score did not belong to participant No. 11, who achieved the lowest score for the studied indicator at the previous control stage (Fig. 2).

At the third control stage of the experiment, the average PSA indicator score was 0.57, the same as at the first control stage. The individual scores of all participants in the experimental group, with the exception of one (No. 4), exceeded the average. Two participants (No. 1 and 2) achieved the highest possible score of 1. For participant No. 1, this was the result of both the first and third control stages of the experiment. Participant No. 2 achieved this result for the first time. Participant No. 5, who demonstrated the highest results at the first and second control stages of the experiment, had a significantly lower result at this stage – 0.81. Minimum score of participant No. 4, which did not exceed the average value, was 0.43. This participant also did not exceed the average value at the first control stage (Fig. 3).

One participant (No. 10) in the control group achieved a score above the average. His score was 0.62, slightly different from the average. This student demonstrated consistently high results throughout all three control stages of the experiment, exceeding the average. Participants No. 11 and 12 demonstrated the minimum result of 0.14. Their results were also the lowest at the first and second control stages (Fig. 3).

Finally, we present a diagram of the average individual results and the total average for all three control stages of the experiment. In the experimental group, one participant (No. 4) did not exceed the average value threshold, while in the control group, only one participant (No. 10) did (Fig. 4).

3.3. Analysis of the Dynamics of Individual Performance

An analysis of the dynamics of the PSA indicator was conducted based on the results of the three control stages of the experiment (Fig. 5). Four patterns of individual performance dynamics can be identified (Table 2).

The "up-up" pattern indicates that the individual performance at each subsequent control stage of the experiment improved compared to the previous one. This pattern was observed only in the control group and characterized 8 % of participants in the combined study group. The "down-up" pattern indicates that the decline in individual performance at the second control stage of the experiment, compared to the first, was followed by an increase in performance when moving from the second control stage to the third. This pattern is predominant for the experimental and control groups; it characterizes 50 % of participants in the experiment. The "up-down" pattern indicates that the increase in individual performance when moving from the first control stage of the experiment to the second was

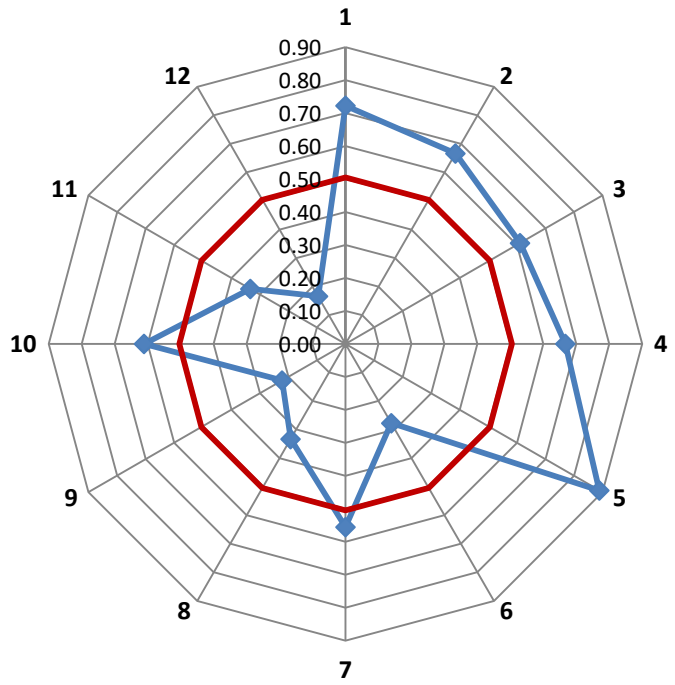

Fig. 2. *Diagram of individual results and the average value of the Problem Setting Analysis indicator at the 2nd control stage of the experiment.*
Numbers 1–5 indicate participants in the experimental group, and 6–12 indicate participants in the control group
Рис. 2. *Диаграмма индивидуальных результатов и среднего значения показателя «Анализ постановки задачи» на 2-м контрольном этапе эксперимента.*
Цифрами 1–5 обозначены участники экспериментальной группы, 6–12 – участники контрольной группы

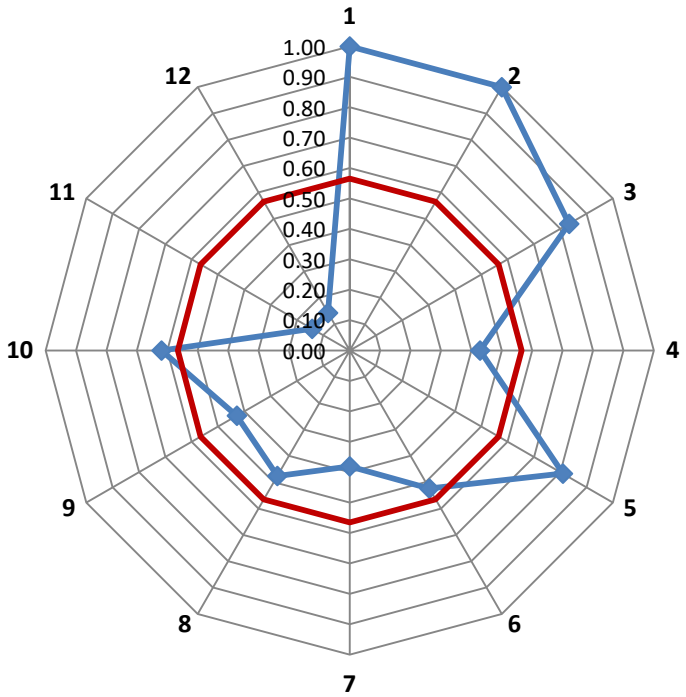

Fig. 3. *Diagram of individual results and the average value of the Problem Setting Analysis indicator at the 3rd control stage of the experiment.*
Numbers 1–5 indicate participants in the experimental group, and 6–12 indicate participants in the control group
Рис. 3. *Диаграмма индивидуальных результатов и среднего значения показателя «Анализ постановки задачи» на 3-м контрольном этапе эксперимента.*
Цифрами 1–5 обозначены участники экспериментальной группы, 6–12 – участники контрольной группы

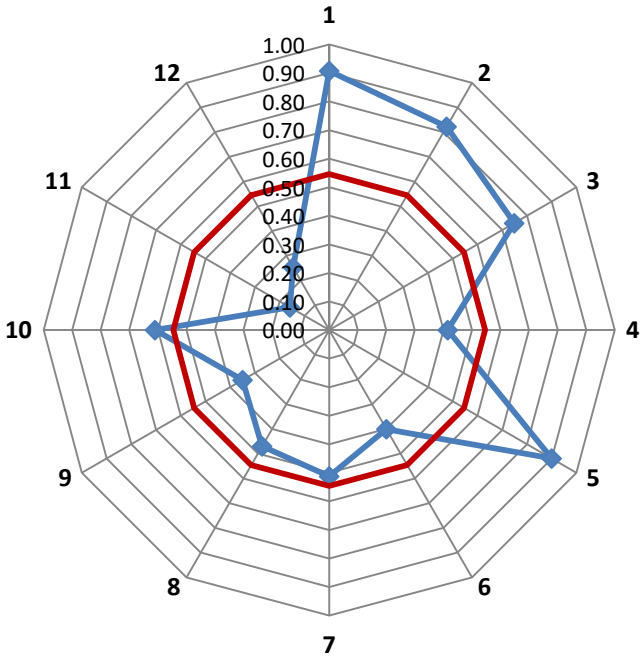

Fig. 4. *Diagram of average individual results and the overall average value of the Problem Setting Analysis indicator at three control stages of the experiment. Numbers 1–5 indicate participants in the experimental group, and 6–12 indicate participants in the control group*
Рис. 4. *Диаграмма средних индивидуальных результатов и общего среднего значения показателя «Анализ постановки задачи» на трех контрольных этапах эксперимента. Цифрами 1–5 обозначены участники экспериментальной группы, 6–12 – участники контрольной группы*

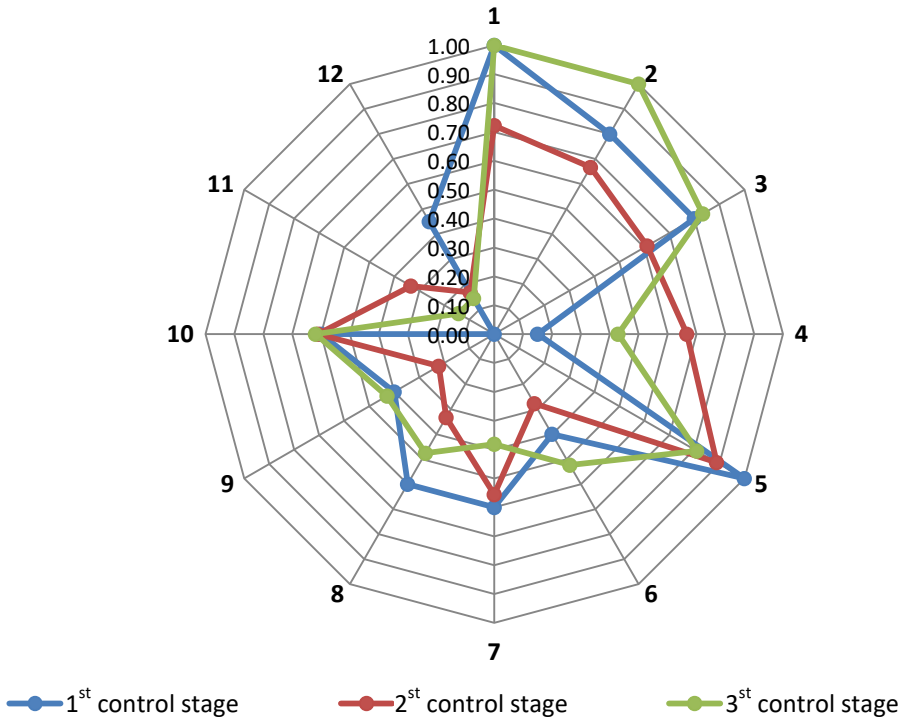

Fig. 5. *Dynamics of individual results for the Problem Setting Analysis indicator at the 1st, 2nd, and 3rd control stages of the experiment. Numbers 1–5 indicate participants in the experimental group, and 6–12 indicate participants in the control group*
Рис. 5. *Диаграмма динамики индивидуальных результатов показателя «Анализ постановки задачи» на 1-м, 2-м и 3-м контрольных этапах эксперимента. Цифрами 1–5 обозначены участники экспериментальной группы, 6–12 – участники контрольной группы*

Table 2. *Dynamics of individual results of the experiment participants*
Таблица 2. *Динамика индивидуальных результатов участников эксперимента*

Type of dynamics	Group					
	Experimental		Control		Combined	
	people	%	people	%	people	%
Up – up	0	0	1	14	1	8
Down – up	3	60	3	43	6	50
Up – down	1	20	1	14	2	17
Down – down	1	20	2	29	3	25
Control totals	5	100	7	100	12	100

followed by a decrease in performance when moving from the second control stage to the third. This trend was observed in each group and characterized 17 % of the combined group of participants. The most negative "down-down" trend indicates that each subsequent result was worse than the previous one. It was observed in both groups and characterized 25 % of the experiment participants.

3.4. Analysis of Extreme Individual Results

The author studied the dynamics of the individual extreme (best and worst) values of the PSA indicator for participants in the experimental and control groups (Fig. 5).

In the experimental group, the extreme best results did not have a clear trend. Thus, participants No. 1 and 2 exhibited fluctuations in the "down-up" dynamics, with No. 2 eventually reaching an absolute maximum and No. 1 returning to it; participant No. 5 demonstrated a negative "down-down" dynamics. The speed of movement of all participants also varied: participant No. 1 moved approximately evenly – almost three intervals in both directions; participant No. 2 moved one interval in the downward direction and three intervals in the upward direction; participant No. 5 moved one interval in the downward direction at each control stage. An interval is defined as one of the 0.1-length intervals into which the range of possible values of the PSA indicator is divided: 0–0.1; 0.1–0.2; …; 0.9–1. Participant No. 4, with the worst extreme result, also demonstrated fluctuations in dynamics: up (five intervals) and down (two intervals).

In the control group, the best extreme result of participant No. 10 was stable (it did not exceed one interval throughout all three control stages of the experiment). The worst extreme results did not show a clear trend. Thus, participant No. 11 demonstrated fluctuations in dynamics: up from absolute zero (by three intervals) – down (by two intervals); participant No. 12 – down (by three intervals) – down (remaining in the same interval).

4. DISCUSSION

Let us illustrate an example of using the OMA scheme using a problem on the topic "Indefinite Integral".

Problem 1. Find the integral $\int x \cdot \cos\left(1-x^2\right)dx$.

To correlate the process of finding a solution with the elements of the scheme, information is presented in the form of Tables 3 and 4.

The proposed structure is a flexible guideline, not a rigid algorithm. This means that nonlinear progression through the scheme is possible during the solution process, returning to previously completed points to clarify their content. Following the scheme is aimed at getting a complete, detailed, and meaningful solution. When introducing a new type of problem, the third part of the scheme is particularly important, as it helps the student develop a new solution tool where a mathematical object (class of objects) is connected with an effective method for investigating it.

The scheme was developed as a tool for working with routine problems, but the author sees its potential for mastering heuristic techniques in solving creative problems, such as those posed in Olympiad Mathematics. Using the scheme is intended to help students initiate the problem-solving process and overcome the frequently encountered "I don't know where to start" problem.

When using the OMA framework, several tasks are simultaneously and purposefully considered: an individual mathematical problem presented in the statement of the problem; the task of finding a solution to this problem; incorporating this problem into a more general class of problems; and independently posing new questions in the described problem situation. These aspects are fundamental for developing the subject and professional competences of future maths teachers.

Drawing on the works of P.Ya. Galperin and his scholars, one can list the distinctive characteristics of the learning outcome responsible for the development of the third type of orientation in students. These include: a) high rationality of action; b) high stability of action; c) broad transfer, including beyond the boundaries of the intended subject area; d) "internal", cognitive motivation; e) optimazation of the learning process; f) a true "sense of the subject", which determines

Table 3. *Solution of problem No. 1 according to the Organizing Mental Activity Framework*
Таблица 3. *Решение задачи 1 согласно схеме организации мыслительной деятельности*

	No.	Description of the student's thinking activity in general		The result of performing the thinking activity
A student is able to	**1. Mathematical problem setting analysis**			
	1	name	the object of study	indefinite integral
	2	formulate	the subject of study	finding the integral value
	3	outline	the answer to the problem (possible variants of the results of object's research)	expression of the form – $F(x)+C$; the set of all antiderivatives of the subintegral function
	4	identify	the research object components	integration variable
				subintegral function
	5	characterize	the research object components in accordance with the requirements of research subject	$x \in D(f)=R$, does not match the $\varphi = 1-x^2$ argument of $g(\varphi)=\cos\varphi$ function
				$f(x)=x\cdot\cos\left(1-x^2\right)$ – the product of two factors, where one factor is the derivative of the argument of the other factor (with an accuracy to a multiplicative constant): $\left(1-x^2\right)'=-2x$
	2. Problem solving			
	1	formulate	the key idea of problem solving (technique of object research)	representation of the integration element in the form $g(\varphi(x))\cdot\varphi'(x)dx=g(\varphi)d\varphi$
	2	select	problem solving "tools" (methods of object research)	bringing a variable under the differential sign
	3	comment on	the application of "tools" at each step of problem solving (process of object research)	see table 4
	4	formulate	an answer to the problem (result of object research)	$-\frac{1}{2}\sin\left(1-x^2\right)+C$
	5	identify	the stages of problem solving (structure of object research)	1) integration element transformation; 2) direct integration; 3) formulation and writing of the answer
	3. Problem solving analysis			
	1	check	the correctness of each step in problem solving (correctness of the process of object research)	no errors were found during the check
	2	assess	the completeness of the solution to the problem (completeness of object research)	the solution is excessively detailed: as experience is gained, items 2–4 and 5–7 can be combined* into a single item (table 4)

Table 3 continued
Продолжение таблицы 3

	No.	Description of the student's thinking activity in general		The result of performing the thinking activity
	3. Problem solving analysis			
A student is able to	3	assess	the rationality of the solution to the problem (rationality of the process of object research)	the solution is rational; the alternative is finding a solution using the variable substitution method
	4	formulate	conclusions on problem solving (comprehensive results of object research)	the method of "bringing a variable under the differential" sign is a generalization of the property of the indefinite integral $\int f(x)dx = F(x)+C \Rightarrow$ $\int f(ax+b)dx = \frac{1}{a}F(ax+b)+C$ for $\varphi(x) \neq ax+b$
	5	analyze	the possibility of transferring the results of problem solution (uniqueness of the research object)	this method can be used in cases when the integration element can be represented as $k \cdot g(\varphi(x)) \cdot \varphi'(x)dx$, i.e., the integration element is a product where one factor is a complex function $g(\varphi(x))$, and the other factor $k \cdot \varphi'(x)$ is, with an accuracy to a multiplicative constant, the derivative of the argument of the first factor

*Note. * This is a stage-by-stage transition of mental actions to the internal plane.*
The teacher controls the following stages: 1) motivation; 2) formation of an orienting basis for future action; 3) materialized actions; 4) external speech actions.

*Примечание. * Речь идет о поэтапном переходе мыслительных действий во внутренний план.*
Под управлением учителя находятся этапы: 1) мотивация; 2) формирование ориентировочной основы будущего действия; 3) материализованные действия; 4) внешнеречевые действия.

***Table 4.** Commenting on the step-by-step solution to problem No. 1*
***Таблица 4.** Комментирование пошагового решения задачи 1*

No.	Action	Commenting
1	$\int x \cdot \cos(1-x^2)dx =$	Let's rewrite the problem statement
2	$-\frac{1}{2} \cdot \int(-2x) \cdot \cos(1-x^2)dx =$	Multiply and divide the integration element by (-2) and place the constant factor $\left(-\frac{1}{2}\right)$ outside the integral sign
3	$-\frac{1}{2} \cdot \int \cos(1-x^2) \cdot (1-x^2)' dx =$	Represent the subintegral function as a product of two factors, one of which is equal to the derivative of the argument of the other factor
4	$-\frac{1}{2} \cdot \int \cos(1-x^2) \cdot d(1-x^2) =$	Bring the variable $1-x^2$ under the differential sign

Table 4 continued
Продолжение таблицы 4

No.	Action	Commenting
5	$-\frac{1}{2}\cdot\int\cos\varphi\cdot d\varphi\Big\vert_{\varphi=\varphi(x)=1-x^2}=$	Represent the integration element as $g(\varphi)\cdot\ d\varphi$, where $\varphi=\varphi(x)=1-x^2$
6	$-\frac{1}{2}\cdot\sin\varphi\Big\vert_{\varphi=\varphi(x)=1-x^2}+C=$	Find the integral using the formula from the table of basic integrals (the argument of the subintegral function coincides with the integration variable)
7	$-\frac{1}{2}\cdot\sin\left(1-x^2\right)+C$	Return to the original integration variable x using the formula $\varphi=1-x^2$

the specific approaches to solving its problems using its inherent means [12]. The use of the OMA framework, as a highly generalized and universal tool for organizing learning, is intended to create the conditions for the emergence of the aforementioned phenomena of the third type of orientation in educational activities related to solving mathematical problems [1; 13].

Organizing mathematical problem-solving activities according to the OMA framework includes:

– orientation of the problem solver in the conditions of the activity (1. Analysis of the mathematical problem setting);

– updating, selection, and application of the activity's tools (2. Problem solving);

– comprehension of the activity being performed and its prospects (3. Analysis of the problem solution).

In other words, it allows implementing a learning model with the third type of orientation, whereby, through analysis of the essential properties and relationships of objects, students master the generalized orientation basis both for a single action and for the activity as a whole. Following the periodization of concepts of orientation within the theory of stage-by-stage action formation and discussing the characteristic distinction between orientation levels of the modern era – strategic, tactical, and operational-technical – then the OMA framework can be positioned as a working tool for organizing strategic-level orientation [8].

Representing a problem situation as a task with the inclusion of interrelated parameters is a culturally acquired psychological tool for thinking. The development of the processes of solving intellectual problems in ontogenesis is associated with the appropriation of the cultural and historical experience of productive thinking as a set of diverse heuristics [14]. The systematic use of the OMA framework in problem solving can be interpreted as a teaching technology when the acquisition of analytical heuristics becomes a manageable process.

In the practice of Russian comprehensive schools, elements of criterion-based learning have become widespread. For example, for assessing student achievement in mathematics, the "knowledge and understanding", "research", "communication", and "reflection" criteria are traditionally distinguished [15]. The author's description of the criteria does not fully coincide with the traditional one and is presented in Table 5 [13]. Due to the ambiguity of the "research" criterion, we will distinguish between the research type of the task itself and research as a method for solving problems that are not research-based in the generally accepted sense and are aimed at mastering mathematical constructs. The instructional OMA framework can serve as a tool for assessing and self-assessing learning outcomes, as it allows analyzing the level of development of specific mental processes.

Let us correlate the learning process steps proposed in the OMA framework (Table 1) with one of the criteria of student achievement assessment: *A*, *B*, *C*, *D* (Table 5) and one of the forms of information-to-knowledge transformation: D – distribution, O – organization, C – classification, V – information verification [13]. This allows comparing the steps of finding solution by complexity and move on to a quantitative analysis of student performance. Moreover, the instructional framework elements can be interpreted as descriptors describing the maximum level of the criteria-based scale for assessing student achievement (Table 6).

A qualitative analysis of the experimental results allows revealing individual differences in the PSA indicator. This demonstrates the influence of the individual characteristics of the experiment participants on the progress made. Possible causes of these differences (motivation for learning, self-regulation characteristics, individual cognitive style, etc.) could be the subject of independent research.

5. CONCLUSIONS

At a 5 % significance level, the hypothesis that special organizational techniques influence the development of students' orientation in learning activities related to solving mathematical problems was confirmed.

The study demonstrated the feasibility of using the developed tool for organizing the teaching of mathematical problem solving using the concept of the stage-by-stage development of mental actions based on the third type of orientation for organizing criteria-based assessment of student achievement.

The developed tool for organizing learning can be recommended for use in the educational process of training

Table 5. *General criteria for assessing students' achievements in the "Mathematics" subject block*
Таблица 5. *Общие критерии оценивания достижений обучающихся в предметном блоке «Математика»*

Criterion designation	Criterion name	Criterion description
A	Knowledge and understanding	The student is able to use the language of mathematics, its laws, regularities, terms, and concepts; apply information to solve problems in familiar and unusual situations
B	Research	The student is able to select and apply appropriate mathematical knowledge, skills, and abilities to solve problems using mathematical modeling techniques
C	Communication	The student is able to concisely and mathematically correctly convey information on planning, conducting, and describing research results in oral and written communications
D	Reflection	The student is able to analyze and summarize a research problem; justify the obtained results and verify their accuracy; point out interdisciplinary connections, if any

Table 6. *Correlating the solution steps in the Organizing Mental Activity framework with the general criteria for assessing students' achievements and forms of information transformation*
Таблица 6. *Соотнесение шагов решения в схеме организации мыслительной деятельности с общими критериями оценивания достижений обучающихся и формами преобразования информации*

Learning Outcome in Terms of Activity				Assessment criterion (Table 5)	Information transformation
A student is able to	**1. Mathematical problem setting analysis**			ABD	DOC
	1	name	the object of study	B	C
	2	formulate	the subject of study	B	C
	3	outline	the answer to the problem (possible variants of the results of object's research)	D	O
	4	identify	the research object components	A	D
	5	characterize	the research object components in accordance with the requirements of research subject	A	D
	2. Problem solving			ABCD	DO
	1	formulate	the key idea of problem solving (technique of object research)	B	O
	2	select	problem solving "tools" (methods of object research)	A	O
	3	comment on	the application of "tools" at each step of problem solving (process of object research)	AC	OD
	4	formulate	an answer to the problem (result of object research)	C	O
	5	identify	the stages of problem solving (structure of object research)	D	O

Table 6 continued
Продолжение таблицы 6

Learning Outcome in Terms of Activity				Assessment criterion (Table 5)	Information transformation
A student is able to	**3. Problem solving analysis**			ABCD	DOCV
	1	check	the correctness of each step in problem solving (correctness of the process of object research)	D	V
	2	assess	the completeness of the solution to the problem (completeness of object research)	D	V
	3	assess	the rationality of the solution to the problem (rationality of the process of object research)	D	V
	4	formulate	conclusions on problem solving (comprehensive results of object research)	ABCD	DOC
	5	analyze	the possibility of transferring the results of problem solution (uniqueness of the research object)	ABCD	DOC

Note. The letters indicate the leading forms of information transformation into knowledge for a given stage of work with the task: D is distribution, O is organization, C is classification, V is information verification.

Примечание. Буквами обозначены ведущие для данного этапа работы с задачей формы преобразования информации в знание: D – разнесение; O – организация; C – классификация; V – проверка информации.

future mathematics teachers when acquiring the material of the "Integral Calculus of One Real Variable Functions" topic within Mathematical Analysis discipline.

The study confirmed the author's main idea: the developed structure for organizing the process of thinkingis an effective tool for teaching mathematical problem solving. The Organizing Mental Activity Framework can be used as a technological tool for organizing the process of problem solving teaching when training mathematics teachers.

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Технология организации решения математических задач с использованием концепции поэтапного формирования умственных действий и критериального оценивания при обучении будущих учителей математики

Макеева Ольга Викторовна, кандидат физико-математических наук,
доцент кафедры высшей математики
Ульяновский государственный педагогический университет имени И.Н. Ульянова, Ульяновск (Россия)

E-mail: mov_ulspu@mail.ru ORCID: https://orcid.org/0000-0003-4345-2296

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Аннотация: Математическое знание в силу специфики его освоения через решение задач играет особую роль в процессе развития различных форм мышления. В ходе решения математических задач за счет интериоризации эвристических приемов происходит формирование культурной формы творческого мышления. На усвоение аналитических эвристик могут оказывать влияние специальные приемы организации процесса обучения. В работе описан инструмент организации обучения решению математических задач как процесса, направленного на формирование ориентиров – эвристик согласно третьему типу ориентировки теории поэтапного формирования умственных действий П.Я. Гальперина. Приведены результаты формирующего эксперимента по освоению предложенной конструкции (схемы организации мыслительной деятельности, далее – ОМД) будущими учителями математики в процессе изучения интегрального исчисления функций одной переменной. С помощью *U*-критерия Манна – Уитни получены статистически значимые различия в уровнях сформированности эвристики «Анализ постановки задачи» в контрольной и экспериментальной группах. В связи с малочисленностью групп проведен качественный анализ результатов эксперимента. Показана возможность использования схемы ОМД для реализации стратегии полного усвоения и формирующего оценивания. Как предполагается, систематическое использование схемы ОМД в процессе обучения решению задач реализует технологию обучения с третьим типом ориентировки и целесообразно при подготовке учителей математики.

Ключевые слова: обучение решению математических задач; теория поэтапного формирования умственных действий; третий тип ориентировки; формирующее оценивание; полное усвоение; подготовка учителя математики; интегральное исчисление функций одной переменной.

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PSYCHOLOGY

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Burnout and quality of working life among Russian and Indonesian teachers: a pilot study

Rofika Dewi Maulina*[1], Master (Psychology), lecturer
Irina L. Aristova[2], PhD (Psychology), Associate Professor
[1]*University of Muhammadiyah Malang, Malang (Indonesia)*
[2]*Far Eastern Federal University, Vladivostok (Russia)*

***E-mail:** rofikadewi@umm.ac.id [1]ORCID: https://orcid.org/0009-0007-8004-2938

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Abstract: Innovative changes in education have significantly increased teachers' workload and stress levels, leading to higher rates of burnout. This burnout adversely affects both their professional performance and personal well-being, highlighting the urgent need to address teachers' mental health as a key factor in improving educational quality and effectiveness. This pilot study aims to explore the relationship between burnout and quality of working life (QWL) among school teachers in Bangkalan, Indonesia and Vladivostok, Russia, and to compare the levels of burnout and QWL between these two countries. Using a correlational research design, data were collected from a sample of 60 teachers, with 30 participants from Bangkalan, Indonesia and 30 from Vladivostok, Russia. Data analysis included correlation analysis to examine the relationship between burnout and QWL and comparative statistical tests to identify differences between groups. The results indicate a significant negative correlation between burnout and QWL in both countries, demonstrating that increased burnout is associated with a decreased quality of working life. Furthermore, the analysis revealed a significant difference in burnout levels, with Russian teachers experiencing higher burnout than their Indonesian counterparts. However, no statistically significant difference was found in the overall QWL between the two groups. These findings underscore the importance of developing targeted interventions to support teachers' mental health and improve their working conditions in order to enhance educational outcomes.

Keywords: burnout; quality of working life; teachers; mental health; cross-cultural comparison.

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INTRODUCTION

In the modern world, the problem of teachers' burnout remains relevant. Innovative changes in education increasingly place demands on teachers, thereby increasing workload and stress levels, eventually leading to burnout. Teaching involves not only the transfer of knowledge to students, but also the formation of their personal qualities. Teachers are an important human resource in educational organisations and play a critical role in improving student development, achievement and quality of education.

Burnout, defined as a syndrome of emotional exhaustion, depersonalisation, and reduced personal accomplishment resulting from emotionally demanding work, has a detrimental impact on teachers' professional performance and overall well-being [1]. This issue is particularly critical in the education sector, as supporting teachers' mental health contributes directly to the effectiveness and quality of their work life, which ultimately affects student outcomes and the broader quality of education.

Teachers are especially vulnerable to burnout due to the emotional and psychological demands inherent in their profession. Research has shown that teachers experience higher levels of burnout compared to other professionals, such as nurses and doctors [2]. Specifically, 34 % of teachers were found to have high levels of emotional exhaustion, while 48 % reported moderate levels [3]. A systematic review has identified several key determinants of teachers' burnout, including job satisfaction, workplace stress, classroom climate, teachers' self-efficacy, neuroticism, perceived collective burnout, and classroom disruption [4]. Emotional exhaustion, a core dimension of burnout, is strongly associated with job dissatisfaction and reduced quality of working life, which may hinder both professional effectiveness and personal well-being [5].

In parallel, the concept of Quality of Working Life (QWL) has gained increasing attention. QWL refers to employees' perceptions of their work environment and experiences, specifically, how effectively the workplace meets their personal needs and values [6]. Numerous studies have established a significant negative relationship between burnout and QWL: higher burnout levels are associated with lower QWL, while a supportive and motivating work environment can help mitigate burnout.

Several studies from various professions further confirm this relationship. For example, Surawattanasakul, Kiratipaisarl, and Siviroj (2024) found that burnout, specifically emotional exhaustion, depersonalisation, and reduced personal accomplishment, significantly impacts the QWL

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experienced by physicians during their internship [7]. Similarly, Sun et al. (2020) reported that an increase in nurses' quality of working life was associated with a decrease in professional burnout [8]. Furthermore, a study by Salehi, Seyyed, and Farhangdoust (2020) found that burnout was significantly influenced by personal characteristics, QWL, and psychological well-being [9].

Previous research has extensively investigated the phenomena of burnout and QWL across various professions, including nurses, doctors, and general employees. However, studies specifically examining the relationship between burnout and QWL among teachers are relatively limited. Furthermore, research that explores how these variables manifest and interact in different geographical and cultural settings, particularly in Indonesia and Russia, remains scarce.

To begin addressing this gap, the current research was designed as a pilot study focusing on teachers from Bangkalan, Indonesia and Vladivostok, Russia. Rather than aiming for national generalisation, this exploratory study seeks to identify preliminary patterns and assess the feasibility of conducting a broader cross-cultural investigation in the future.

Based on the background described above, this pilot study aims to explore the relationship between burnout and quality of working life (QWL) among teachers in a selected city in Indonesia and a selected city in Russia. In addition, the study intends to examine whether there are significant differences in the levels of burnout and QWL between the two teacher groups.

METHODS

This study employed a correlational pilot design to explore the relationship between burnout and QWL among teachers. A simple random sampling technique was used within a limited scope to recruit a total of 60 participants, comprising 30 teachers from Bangkalan, Indonesia, and 30 teachers from Vladivostok, Russia. The Indonesian participants were recruited from a public senior high school in Bangkalan, while the Russian participants were selected from two general secondary schools in Vladivostok. All participants were responsible for teaching general academic subjects across various grade levels. Although subject specialisation was not the main focus of the study, the sample was limited to general education teachers to ensure consistency. All schools involved were state-run secondary institutions, providing a comparable institutional context for both groups and supporting the relative homogeneity of the sample in terms of teaching role and school setting.

Table 1 presents the demographic characteristics of the teacher participants from both countries. Gender, age, and teaching experience were distributed relatively similarly across groups, ensuring a degree of comparability in demographic characteristics.

Table 1. *Demographic characteristics of teacher State secondary school in Indonesia and Russia*
Таблица 1. *Демографические характеристики учителей государственных средних школ из Индонезии и России*

Variable	Bangkalan (Indonesia)	Vladivostok (Russia)
Number of participants	30	30
Gender		
Male	6	4
Female	24	26
Age		
20–29	13	10
30–39	14	5
40–49	3	7
50–59	0	6
60 years and more	0	0
Teaching experience		
<1 year	4	4
1–3 years	7	7
4–6 years	4	3
7–9 years	4	2
10 years and more	11	14

To explore potential differences in burnout and QWL levels between the two groups, comparative statistical analyses were conducted. The analysis focused on identifying whether there were statistically significant differences between the two teacher samples. A *p*-value less than 0.05 ($p<0.05$) was considered indicative of a statistically significant difference, while *p*-values equal to or greater than 0.05 ($p\geq0.05$) were interpreted as showing no significant difference. The analysis used the Asymptotic Significance (2-tailed) value as the decision criterion.

The instruments used to measure the two variables are the Copenhagen Burnout Inventory (CBI) by Kristensen et al. (2005) [10] and the Work-related Quality of Life Scale (WRQoL) by Easton and Van Laar (2018) [11].

Burnout was assessed using the Copenhagen Burnout Inventory (CBI). The original CBI developed by Kristensen et al. (2005) consists of three subscales: personal burnout, work-related burnout, and client-related burnout. In the present study, the personal burnout (6 items) and work-related burnout (7 items) subscales were taken from the original version. The third subscale (6 items) was adapted by replacing the term 'client' with 'colleague'. All items, scoring, and the underlying construct remain consistent with the original CBI. Thus, three dimensions were assessed in total: personal burnout, work-related burnout, and colleague-related burnout. Personal burnout relates to physical and psychological exhaustion and overwork experienced, work-related burnout refers to a person's attribution of burnout symptoms due to their work, and colleague-related burnout is the extent to factors related to their interactions with colleagues of their work. Participants rated how often they experienced these feelings on a 5-point scale ranging from 0 (never) to 4 (always) [10].

The Work-related Quality of Life Scale (WRQoL) is used to assess the overall quality of working life among employees. Developed by British psychologists Easton S. and Van Laar D., the instrument consists of six key dimensions: general well-being, home–work interface, job and career satisfaction, control at work, working conditions, and stress at work. In this study, the structure and scoring guidelines followed those outlined in the official WRQoL user manual [11]. The psychometric properties of the scale, including its factorial validity, internal consistency, and applicability in education settings have been supported in prior peer-reviewed research, particularly in a study involving higher education employees in the United Kingdom [12]. This provides a sound empirical foundation for the use of WRQoL in cross-cultural and occupational contexts, including teaching.

Data collection was carried out using a Google Form which was sent to respondents so that they could participate at a time and place that was convenient for them. Then, data were processed and analyzed using the SPSS statistical program.

RESULTS

The results of statistical analysis of the relationship between emotional burnout and the quality of teachers' work life in Indonesia and Russia are presented in Table 2. Based on the results obtained, the significance value of burnout and quality of working life for teachers in both countries is <0.05. This means that there is a significant relationship between burnout and quality of teachers' work life. The data obtained also shows that burnout has a significant negative relationship with quality of teachers' work life in both countries, namely −0.365 and −0.552.

Next, researchers determined whether there were differences in burnout and quality of working life between Russian and Indonesian teachers. The results of this test are shown in Table 3. From the Table 3, the asymptotic *p*-value / Asymp. Sig. (2-tailed) for burnout is <0.05, which indicates that there is a statistically significant difference between the groups of Russian and Indonesian teachers. Based on the results of calculating the average score, it can also be seen that the burnout scores of Russian teachers are higher than Indonesian teachers (70.48>44.9).

Then, for the differences in the teachers' quality working life in Russia and Indonesia, it was found that the asymptotic *p*-value was >0.05. This means that there are no statistically significant differences between groups of teachers in Russia and Indonesia in terms of overall quality of working life. Even if we look at the average scores of the quality of working life of teachers in these two countries, it suggests that the scores are very similar: Indonesian teachers – 82.33, Russian teachers – 82.03.

From Table 4, it can be seen that Russian teachers had higher average scores in all burnout dimensions. The highest score was in personal burnout (M=75.27), followed by work-related burnout (M=72.92), and colleague-related burnout (M=65.94). Indonesian teachers, on the other hand, showed moderate levels in personal burnout (M=54.13), and lower scores in work-related burnout (M=45.67) and colleague-

Table 2. *Significant correlations of variables among teachers respondents in Indonesia and Russia, N=30*
Таблица 2. *Значимые корреляции переменных среди опрошенных учителей в Индонезии и России, N=30*

CBI	WRQoL	
	Correlation coefficient	**Sig. (2-tailed)**
Indonesian	−0.365*	0.047
Russian	−0.552**	0.002

*Note. * is significant at the 0.05 level (two-sided); ** is significant at the 0.01 level (two-tailed).*
CBI is Burnout; WRQoL is Quality of working life.

*Примечание. * – значимо на уровне 0,05 (двусторонний тест); ** – значимо на уровне 0,01 (двусторонний тест).*
CBI – выгорание; WRQoL – качество трудовой жизни.

Table 3. *Comparison of differences of burnout and quality of working life among teachers in Indonesia and Russia*
Таблица 3. *Сравнение различий в выгорании и качестве трудовой жизни учителей в Индонезии и России*

Method	Asymp. Sig. (2-tailed)	Average value	
		Russia	Indonesia
Burnout (CBI)	<0.001**	70.48	44.9
Quality of working life (WRQoL)	0.796	82.03	82.33

*Note. * is significant at the 0.05 level (two-sided); ** is significant at the 0.01 level (two-tailed).*
*Примечание. * – значимо на уровне 0,05 (двусторонний тест); ** – значимо на уровне 0,01 (двусторонний тест).*

Table 4. *Descriptive statistics for burnout dimensions (CBI) among Indonesian and Russian teachers, N=30*
Таблица 4. *Описательная статистика по уровню выгорания (CBI) индонезийских и российских учителей, N=30*

CBI dimension	Country	Mean
Personal burnout	Indonesia	54.13
	Russia	75.27
Work-related burnout	Indonesia	45.67
	Russia	72.92
Colleague-related burnout	Indonesia	34.83
	Russia	65.94

related burnout (M=34.83). The total burnout score was also higher for Russian teachers (M=70.48) compared to Indonesian teachers (M=44.90), which suggests that burnout levels were generally higher among teachers in Russia.

From Table 5, the total WRQoL scores for Indonesian and Russian teachers are very similar (Indonesia: M=82.33; Russia: M=82.03). However, there are clear differences in several dimensions. Indonesian teachers scored higher in job and career satisfaction (M=23.33) and general well-being (M=21.17). Meanwhile, Russian teachers scored higher in home–work interface (M=21.07) and control at work (M=22.63). The stress at work score was also higher among Russian teachers (M=11.53) compared to Indonesian teachers (M=4.37), showing that Russian teachers reported feeling more stressed in their work.

DISCUSSION

The results of this study confirm a significant relationship between burnout and QWL among teachers. Specifically, a significant negative correlation was found between the two variables in both Indonesian and Russian teachers samples. The data showed a correlation coefficient of −0.365 with a significance value of 0.047 for Indonesian teachers, and −0.552 with a significance value of 0.002 for Russian teachers. Both *p*-values (<0.05 and <0.01) indicate that these relationships are statistically significant.

This significant negative relationship means that the higher the level of burnout experienced by teachers, the lower their quality of working life, and vice versa. These findings are consistent with previous research in other occupational settings. For instance, a study by Pereira et al. (2022), which involved 459 municipal workers in Portugal during the COVID-19 pandemic, found that all three dimensions of burnout: emotional exhaustion, cynicism, and low effectiveness, were significantly and negatively associated with quality of working life [13]. Additionally, studies by Surawattanasakul, Kiratipaisarl, and Siviroj (2024) on physicians, Sun et al. (2020) on nurses, and Salehi, Seyyed, and Farhangdoust (2020) on auditors also demonstrated a negative relationship between burnout and QWL [7–9]. This indicates that the link between these two variables is a consistent phenomenon across various professions, including teaching, a profession with unique demands.

Understanding this relationship is crucial, as it has important implications for teachers well-being and teaching effectiveness. A high level of QWL, which includes a supportive work environment where teachers' personal needs are met, professional and career development is encouraged, and interpersonal relationships at school are democratic and positive, can help prevent burnout [14]. Such an environment fosters motivation and satisfaction. Teachers with good QWL tend to be more engaged, motivated, and satisfied with their work, which ultimately enhances both teaching effectiveness and their overall well-being. Conversely, high levels of burnout can negatively affect multiple aspects of a teachers' professional life, including reduced teaching effectiveness, physical and mental health issues, strained relationships with students and colleagues, and lower job satisfaction.

Table 5. *Descriptive statistics for work-related quality of life (WRQoL) dimensions among Indonesian and Russian teachers, N=30*
Таблица 5. *Описательная статистика по качеству трудовой жизни (WRQoL) индонезийских и российских учителей, N=30*

WRQoL dimension	Country	Mean
General well-being	Indonesia	21.17
	Russia	20.93
Home–work interface	Indonesia	11.30
	Russia	21.07
Job and career satisfaction	Indonesia	23.33
	Russia	10.07
Control at work	Indonesia	10.90
	Russia	22.63
Working conditions	Indonesia	11.27
	Russia	10.77
Stress at work	Indonesia	4.37
	Russia	11.53

In addition to confirming the negative relationship between burnout and QWL, this study also reveals a significant difference in burnout levels between Indonesian and Russian teachers. Specifically, Russian teachers reported a significantly higher average burnout score (M=70.48) compared to Indonesian teachers (M=44.9). This difference was statistically significant at the 0.01 level. The analysis of burnout dimensions, as shown in Table 3, revealed consistent differences between the two groups. Russian teachers experienced higher burnout not only overall, but also in each specific dimension. Personal burnout, which reflects physical and emotional exhaustion, was the highest among Russian teachers. This may suggest greater stress or fatigue related to their working conditions. Higher scores in work-related and colleague-related burnout also point to possible pressures from job roles and interactions in the workplace. These findings may be related to contextual challenges such as heavy workload, lack of institutional support, or broader socio-economic factors affecting teachers in Russia. In comparison, Indonesian teachers reported more moderate levels of burnout, especially in the interpersonal domain, which may reflect different cultural, organisational, or systemic conditions.

This significant disparity can be explained by differing contextual and country-specific factors, which serve as key criteria for interpreting the observed variation. According to Gorblyansky, Ponamareva, and Kontorovich (2019), several factors have been identified as contributing to higher levels of burnout among Russian teachers, including longer work experience, demands to work on weekends and holidays, dissatisfaction with work schedules, and spending excessive time dealing with work-related issues [15]. These factors reflect the generally more intense workload and pressure within the Russian education system, such as large class sizes, high administrative burdens, and limited resources. Long working hours, lack of structured rest periods, and limited control over work routines may further increase emotional exhaustion and depersonalisation, two core components of burnout.

Meanwhile, Indonesian teachers also experience high workloads, including not only teaching duties but also a significant amount of administrative tasks. Other contributing factors include frequently changing curricula, rigid school policies, and national-level accountability pressures. However, the lower average burnout level reported by Indonesian teachers may be influenced by an important distinguishing factor: gratitude. A study on teachers in Indonesia found that individuals with higher levels of gratitude reported significantly greater job satisfaction. This sense of gratitude, despite challenges such as limited compensation or temporary employment was associated with stronger psychological well-being and a more positive attitude toward their teaching roles, which may serve as a protective factor against emotional exhaustion and other symptoms of burnout [16]. Supporting this, other research demonstrated a significant negative relationship between gratitude and burnout, specifically emotional exhaustion and depersonalisation. Gratitude also mediated the relationship between social support and burnout, indicating that teachers with higher gratitude were less affected by burnout even when facing demanding work conditions [17]. Similarly, other research indicated that teachers with higher gratitude also experienced greater work engagement and lower levels of burnout [18]. This effect may serve as protective mechanisms against burnout among Indonesian teachers.

Interestingly, despite the significant difference in burnout levels between Indonesian and Russian teachers, as discussed earlier, the results of this study indicate that there

is no statistically significant difference in the level of QWL experienced by teachers in both countries. Table 3 shows that the asymptotic significance value (*p*-value) for QWL is 0.796, which is greater than 0.05, confirming that the observed difference is not statistically significant. The mean scores also indicate a very similar QWL for both groups: 82.3 for Indonesian teachers and 82.03 for Russian teachers. These findings suggest that teachers in both countries, overall, report a moderate level of QWL.

This similarity in QWL levels, despite differing educational contexts and burnout-related factors, may be explained by a combination of contextual influences. One common contributing factor may be the teachers' shared perception of their profession. Teachers in both Indonesia and Russia tend to view teaching as a valuable and meaningful profession that contributes to personal fulfillment and job satisfaction. Moreover, societal recognition and respect for the teaching profession in both countries may foster a sense of pride and appreciation, positively influencing their overall perception of QWL.

In Russia, QWL is shaped by multiple factors, including years of professional experience and varying skill levels. Teachers with more than five years of experience are reportedly better able to manage bureaucratic fatigue, which may contribute to a higher quality of working life. In contrast, less experienced teachers (with fewer than three years of service) tend to report lower satisfaction with the socio-psychological climate at school, possibly due to limited communication skills when interacting with more senior colleagues [19]. Additional structural and interpersonal factors also play a role in shaping QWL among Russian teachers. Zvyagintsev et al. (2022) identified administrative burden, limited opportunities for career advancement, lack of recognition, and weak collegial support as key obstacles to occupational well-being in Russian schools [20]. In the literature, well-being is commonly regarded as a core component of QWL, encompassing emotional, psychological, and social aspects of working life.

In Indonesia, similar factors have been found to influence teachers' QWL, including a supportive work environment, work motivation, general well-being, family support, health, workload, job satisfaction, self-esteem, competence, work loyalty, discipline, remuneration, and opportunities for professional development [21]. Additionally, Indonesian teachers also associate good QWL with safe and healthy working conditions, standardised working hours, and manageable workloads.

These findings suggest that although national and institutional contexts differ, many core elements such as emotional well-being, development opportunities, and support, are consistently valued by teachers in both countries. While the specific constellation of influencing factors may vary between Indonesia and Russia, a combination of generally shared components (such as professional meaning and perceived societal appreciation) and context-specific conditions (including workload, interpersonal dynamics, and systemic support structures) appears to contribute to a relative equilibrium. This balance may help explain why the QWL reported by teachers in both countries remains at a comparable and moderate level.

While the total WRQoL scores were nearly identical across both groups, the dimension-level analysis revealed several notable differences (see Table 5). Russian teachers reported higher scores in home–work interface and control at work, suggesting greater perceived flexibility and autonomy. According to Zvyagintsev et al. (2022), Russian teachers often have longer teaching experience and may benefit from greater decision-making authority, particularly in pedagogical matters, despite existing bureaucratic constraints. Moreover, although they face systemic stressors such as administrative overload and low salaries, many report relatively high levels of job satisfaction. One contributing factor may be their participation in professional associations and accumulated teaching experience both of which have been linked to higher occupational well-being and a stronger sense of professional agency [20]. These factors may enhance teachers' perception of control over their work environment and responsibilities. In turn, this sense of control may support a better integration of work and personal life, helping to explain the higher scores in home–work interface and control at work observed among Russian teachers in this study.

In contrast, Indonesian teachers showed higher levels of job and career satisfaction and general well-being. These patterns may reflect not structural advantages, but rather intrinsic motivation, strong affective attachment to their roles, and personal or spiritual values that shape how teachers perceive their work. A study on teachers in Tegal, Indonesia, found that work motivation particularly intrinsic factors such as commitment, task responsibility, and the need for achievement, was significantly related to teacher performance. These internal psychological factors may explain the higher job and career satisfaction and general well-being among Indonesian teachers, despite various structural challenges [22].

The key findings of this study confirm the negative relationship between burnout and QWL among teachers in both Indonesia and Russia. The results also show that Russian teachers reported higher levels of burnout, even though the total QWL scores in both countries were very similar. This suggests that improving QWL could be an important strategy to reduce teacher burnout and its impact on well-being and professional performance. However, such efforts need to consider each country's specific context, including differences in workload, support systems, and educational policies.

Even so, this study has certain limitations. The relatively small sample size and limited geographic coverage may reduce the generalisability of the findings. Nonetheless, this is, to our knowledge, the first study to examine burnout and QWL among Russian teachers using both the CBI and the WRQoL. The lack of previous studies using these instruments in this population limits direct comparison, but at the same time underscores the originality and relevance of the current research. Moreover, due to the correlational design, no causal conclusions can be drawn. Future research is encouraged to include larger, more diverse samples and to adopt longitudinal or experimental approaches to better explore the dynamics between burnout and QWL across different educational and cultural contexts.

Despite these limitations, the study offers meaningful preliminary insights. A better understanding of the relationship between teacher burnout and QWL can inform future efforts to enhance teacher well-being and professional sustainability. In addition, this research contributes to the expanding cross-cultural literature by highlighting the significance of contextual and cultural influences in shaping teachers' work experiences.

CONCLUSIONS

The findings of this pilot study revealed a statistically significant negative correlation between burnout and quality of working life (QWL) among teachers in both Indonesia and Russia, suggesting that higher levels of burnout are associated with lower perceived QWL. Additionally, the results showed a significant difference in burnout levels, with teachers from Russia reporting notably higher burnout than their Indonesian counterparts. This difference may be explained by contextual and cultural characteristics unique to each country.

Interestingly, despite the disparity in burnout levels, no statistically significant difference was found in the overall QWL between the two groups. Teachers from both countries reported moderate levels of QWL, indicating that a combination of shared and unique influences may shape their work-life experiences in complex ways.

These preliminary findings highlight the potential importance of QWL in mitigating teachers' burnout and its adverse impact on well-being and professional functioning. They also point to the need for context-sensitive support strategies tailored to the specific educational and cultural environments in which teachers operate.

While the study is limited by its small, localised sample and correlational design, it offers early cross-cultural insights and serves as a foundation for future research. Subsequent studies should aim to explore causal mechanisms using larger, more diverse samples and longitudinal or experimental approaches to inform more effective and scalable interventions.

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Выгорание и качество трудовой жизни российских и индонезийских учителей: пилотное исследование

Маулина Рофика Деви*[1], магистр психологии, преподаватель
Аристова Ирина Леонидовна[2], кандидат психологических наук, доцент
[1]*Университет Мухаммадия Маланг, Маланг (Индонезия)*
[2]*Дальневосточный федеральный университет, Владивосток (Россия)*

***E-mail:** rofikadewi@umm.ac.id [1]ORCID: https://orcid.org/0009-0007-8004-2938

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Аннотация: Инновационные изменения в образовании значительно увеличили рабочую нагрузку и уровень стресса учителей, что привело к их более частому выгоранию. Выгорание негативно сказывается на профессиональной деятельности и личном благополучии, что подчеркивает необходимость решения проблемы психического здоровья учителей как ключевого фактора повышения качества и эффективности образования. Целью пилотного исследования является изучение взаимосвязи между выгоранием и качеством трудовой жизни (КТЖ) школьных учителей в Бангкалане (Индонезия) и Владивостоке (Россия), а также сравнение уровней выгорания и КТЖ в этих двух странах. Были собраны данные у 60 учителей: по 30 участников из Бангкалана и Владивостока. Анализ данных включал корреляционный анализ для изучения связи между выгоранием и КТЖ, а также сравнительные статистические тесты для выявления различий между группами участников. Результаты показали значимую отрицательную корреляцию между выгоранием и КТЖ в обеих странах, что демонстрирует связь между ростом выгорания и снижением качества трудовой жизни. Кроме того, анализ выявил существенные различия в уровне выгорания: российские учителя испытывают его в большей степени по сравнению с индонезийскими. Однако статистически значимых различий в общем уровне КТЖ между двумя группами выявлено не было. Эти выводы подчеркивают важность разработки целевых мер по поддержке психического здоровья учителей и улучшению условий их труда в целях повышения качества образования.

Ключевые слова: выгорание; качество трудовой жизни; учителя; психическое здоровье; межкультурное сравнение.

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OUR AUTHORS

Akopyan Viktor Albertovich, PhD (Pedagogy), Associate Professor,
Minister of Education of the Samara Region.
Address: Ministry of Education of the Samara Region,
443099, Russia, Samara, A. Tolstoy Street, 38/16.
E-mail: ava1977@mail.ru

Aristova Irina Leonidovna, PhD (Psychology), Associate Professor.
Address: Far Eastern Federal University,
690922, Russia, Vladivostok, Russky Island, Ajax Settlement, 10.
E-mail: aristova.il@dvfu.ru

Kravtsun Igor Andreevich, adjunct of the postgraduate course.
Address: St. Petersburg University of the MIA of Russia,
198206, Russia, St. Petersburg, Pilot Pilyutov Street, 1.
E-mail: kravia52@gmail.com

Makeeva Olga Viktorovna, PhD (Physics and Mathematics),
assistant professor of Chair of Higher Mathematics.
Address: Ulyanovsk State Pedagogical University,
432071, Russia, Ulyanovsk, Lenin Square, 4/5.
E-mail: mov_ulspu@mail.ru

Maulina Rofika Dewi, Master (Psychology), lecturer.
Address: University of Muhammadiyah Malang,
65113, Indonesia, Malang, Jl. Bandung, 1.
E-mail: rofikadewi@umm.ac.id

НАШИ АВТОРЫ

Акопьян Виктор Альбертович, кандидат педагогических наук, доцент,
министр образования Самарской области.
Адрес: Министерство образования Самарской области,
443099, Россия, г. Самара, ул. А. Толстого, 38/16.
E-mail: ava1977@mail.ru

Аристова Ирина Леонидовна, кандидат психологических наук, доцент.
Адрес: Дальневосточный федеральный университет,
690922, Россия, г. Владивосток, о. Русский, п. Аякс, 10.
E-mail: aristova.il@dvfu.ru

Кравцун Игорь Андреевич, адъюнкт адъюнктуры.
Адрес: Санкт-Петербургский университет МВД России,
198206, Россия, г. Санкт-Петербург, ул. Лётчика Пилютова, 1.
E-mail: kravia52@gmail.com

Макеева Ольга Викторовна, кандидат физико-математических наук,
доцент кафедры высшей математики.
Адрес: Ульяновский государственный педагогический университет имени И.Н. Ульянова,
432071, Россия, г. Ульяновск, пл. Ленина, 4/5.
E-mail: mov_ulspu@mail.ru

Маулина Рофика Деви, магистр психологии, преподаватель.
Адрес: Университет Мухаммадия Маланг,
65113, Индонезия, г. Маланг, ул. Бандунг, 1.
E-mail: rofikadewi@umm.ac.id

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