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About

• The scientific Education & Pedagogy Journal aims to make the results of scientific research and practical activities in the field of pedagogy of education mutually accessible for international and Russian specialists.
• The founder of the journal is Tomsk State Pedagogical University.

The journal publishes:

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• original articles in English devoted to the most pressing problems of the theory, practice, philosophy, and history of education. Moreover, authors will be given the opportunity to publish Russian translations of these articles in other TSPU journals.

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Publication frequency is two issues per year.

Call for papers for the upcoming issue is open.
QUALITY OF THE SECONDARY SCHOOL EDUCATIONAL ENVIRONMENT: A COMPARATIVE STUDY USING THE SACERS RATING SCALE*  

E.V. Ivanova¹, I.A. Vinogradova¹, O.V. Nesterova²  

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² Center for the Development of Regional Systems of Inclusive Professional Education of the Federal State Educational Institution of Higher Professional Education “GINFO,” Moscow, Russian Federation  

The quality of education is the main priority in most states’ policy, and Russia is no exception. Russia pays much attention to the accessibility of quality education for all citizens regardless of their place of residence and social status. The quality of education is considered a complex characteristic of educational activity and students’ training. We will consider it within the framework of this article in the context of the assessment and development of the school educational environment. The quality of the educational environment is provided by the following factors: content components relating to the interaction between participants of an educational relationship; organization of the educational process; conditions for professional staff growth and comfortable environment for exceptional children.

The study using the SACERS rating scale revealed that schools in different districts of the metropolitan area differ in terms of providing students with equal conditions in their educational environment. The most significant differences were revealed in the following components of the educational environment: the creation of organizational conditions for extracurricular activities and additional education; interior solutions to ensure privacy, the comfort of communication, and motor activity; conditions for the learning and development of students with special educational needs. The study showed that schools with a higher quality index of the educational environment have quite homogeneous educational conditions. They provide relatively equal access to quality education compared to a group of structural units with a lower quality index. The differences in the compared educational organizations specifying the heterogeneity of educational conditions are related to characteristics such as the variability or uniformity in the use of resources, resource availability or its active use, whether it is a systematic or fragmented working process, and the focus on control norms or development.

**Keywords:** variability and use of school resources, quality of the educational environment, heterogeneity of educational conditions, educational environment, equal access to quality education, SACERS rating scale, schools with different educational environment quality indices.

Today, the issues of providing equal access to quality education are relevant not only for the Russian Federation but for many countries. In Russia, access to quality education for all citizens regardless of their place of residence and social status is a priority goal of the State’s policy on education.

What constitutes quality education today? How can educational organizations, many of them lacking resources, integrate the traditional approach to education and the new demands of our

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time? These new demands include flexible curricula, staff training, retraining, continually updated textbooks and materials, access to new information and communication technologies, and deep international cooperation. It should be noted that the search for answers to these questions has been going on for quite some time, as the idea of what education should be is changing alongside society’s development.

According to the results of international comparative studies (PISA, PIRLS, TIMSS, ICCS, ICILS), the Russian Federation demonstrates positive results in ensuring education equality. Russian students show the lowest Achievement gap among students from the highest and lowest socio-economic groups [1].

The improvement of education quality at a state and educational organization level is carried out as follows: through assessing the quality of training (learning achievements) and the educational activities conditions; through improving the quality of management decisions; through the development of educational conditions in educational organizations.

According to World Bank experts, Russia’s effectiveness in ensuring equal educational opportunities for students to receive a quality education is determined by serious and sustainable measures to improve educational policy and focus on building educational infrastructure [1].

The study revealed that Moscow’s educational infrastructure has a much higher index than other regions, both in the education system as a whole and in the context of general education [2, 3]. The positive dynamics in Moscow’s education quality was revealed in the framework of the independent assessment, which was carried out according to criteria such as openness and accessibility of information about the organization; comfort conditions; service accessibility for exceptional children; friendliness, politeness of the social sphere employees; satisfaction with the conditions of services [4]. Thus the quality of education should be considered. First, it is necessary to consider a change in dynamics. Secondly, consider those resources through which specific results have been achieved [5, 6].

The results of research among the schools in the capital region allowed us to get a diverse view on the heterogeneous development of educational conditions, which requires finding management solutions that guarantee quality learning for each school student [7, 8].

Most parents associate education attainment with life success and place high demands on the quality of education [9]. At the same time, it should be noted that the availability of high-quality education differs between the administrative districts of Moscow. Children from the city center have a better opportunity of getting a quality education, even if their parents do not search for the best school for their child.

The outlined contradiction between the apparent progress in ensuring equal access to quality education, both nationwide and in the metropolitan region, and the presence of sure signs of Elitism in education has led to an interest in this problem and an empirical study of the educational environment in Moscow schools.

Methods and organization of research into the educational environment using the SACERS rating scale

SACERS (School-Age Care Environment Rating Scale) [10, 11] was used as an independent instrument to assess the educational environment. In the present study, we used a version of the method adapted to the conditions of the Russian school system [12, 13].

The SACERS scales are a logical continuation of the international educational environment diagnostic line, in particular of the ECERS-R scale which was designed to study the quality of preschool education [14–16].

The SACERS methodology consists of seven scales: Indoor Space and Furnishings, Health and Safety, Activities, Interactions, Program Structure, Staff Development, Special Needs
Supplementary Items. These scales are represented by forty-eight indicators. Each is assessed on a 7-point scale, which reveals the level of development of the educational environment: Poor, Minimal, Good, and Excellent.

The study of the educational environment in Moscow schools was conducted using a random sample – 58 structural units of educational organizations in Moscow from nine districts (Central, Northern, North-Eastern, Eastern, South-Eastern, Southern, South-Western, Western, and North-Western).

Research methods: participant observation, survey. Methods of mathematical data processing: mean, variance, standard variations, medians, contingency tables, a confidence interval for the mean, Student’s T-test by Welch’s method, analysis of variance.

**Research results of the educational environment using the SACERS rating scale**

Let us turn to the research results of the Moscow schools’ educational environment using the SACERS scales. The quality index of the Moscow schools’ educational environment amounts to 5.21 points. This value represents a Good level of development of the educational environment and indicates the sufficient potential of Moscow educational organizations in terms of creating educational conditions.

The highest values were obtained in the following scales: Interaction (5.81 scores), Staff Development (5.63 scores), Program Structure (5.34 scores).

High scores indicate:

- a good potential of Moscow schools in terms of interaction between students and staff, staff and students, and staff and parents
- positive trends in providing varied programs of additional education and extracurricular activities and use of the city’s socio-cultural space
- favorable conditions created in the Moscow educational system in terms of staff professional growth. Moscow schools can take professional growth courses both based on their educational organizations (when an invited lecturer works with staff) and based on other educational organizations in Moscow [12].

The value of the Health and Safety indicator (5.08 points) indicates that educational institutions currently have sufficient capacity to organize nutrition for students and the work of medical staff per the needs of students. An adequate number of systematic activities to protect health and promote healthy lifestyles are planned and carried out in educational institutions in Moscow.

Lower scores compared to other indicators were found on the scales Activities and leisure (4.65 points), Space and furnishings (4.64 points), and Special needs (4.3 points). It indicates that:

- There is an insufficient amount of special facilities in Moscow schools, limited resources to implement programs (variety of materials, facilities), lack of free access to materials outside of specially organized classes with staff
- The main problems of the school space are as follows: lack of educational space and inability to transform the space in order to organize various forms of learning and extracurricular activities. It is caused by the typical design of school buildings (inconvenient layout of rooms, which hinders movement, limits the implementation of a variety of activities, does not provide sufficient facility visibility)
- As a rule, in Moscow educational institutions, the tasks and features of inclusive education are poorly considered. There are poor conditions for the education and development of exceptional children.
The average values for 48 indicators of the educational environment are presented in Table 1. Now let us analyze them.

Table 1

Average values of the indicators of the educational environment using SACERS scale (as a whole)

<table>
<thead>
<tr>
<th>Scale</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Space and Furnishings</strong></td>
<td></td>
</tr>
<tr>
<td>1.1. Indoor space</td>
<td>4.93</td>
</tr>
<tr>
<td>1.2. Space for gross motor activities</td>
<td>5.29</td>
</tr>
<tr>
<td>1.3. Space for privacy</td>
<td>4.05</td>
</tr>
<tr>
<td>1.4. Room arrangement</td>
<td>3.62</td>
</tr>
<tr>
<td>1.5. Furnishings for routine care</td>
<td>6.07</td>
</tr>
<tr>
<td>1.6. Furnishings for learning and recreational activities</td>
<td>5.40</td>
</tr>
<tr>
<td>1.7. Furnishings for relaxation and comfort</td>
<td>3.71</td>
</tr>
<tr>
<td>1.8. Furnishings for gross motor activities</td>
<td>4.29</td>
</tr>
<tr>
<td>1.9. Access to host facilities</td>
<td>6.28</td>
</tr>
<tr>
<td>1.10. Space to meet personal needs of staff</td>
<td>4.62</td>
</tr>
<tr>
<td>1.11. Facilities for the school staff individual work</td>
<td>4.36</td>
</tr>
<tr>
<td><strong>Health and Safety</strong></td>
<td></td>
</tr>
<tr>
<td>2.12. Health policy</td>
<td>5.26</td>
</tr>
<tr>
<td>2.13. Health practices</td>
<td>5.19</td>
</tr>
<tr>
<td>2.14. Emergency and safety policy</td>
<td>5.39</td>
</tr>
<tr>
<td>2.15. Safety regulations</td>
<td>4.77</td>
</tr>
<tr>
<td>2.16. Attendance</td>
<td>6.76</td>
</tr>
<tr>
<td>2.17. Departure</td>
<td>5.31</td>
</tr>
<tr>
<td>2.18. Meals</td>
<td>5.21</td>
</tr>
<tr>
<td>2.19. Personal hygiene</td>
<td>4.12</td>
</tr>
<tr>
<td><strong>Activities</strong></td>
<td></td>
</tr>
<tr>
<td>3.20. Arts and crafts</td>
<td>4.02</td>
</tr>
<tr>
<td>3.21. Music and movement</td>
<td>5.17</td>
</tr>
<tr>
<td>3.22. Blocks and construction</td>
<td>4.59</td>
</tr>
<tr>
<td>3.23. Drama/theater</td>
<td>4.76</td>
</tr>
<tr>
<td>3.24. Language/reading activities</td>
<td>5.41</td>
</tr>
<tr>
<td>3.25. Math/reasoning activities</td>
<td>5.03</td>
</tr>
<tr>
<td>3.26. Science/nature activities</td>
<td>5.05</td>
</tr>
<tr>
<td>3.27. Cultural awareness</td>
<td>4.57</td>
</tr>
<tr>
<td><strong>Interactions</strong></td>
<td></td>
</tr>
<tr>
<td>4.28. Greeting/departing</td>
<td>5.13</td>
</tr>
<tr>
<td>4.29. Staff-child interactions</td>
<td>5.90</td>
</tr>
<tr>
<td>4.30. Staff-child communication</td>
<td>5.47</td>
</tr>
<tr>
<td>4.31. Staff supervision of children</td>
<td>5.91</td>
</tr>
<tr>
<td>4.32. Discipline</td>
<td>6.47</td>
</tr>
<tr>
<td>4.33. Peer interactions</td>
<td>6.41</td>
</tr>
<tr>
<td>4.34. Interactions between staff and parents</td>
<td>6.31</td>
</tr>
<tr>
<td>4.35. Relationship between program staff and classroom teachers</td>
<td>5.91</td>
</tr>
</tbody>
</table>
The highest scores were obtained in the Attendance and Discipline indicators (6.76 and 6.47 points, respectively). This reflects the general trend observed in schools, where the main focus is shifted to the controlling-disciplinary impact on students and routine moments.

The indicator Access to host facilities (electives, CAS activities, clubs) (6.28 points) has presented a high score. The combination of schools with different specializations into educational complexes allowed the expansion of the range of these programs. However, the availability of specially equipped rooms, sufficient materials, and equipment for implementing all areas of extracurricular activities and additional educational services is a lacking factor in many educational organizations.

High values were identified for the indicator of the furnishings for routine care availability (Space and furnishing scale). This indicator shows a sufficient amount of furnishings in the canteen and classroom, which, as a rule, is in good condition and appropriate to the age and height of students.

Almost all indicators of the Interactions scale are close to the Excellent level. For example, Peer interactions and Interaction between staff and parents have 6.41 and 6.31 points, respectively. At the same time, the values of Staff-child interaction, Staff supervision of children, Relationship between program staff and classroom teachers are within the Excellent level.

The lowest values were obtained for the Space and furnishings indicators, namely for the Room arrangement indicator (3.62 points). This data indicates a lack of well-equipped, specialized spaces for various activities, insufficient spaces and rooms for independent use by children, spaces for homework or other independent work, and outdated buildings that do not meet the modern requirements. Furnishings for relaxation and comfort is not a sufficiently represented area (3.71 points). In educational organizations, we often observe a limited number of Home-like spaces, the lack of Coziness of recreational areas, and the absence of places for recreation and change of students’ activities.
Low values were revealed for the indicator Individualization (3.86 points). Difficulties in creating equal educational conditions for exceptional students are associated with the organization of the internal space in large schools.

The overall picture of educational environment comfort zones is presented in Table 2.

Table 2

<table>
<thead>
<tr>
<th>ZONES OF COMFORT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Space and Furnishings</td>
</tr>
<tr>
<td>Furnishings for routine care</td>
</tr>
<tr>
<td>Access to additional educational services</td>
</tr>
<tr>
<td>Health and Safety</td>
</tr>
<tr>
<td>Attendance</td>
</tr>
<tr>
<td>Interaction</td>
</tr>
<tr>
<td>Discipline, peer interactions, the interaction between staff and parents</td>
</tr>
<tr>
<td>Program Structure</td>
</tr>
<tr>
<td>Variety of additional education programs and extracurricular activities, use of the social and cultural space of the city</td>
</tr>
</tbody>
</table>

A comparison of the contrasting groups identified according to the educational environment quality index was the next stage of the analysis: clusters A and B. Let us specify that the division of the sample into clusters distinguished two contrasting groups: 1) cluster A – an educational environment quality index from 3.06 to 4.69 points (15 structural units); 2) cluster B – an educational environment quality index from 5.83 to 7 points (14 structural units). Cluster C included structural units with average values of the educational environment quality index. This group was not further compared with clusters A and B.

The educational environment quality index in cluster B was 6.36 points, which is close to the highest Excellent level. In cluster A, the quality index was 4.26 points, not reaching the Good level.

When comparing the highlighted groups, it should be noted that the average values of the subscales in group A are within 6–7 points (Excellent level) compared to group B, where the values are within 3–5 points (Good level). The greatest differences in quality indices are observed in the subscales of Space and Furnishings, Health and Safety, Activities, and Special Needs Supplementary Items. This reflects the overall picture for the sample as a whole. Significant differences were found in all subscales (Table 3).

Table 3

The mean values of the educational environment’s components quality indices and the significance of their differences in groups A and B

<table>
<thead>
<tr>
<th>Subscales</th>
<th>Group A</th>
<th>Group B</th>
<th>Median differences</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>&lt;X&gt;</td>
<td>&lt;X&gt;</td>
<td>Yes/ No</td>
</tr>
<tr>
<td>1. Space and Furnishings</td>
<td>6,08</td>
<td>3,60</td>
<td>Yes</td>
</tr>
<tr>
<td>2. Health and Safety</td>
<td>6,49</td>
<td>4,36</td>
<td>Yes</td>
</tr>
<tr>
<td>3. Activities</td>
<td>6,17</td>
<td>3,94</td>
<td>Yes</td>
</tr>
<tr>
<td>4. Interactions</td>
<td>6,72</td>
<td>5,23</td>
<td>Yes</td>
</tr>
<tr>
<td>5. Program Structure</td>
<td>6,56</td>
<td>4,80</td>
<td>Yes</td>
</tr>
<tr>
<td>6. Staff Development</td>
<td>6,90</td>
<td>4,91</td>
<td>Yes</td>
</tr>
<tr>
<td>7. Special Needs Supplementary Items</td>
<td>5,82</td>
<td>3,34</td>
<td>Yes</td>
</tr>
</tbody>
</table>
The most significant differences in groups A and B were found in the Special Needs Supplementary Items scale. This may indicate that, in terms of education for exceptional children in schools with a lower index, it is necessary to create special conditions for children pertaining to different categories – hearing impaired, severe speech disorders, Autistic Spectrum Disorders. Thus, the school space and equipment should meet recommendations of the psychological, medical and pedagogical commission on educational conditions. The needs of exceptional children should also be considered, along with the requirements for special conditions presented in the Federal Educational Standard for students with disabilities. Conditions must be created for exceptional children to participate in educational and extracurricular activities and include them in fellow students’ communities.

The data from the Special Needs Supplementary Items scale (3.34 points) of the Group B schools indicates that these educational organizations created special conditions related to the transformation of the subject-space environment. They have functional spaces, some didactic materials, and equipment for teaching children with disabilities. Interaction between the support specialists and teachers is built to allow consistent and effective work. Separate conditions for interaction between unimpaired and exceptional children are created (exceptional children are not excluded from events and activities, ensuring their inclusion at the level possible for them).

As shown in Table 4, in group A the standard deviation ranges from 0.37 to 1.50, compared with group B, where this ranges from 1.70 to 2.10. This means that the structural subdivisions of Group A schools are more homogeneous according to the highlighted parameters than those of Group B. At the same time, Group A revealed relatively homogeneous conditions for the Interaction and Staff development subscales, while Group B – for the Staff development and Program Structure subscales.

<table>
<thead>
<tr>
<th>Subscales</th>
<th>Group A schools ( \bar{\sigma}(X) )</th>
<th>Group B schools ( \bar{\sigma}(X) )</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Space and Furnishings</td>
<td>1.44</td>
<td>1.87</td>
</tr>
<tr>
<td>2. Health and Safety</td>
<td>1.06</td>
<td>2.10</td>
</tr>
<tr>
<td>3. Activities</td>
<td>1.26</td>
<td>2.01</td>
</tr>
<tr>
<td>4. Interactions</td>
<td>0.77</td>
<td>1.90</td>
</tr>
<tr>
<td>5. Program Structure</td>
<td>1.11</td>
<td>1.72</td>
</tr>
<tr>
<td>6. Staff Development</td>
<td>0.37</td>
<td>1.70</td>
</tr>
<tr>
<td>7. Special Needs Supplementary Items</td>
<td>1.50</td>
<td>1.80</td>
</tr>
</tbody>
</table>

Analysis of the educational environment in different clusters shows significant differences for most of the educational environment indicators (Table 5). The exceptions include the following: Space for privacy, Health policy, Drama/theater, Greeting/departing, Free choice, Promoting communication.

The indicator Space for privacy revealed low values in both groups (in group A – 4.29 points, in group B – 3.53 points) (Table 5). This means that in most Moscow schools, students often have no opportunity to be alone or in a small group isolated from others. There is a limited amount of space for individual work, including homework. Students do not have the opportunity to use
mobile furnishing to independently organize private areas (for example, with the help of mobile shelving, benches, and bean bag chairs). Teachers rarely organize a variety of individual and small group activities in spaces separate from the main classrooms. Teachers generally prefer activities in classrooms.

Table 5

<table>
<thead>
<tr>
<th>Indicators</th>
<th>Group A</th>
<th>Group B</th>
<th>Mean differences</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1. Indoor space</td>
<td>6.43</td>
<td>3.47</td>
<td>Yes</td>
</tr>
<tr>
<td>1.2. Space for physical activities</td>
<td>6.50</td>
<td>4.27</td>
<td>Yes</td>
</tr>
<tr>
<td>1.3. Space for privacy</td>
<td>4.29</td>
<td>3.53</td>
<td>No</td>
</tr>
<tr>
<td>1.4. Room arrangement</td>
<td>5.36</td>
<td>2.53</td>
<td>Yes</td>
</tr>
<tr>
<td>1.5. Furnishings for routine care</td>
<td>Not available</td>
<td>Not available</td>
<td></td>
</tr>
<tr>
<td>1.6. Furnishings for learning and recreational activities</td>
<td>6.50</td>
<td>4.87</td>
<td>Yes</td>
</tr>
<tr>
<td>1.7. Furnishings for relaxation and comfort</td>
<td>5.36</td>
<td>2.60</td>
<td>Yes</td>
</tr>
<tr>
<td>1.8. Furnishings for active recreation</td>
<td>6.07</td>
<td>2.33</td>
<td>Yes</td>
</tr>
<tr>
<td>1.9. Access to host facilities</td>
<td>6.86</td>
<td>5.07</td>
<td>Yes</td>
</tr>
<tr>
<td>1.10. Space to meet personal needs of staff</td>
<td>6.21</td>
<td>3.40</td>
<td>Yes</td>
</tr>
<tr>
<td>1.11. Facilities for the school staff individual work</td>
<td>6.29</td>
<td>2.87</td>
<td>Yes</td>
</tr>
<tr>
<td>2.12. Health policy</td>
<td>6.43</td>
<td>5.21</td>
<td>No</td>
</tr>
<tr>
<td>2.13. Health practices</td>
<td>6.36</td>
<td>3.93</td>
<td>Yes</td>
</tr>
<tr>
<td>2.14. Emergency and safety policy</td>
<td>6.36</td>
<td>4.29</td>
<td>Yes</td>
</tr>
<tr>
<td>2.15. Safety practice</td>
<td>6.50</td>
<td>2.71</td>
<td>Yes</td>
</tr>
<tr>
<td>2.16. Attendance</td>
<td>Not available</td>
<td>Not available</td>
<td></td>
</tr>
<tr>
<td>2.17. Departure</td>
<td>6.64</td>
<td>4.54</td>
<td>Yes</td>
</tr>
<tr>
<td>2.18. Meals</td>
<td>6.93</td>
<td>4.00</td>
<td>Yes</td>
</tr>
<tr>
<td>2.19. Personal hygiene</td>
<td>5.71</td>
<td>3.20</td>
<td>Yes</td>
</tr>
<tr>
<td>3.20. Arts and crafts</td>
<td>6.50</td>
<td>2.53</td>
<td>Yes</td>
</tr>
<tr>
<td>3.21. Music and movement</td>
<td>5.93</td>
<td>4.40</td>
<td>Yes</td>
</tr>
<tr>
<td>3.22. Blocks and construction</td>
<td>6.14</td>
<td>3.47</td>
<td>Yes</td>
</tr>
<tr>
<td>3.23. Drama/theater</td>
<td>5.86</td>
<td>4.47</td>
<td>No</td>
</tr>
<tr>
<td>3.24. Language/reading activities</td>
<td>6.29</td>
<td>4.93</td>
<td>Yes</td>
</tr>
<tr>
<td>3.25. Math/reasoning activities</td>
<td>6.21</td>
<td>4.20</td>
<td>Yes</td>
</tr>
<tr>
<td>3.26. Science/nature activities</td>
<td>6.43</td>
<td>3.47</td>
<td>Yes</td>
</tr>
<tr>
<td>3.27. Cultural awareness</td>
<td>6.00</td>
<td>4.07</td>
<td>Yes</td>
</tr>
<tr>
<td>4.28. Greeting/departing</td>
<td>5.93</td>
<td>4.71</td>
<td>No</td>
</tr>
<tr>
<td>4.29. Staff-child interaction</td>
<td>6.57</td>
<td>5.20</td>
<td>Yes</td>
</tr>
<tr>
<td>4.30. Staff-child communication</td>
<td>6.71</td>
<td>4.27</td>
<td>Yes</td>
</tr>
<tr>
<td>4.31. Staff supervision of children</td>
<td>6.93</td>
<td>4.67</td>
<td>Yes</td>
</tr>
<tr>
<td>4.32. Discipline</td>
<td>Not available</td>
<td>Not available</td>
<td></td>
</tr>
</tbody>
</table>
As for the other indicators, no significant differences were found between groups A and B. They both have relatively high average values within the Good level (Health policy, Drama/theater, Greeting/departing, Space for privacy, Free choice, Promoting communication.).

To understand the possible reasons why educational conditions in Moscow schools differ significantly according to some educational environment indicators, let us turn to qualitative analysis. Table 6 presents a characteristic comparison of the educational environment in schools which differ according to the quality index, compiled based on statistically significant differences identified in the quantitative analysis.

The data in Table 6 generally reflects an Increment in the selected indicators from cluster A to cluster B. For example, while educational organizations with a lower quality index (cluster A) have rooms with necessary space, light, and ventilation, schools with a higher quality index (cluster B) are characterized by spacious rooms with light and temperature control. Similar positive changes are noted for other indicators.
<table>
<thead>
<tr>
<th>Cluster A</th>
<th>Cluster B</th>
</tr>
</thead>
<tbody>
<tr>
<td>A sufficient level of space, light, ventilation, temperature modes; Premises are in good condition</td>
<td>Large, open spaces that are aesthetically pleasing and allow the following: easy movement and activity; placement of furnishings without restricting movement; control of air ventilation and amount of natural light</td>
</tr>
<tr>
<td>The classrooms are well visible but not always conveniently located; the purpose of the rooms is uncertain, there are no designated spaces for certain activities</td>
<td>The classroom layout is arranged with dedicated spaces for specific activities. Separated quiet and noisy areas and unoccupied space with all necessary furnishings for independent work</td>
</tr>
<tr>
<td>Spacious exterior and some interior activity spaces are used daily. Areas for outdoor activities are organized in the schoolyard</td>
<td>The space for physical activity is large, pleasant, and varies, both inside and outside the building, is used daily, and is separated according to specific age groups</td>
</tr>
<tr>
<td>There is minimal stationary and portable equipment for individual or group activity, indoors or outdoors, in good working order</td>
<td>A variety of fixed activity equipment that is easily accessible at all times, sturdy, age-appropriate, and develops various skills. A variety of portable equipment for individual and group play</td>
</tr>
<tr>
<td>Staff rooms are not separated from the students’ space except for separate restrooms. Storage spaces are available for staff belongings</td>
<td>Staff areas are separated from student spaces, furnished with comfortable furnishings in good condition and comfortable for adults. There is sufficient storage space for personal belongings and work materials</td>
</tr>
<tr>
<td>There are small spaces for staff conversations and meetings during the school day, combined with an office space shared with administration. There is storage space for lesson materials</td>
<td>Spacious workspaces for staff and storage space for materials. Sufficient space for staff to meet and discuss and have some privacy, and furnishings appropriate for adults. Staff involved in extracurricular activities have their workspace</td>
</tr>
<tr>
<td>There are no obvious safety concerns. Supervision is organized to ensure that safety is observed. Employees have a prescribed policy for emergency and urgent situations</td>
<td>Systematic safety work with staff, students, and parents is implemented. The environment is organized to prevent problems and possible emergencies</td>
</tr>
<tr>
<td>Meals are provided on a regular basis under the requirements of Sanitary regulations and standards</td>
<td>The meals are served in a comfortable environment under the requirements of Sanitary regulations and standards; parents are provided with information about their children’s nutrition</td>
</tr>
<tr>
<td>Basic art materials in good condition are available to students, but their use is regulated</td>
<td>A variety of art materials are freely available to children in the required quantity and configuration. Students are given the opportunity to choose any materials and art activities they wish</td>
</tr>
<tr>
<td>The daily schedule exists and students are familiar with it, the activities take place in a repetitive sequence throughout the day. The schedule includes daily physical and speech activities</td>
<td>The schedule includes different types of activities, including outdoor activities, and students may choose activities they like</td>
</tr>
<tr>
<td>Conditions for the professional growth of staff involve regular professional growth on the educational organization’s grounds and access to reference materials</td>
<td>Conditions for staff growth include a variety of field trips and in-house training activities that take into account the needs and interests of staff and the availability of a professional library, including one in electronic format</td>
</tr>
</tbody>
</table>

When considering the problem of equal access to quality education, it is essential not only to identify and state the differences between educational organizations with High and Good levels of the quality index. It is also important to interpret the possible reasons for determining the
identified differences. In our opinion, such reasons may be caused by the differences in the educational organization’s staff attitude towards the formation and development of the educational environment, which are expressed in a number of characteristics or criteria:

– variability or uniformity in the use of resources
– availability of a resource or its active use
– consistency of work or fragmentation
– focus on control norms or development.

The criterion of variability or uniformity in the use of school resources emphasizes the differences between the compared clusters regarding the ability and willingness of the educational organization to provide conditions beyond the required level, to use variability, and to consider the interests and needs of students and staff. This difference lies in the provision of a whole set of conditions, their integrity in the school’s educational environment (cluster B), or in the provision of certain specific conditions, their single cases, their uniformity (cluster A).

The resource availability criterion or its active use determines the participants’ actions in the environment of the educational complex depending on their needs.

Here is one example from the area of staff professional growth. The availability and active use of educational resources in cluster B are associated with staff participation in various training activities, taking into account the needs and staff interests, which are encouraged by the school administration. On the other hand, the availability of the resource in cluster A only implies regular professional staff growth on the educational organization’s grounds, sometimes without considering the needs and staff interests.

The criterion of systematic or fragmented work reflects regular, consistent work with school resources to create a comfortable school environment throughout the day for all participants of the educational process, or lack of work with school resources, respectively. Thus, the educational organizations in cluster B conduct systematic work on safety issues with staff, students, and parents. The environment is organized to prevent problems and possible emergencies. Compared to cluster A, where there are no obvious problems with safety, school security is organized to ensure a safe environment at school. Employees are provided with rules and regulations in case of emergency.

The focus on control norms or development indicates the following differences in the approach to creating educational conditions: creating conditions at a sufficient level for external and internal control, meeting the minimum requirements with regards to the organization of the school educational environment (cluster A), or the desire to develop and move forward to improve the school educational environment, when actions to create conditions are proactive (cluster B).

To a certain extent, the identified differences between the schools, which differ according to the quality index, are due to objective reasons such as the physical and spatial environment indicators. For example, the differences in physical and spatial environment indicators are due to the lack of sufficient space and facilities and the school buildings’ design, often 50–60 years old or older. However, the existing differences are determined by the strategy of a particular educational organization. It was either built on the principle of minimum compliance with the requirements or based on proactive actions and preventive measures to improve the quality of education available to every student, involving accessibility and motivation to choose one’s educational trajectory.

**Conclusion**

The quality of the educational environment is provided by the content components associated with the participants’ interaction in the educational process, the organization of the educational
process, and the conditions for staff professional growth. Schools’ facilities cannot be the only condition for providing quality education. The group of schools with a higher educational environment quality index has rather homogeneous educational conditions, which provide relatively equal access to quality education compared to the group with a lower educational environment index.

Statistically significant differences between schools with different educational environment quality indices, determining the non-uniformity of educational conditions, are connected with characteristics such as variability or uniformity in the use of resources, availability of a resource or its active use, systematic or fragmentary work, or orientation on control norms or development.

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The authors of the article focus on changes related to education. Education is considered as a communicative construct arising from the process of symbolic interaction between individuals who establish meanings when coordinating their statements. The communicative generation of situations and orders of knowledge is interpreted as educational semiosis. Analyzed is the discourse of modern humanities which are competing with each other in determining the current socio-cultural situation. Highlighted is the research tendency, asserting the point of changing the cultural morphogenesis by means of its visualization processes. Based on this, the hypothesis of a gap between culture and education is put forward. According to this hypothesis, cultural relations are increasingly mediated by figurative participation, while educational practices appeal to verbal and textual forms of the situational mediation. Within the relations between actors in education, this is reflected in the dominance of legitimate (metanarrative) samples, the transmission model of educational knowledge, the communicative preference for orderliness, the desire for unambiguity, the clarity and completeness of logocentric forms of thinking, and so on.

The change of the mediation form in the organization of educational interaction and the transition from the verbocentric order to the ocular-centric one, is suggested as a step in the development of modern education. It must affect the way educational relations (educational communication) function, the way words (speech) and images (vision) are inter-related, the principles of students’ orientation in their attitudes to the sign-symbolic world, their partners in interaction, and to themselves. In the first case, the point is to organize educational communication based on the principles of paradoxicality, paralogicality, and disproportionality of statements and images of the situation. Here the most important educational objective is to make the participants of the educational interaction consider their differences in their interpretations of the world, their styles of utterance, and their discursive positioning. In the second case, the educational objective is the liberalization of vision, which emerges in the course of perceptual work emancipated from the primary procedures of interpretation and comprehension of the visible and relying on the action of the image as the context of the statement. The third case is about worldview constants, radical changes in the position of the educational subject, acquiring the experience of self-detachment in learning. In the final analysis, this provides an opportunity for differentiation and diversification of the worlds of human presence.

**Keywords:** visualization of culture, orders of culture and education, sign-symbolic mediation of educational relations, educational semiosis, communicative design of educational interaction.
Introduction

In the following text, several presumptions will be used. The first one concerns the situation definition. One of the interpretations of this definition corresponds to the intellectualist interpretation of the definition given by Thomas’s Theorem. According to this interpretation, the situational definition emphasizes meaningfulness, which not only places individuals in the situational center but also enables them to rationally carry out the situational definitions their ability to control the situational definitions they carry out rationally. Thomas also emphasizes the social conditionality of situational definitions because “children are always born in a group of people in which all the general types of situations that might arise have already been defined, and the corresponding rules of behavior have been developed. In this situation, they don’t have the slightest chance to create their own definitions and freely follow their desires” [1, p. 63]. This means that the degree of freedom in the choice of situational definitions corresponds to the discursive resource that the community has at its disposal in each particular historical period.

Agreeing in many respects with the idea of social conditionality, we would also like to clarify the situational-communicative aspect of situational definitions. The social projection may refer to the conventions established in the community, which have an objectified normative status for the actors. In this case, the situational-communicative aspect relates to the rules and regulations functioning in the interaction, which determine the situational drafting characteristic at a particular moment. The solution to the problem of the “relation between the subject of speech and language” presented by Jacques Lacan [2, p. 124] serves as an analogy of the distinction between the social and the situational-communicative aspects. In his interpretation, the relation between the subject of language and that of speech must be established in the course of communication. Here, the language is a “symptom whose meaning must be revealed” [2, p. 90].

The distinction introduced allows us to assume special possibilities of communication in terms of analysis and the definition (redefinition) of the situation. The latter relates to the situation when the coordination of interactors’ statements can make changes in the established linguistic conventions. Coordination does not always contain a scenario of meaningfulness, although it does not exclude it. We just point here to another parameter of the communicative definition of the situation, namely, the mutual adjustment of statements that establish a mutually acceptable interpretation of the interactive conditions through coordination. The comprehension of the situation, which W. Thomas talks about, can be placed in the second tier of interpersonal interaction and can even be completely absent. The educational situation itself is perceived by its participants as a natural state of things.

The second presupposition concerns the specifics of educational reality, which, while subject to the basic definitional rules, has a number of features that distinguish it from the reality of everyday life or other symbolic worlds. First of all, it is about the duality of the educational reality associated with the specific “conditionality” and “unconditionality” of the academic world. “Conditionality” is derived from the cultural mission of education, its extraction from extra-educational socio-cultural practices to select and transmit the socially significant experience to the coming generations. This experience needs special processing or educational recontextualization. From this perspective, the subject “physics” imitates the “practice of physics”, and the university course “philosophy” is an educational expression of the philosophical thought. Based on this, the boundary between education and life is functionally conditioned, defining educational reality as a model of life and provoking criticism of education from a “real life” perspective regarding incomplete conformity of educational models to professional requirements. “Unconditioned” educational reality is related to the fact that in the educational
interaction created by the participants, they reproduce and replicate patterns of behavior and demonstrate and affirm moral or aesthetic values that are meaningful to them, which are primarily related to the ongoing interaction. From this follows the necessity of realization in the analysis of presentism. Orientation at presentist attitudes can be defined as the importance of establishing methodological control over realities that originate outside educational (historical, cultural, and social) genesis.

Finally, the third supposition is related to the idea of symbolic mediation of interaction. This means that the situational variables involved in forming educational reality will primarily include the symbolic mediators used in the interaction, whose status is also largely dependent on the current interaction. In this case, we interpret symbolic mediators instrumentally and as a system-forming principle of the asserted educational order. This is of particular importance for the educational situations adapting to the changing conditions of an individual’s development. In this case, the change of the mediator as a special constitutive action becomes an opportunity for people to redefine educational reality, a new form of their attitude to the signs they use, to other individuals, and to themselves. It is assumed that modern education is largely determined by the emergence of a new powerful player on the cultural scene – the image – which mediates the set of life conditions in action.

Considering the reality of education as a relevant social symbolic formation does not mean abandoning the history of relations, which are often implicitly present in the situational constitution. However, we take the “history of relationships” as a communicative resource to which the participants of the interaction turn, solving their current problems in it. In this case, developing educational conditions appears to be connected with a rhetorical break with the old and the establishment of a new order of interaction, which is never final. Neither is the status of the mediators determining the educational relations ever final.

**On the verbal and visual mediation of the cultural order**

Culture can be represented as an order that is asserted through symbolic domination. In this paper, we will partly refer to the description of the order proposed by the Canadian cultural scientist G.M. McLuhan and supported, in particular, by the Polish sociologist P. Sztompka. As Sztompka notes, the dominance of oral, textual, or visual cultures can be observed in different historical periods [4, p. 6]. The first of these eras is dominated by the spoken word, functioning in direct social contact. Writing and printing, replicated by education, mark the modern era with its general accessibility of messages. The differences between these eras and the modern era, from G.M. McLuhan’s point of view, are determined by communication technology, which brings with it a “total change” in the system of cultural mediation [5, p. 63]. The key aspect of cultural mediation produced by communication technology “is the change in scale, speed, or form that it brings to human affairs... [it] defines and controls the scale and form of human association and human action” [Ibid., pp. 11–12] in ways that “abolish temporal and spatial factors” [Ibid., p. 12].

The modern era, constituted by the simultaneous action of communication technology, “a means of communication without a message” [5, p. 11] and the visual image, “a message without a code” [6], becomes, in J.-L. Nancy’s definition, the “world of image efficiency” [7, p. 153]. At the same time, the incredible growth of the visual material, which has appeared over the last two or three decades, means that “it is often difficult to say with certainty what we see when we look at

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1 Presentism is “the view that only present things and events exist. The past and the future do not exist. To implement this thesis in education, it is necessary to control a language, because temporal forms (past, present and future) are actively used in everyday speech” [3, p. 30].

the world” [8, p. 13]. Polish researchers B. Mazepa-Domagała and T. Wilk, sharing this position, note that “the visual era is developing before our eyes, a new cultural code is being formed, determined by images, the computer and the Internet” [9, p. 89]. They believe that visually dominant culture modifies social reality, generally accepted interpretations, and evaluations. They also believe that it produces a new “set of ways of looking (stare, harassment by means of gaze, contemptuous look) and strategies for creating new (orders of) visibility and modes of vision” [10, p. 55]. First and foremost, these kinds of modifications radically transform the position of the beholder from a passive recipient to an active (engaged) subject of visual culture. This is because the latter is “something in which we take part with the intention of actively contributing to change, rather than simply watching what is happening around” [8, p. 20].

In general, the idea of visual dominance in culture is supported today by many humanities scholars. American cultural scientist N. Mirzoev emphasizes the most radical status of cultural visualization: “Whether we like it or not, the emerging world community consists of visuals” [8, p. 12]. He also defines modern culture as a visual one: “Visual culture includes the things we see, the inherent speculative model of how we should see, and the variants of our behavior as a result of this activity. Visual culture is not simply the sum of everything that has been created for viewing, be that pictures or movies. Visual culture is the relationship between what is observable and the names we give to what we see. It also includes what cannot be seen and what is hidden from view” [Ibid., p. 17]. At the same time, some researchers are more cautious in qualifying the present situation, designating it as transitional. In their presentation, the former order of verbal domination is being diffused but not completely removed. Emphasizing the drama of what is happening, they argue that the image strikes at the dominance of text and words, changing humans’ connections with the world and themselves. The final assertion of visuality will entail a shift in the cultural code, which “is a change in the means by which group identity and the individual’s social identity are created” [11, p. 95]. Transitivity also implies that in the contemporary situation, just as before, the various cultural mediators are engaged in a symbolic struggle with each other.

Let us clarify the essential features of the cultural orders being constructed under such cultural mediators as the printed word and the image.

Much of the contemporary cultural situation, according to McLuhan, is based on the work done through the printed text [5]. Book knowledge is an infinite specialization. It is carried not by people but by sheets of paper. The proliferation of printing created the conditions for widespread mass production, the emergence of narrow professionalism, and major scientific discoveries. It determined a significant complication of human communication and served as the source that gave birth to the mass media. Serial production as an invariant of “print” culture is carried out according to principles of mechanization, unification, and standardization. From the philosophical point of view, mass production and consumption, mass-replication of cultural standards and norms of reality perception are expressions of the primacy of the general over the specific, the


2 B. Latour analyzed the differences between pre-scientific and scientific cultures and the explosive nature of scientific achievements since the modern age. He associates such progress with the emergence of many new techniques of writing and recording, ways of using paper, printing, signs and diagrams. According to him they “must have certain properties: they must be both movable and immutable, representable, readable and compatible with each other” [12, p. 105–106]. Replicated in unlimited quantities and without distortion through the technology of printing, these techniques provided opportunities for new social mobilization and symbolic power, less dependent on space and time. Despite Latour’s use of the term “visualization”, which should refer back to image culture, we can relate his argument to the text culture, since “image” in given analytical context functions as a form of recording that represents an object “whole and at once” and in a “panoptic way”. 
single over the multiple [13]. The associated thinking and understanding of the world and the individual’s relations with society and oneself are based on the myth of the “Grand narrative” [14].

What is qualitatively different about the image as a dominant cultural order? In the humanities studies, the image is usually presented in many ways: as a mental construction localized in human memory, as a graphical image (drawing, sculpture, photography, television or Internet message, advertising, etc.), as an optical projection of an object, as a perceptual (sensual) phenomenon and as a verbal sign (metaphor, description) [15]. An image is something through which a person interacts with the world. In many cases, it is “something more than a product of perception. It appears as a result of individual or collective symbolization” [16, p. 22]. In socially oriented studies, the image is interpreted not as an object of art but as a “socio-cultural fact” (“a visual event”) that regulates the relationship between visual and social spaces [Ibid., p. 21]. According to Witold Kawecki, images1 solve a dual problem: cognition of reality and its construction. But more significantly, images create the social world as a system of classifications, which is achieved through the functioning of images to legitimize the social order being created. At the same time, images also act as a basis for social consolidation, formation of social ties and local communities, and as means of control and power (through iconic coercion, leading to differentiation of social categories and determination of the subordinate position between categories) [17]. The production of the social matter mediated by images is such that it “will often and unpredictably change, using formats that may seem meaningless to older generations”, [8, p. 72] stripping the vitality of myths about socio-cultural continuity and the value of experience cumulation.

Researchers are also recording the emergence of the visual knowledge phenomenon. This corresponds to how experience, literacy, skills, and abilities are created and practiced through language, words, and visual forms of expression and representation [18, p. 116]. According to the interpretation of this type of knowledge, the visualizations do not support linguistic and textual practices but rather substitute them. Therefore, the focus is on the contexts and ways of “institutionalization” and “use” of visual products. It is believed that in contemporary culture, the image plays not only the role of an expressive medium but also becomes a carrier of both contents and (which may be even more important) a special, simultaneous cohesion of messages2. The image changes not only the form of knowledge but also the way in which it is appropriated. It is accompanied by the dissolution of the previous forms of social use of knowledge, particularly by blurring the boundary between special knowledge and generally accepted knowledge. The latter comes at the expense of the devaluation of sacred knowledge, the mass dissemination of which threatens the loss of privilege and power.

When we talk about the visual richness of culture, it is impossible not to touch upon the phenomenon of digitalization. The latter has radically changed the semiotic relation in the process of semiosis by forming the relocation of the signifier and the signified. The common word usage usually involves a semiotic model of representation that appeals to the “trace” metaphor. In this metaphor, the “good” signifier reflects the essence of the signified, embodied in a concept. But in the digital world, the opposite relationship takes place. It is related to the constructive ability of the digital message to create an artificial reality: the signifier can dictate the parameters of the signified. The effect of the constructive action of the signifier was designated by the French philosopher J. Baudrillard with the term “hyper-reality”, indicating the replacement of the so-

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1 We believe that in some cases it is necessary to control the use of the term “vision,” avoiding its excessive psychologization. Thus, when discussing the problems of the impact of cultural images it would be more correct to use such terms as “visual artifact” or “image”. Regarding the latter, it is appropriate to cite W. Mitchell’s point of view: “A picture is a material object, an object that can be burned or broken. A vision is something that arises in an image and survives its destruction - in memory, narrative, copies, and traces on other media” [19, p. 10].

2 The image functions “as a visual metaphor” that connects heterogeneous elements in an “inexpressible” way... It is almost a “total sign” (symbolic, iconic, and indexical, indicating a clearly recognizable event) in a form that can be grasped in a single glance [20, p. 122].
called reality with signs of reality. According to Baudrillard, the media is “a kind of genetic code that sets the transformation of the real into the hyper-real, just as another code, the micromolecular one, sets the transition of the representational sphere of meaning into the genetic sphere of the programmed signal” [21, p. 56].

The emergence of hyper-reality in culture leads to a crisis of representation and an aggravation of the perceived reality’s boundaries. In our opinion, the diffusion of boundaries is aptly captured by the term “(un)distributed imagery”. Supporters of this version are referring to a change in the modality of human reception that problematizes the principles of its identification. According to the Russian philosopher I.N. Inishev, the images arising in human contact with the world “are not so much visual as tactile; in perception, we rely more on contact senses, such as smell and touch, than on distant ones, such as sight and hearing. They cannot be characterized by focusing on the traditional division between external and internal spheres, reality and fantasy” [22, p. 33]. The aforementioned cultural scientist N. Mirzoev produces a more radical classification of the inherent human world view. According to him, “the ability to see is a system of sensual reactions of the whole body, not just the eye” [8, p. 20]. Meanwhile, referring to corporeality as a source of orientation in dynamic reality is fraught with absolutizing subjective experience; ignoring its objective mediation by constructive cultural elements and disorientation, with all the ensuing consequences.

The above reconstructions can be seen as an example of descriptions of the symbolic opposition between figurative and verbally oriented humanitarian practices. They also serve as a representation of the ambiguous situation in scholars’ understanding of visualization processes. The differences in situational definitions created by the humanities result in differences in the preference of mechanisms and ways of responding to the image of the state of affairs, including appeals to current and projected educational practices.

On semiosis of culture and semiosis of education

It is generally accepted that one or another version of the cultural order is a condition for structuring the contents and forms of education. Of course, this does not signify a direct projection of cultural relations into the space of education. While being a specific symbolic region, the latter may both establish the relations of relevance with culture and enter into controversial relationships with it. In the latter case, we are talking about education participation in culture either as a mechanism of the preservation of cultural trends or as a change factor. B. Bernstein outlines the social mechanism of education’s participation in cultural dynamics. He points out that the basis of changes in culture is created by transformations in social relations (in this case, the interaction between the participants of educational space can be a variant of such relations), which should find their expression in the changing ways of the statement (speech practices) [11]. In other words, education can be understood as a specific, discursively formed way of social relations with a current cultural situation.

A question arises whether one can state that education today is sensitive to the visualization of culture or even transmits a visually dominant cultural order? The answer to this question can be obtained by turning to descriptions of what happens with the image in education.

According to the Polish researcher T. Szkudlarek, the orders of modern culture and education do not coincide. While the semiosis of the former is steadily and universally shifting towards visualization, education remains text-centered. Schkudlarek notes that “educational intervention can refer to the fundamental relation between the orality, the writing and the visualization of culture. Each of these codes requires certain competencies that can arise spontaneously from interaction with cultural texts as well as being the subject of specialized learning technology. For
some reason, the European school has become almost one-dimensional, focused on the writing technology” [23, p. 138]. In this context, the “visual turn” of culture can be a challenge to existing educational practices as well as an indication of pedagogical choices. That is, the word has a symbolic advantage in education today, producing a specific recontextualization of the image: the latter only accompanies the word, illustrates its meanings, reveals in its functioning the priority participation of the rules determining the connection between the word and thinking. There is, however, a problem with this connectivity. In education oriented at the transmission of cultural standards, it means not only the unity of word and thought but mainly what we see by means of thought. It is an ordered thought, striving for unambiguity and clarity, consistent and complete, oriented at the unity of its own referent and running from uncertainty.

The monopoly of thought is known to belong, first of all, to teachers or to their representative tools (textbooks, manuals, and educational curricula). Given this fact, the image in education is already overinterpreted, and the process of perception is normalized in accordance with legitimate verbal samples. In this case, it is predetermined in its illustrative position and the students’ perception as a form set for transmission “from above”. “Positivism and logical empiricism underlying it have produced an image of knowledge independent of its creator and possessor, hence objective knowledge whose content relies on “bare facts” [24, p. 26]. It is not about the evil will of the teacher, but about the contextualization of the cultural order by the education order, pedagogical behavior prescriptions, according to which the teacher’s word should have a form that is convenient for transmission and acquisition. It is a form of thought subordinated to logic. Because of logic’s claim to be universal, this form can be seen as an instance of social control. The students do not participate in its production; at best, they only consciously comprehend it. The students, due to their status, are already excluded from the process of thought production and are forced to use someone else’s product.

The situation is no better when it comes to educational content directly aimed at the creative development of students, their introduction to the world of artistic forms, and thus to creating images. According to Professor D. Klus-Stańska’s research, there is a serious didactic deformation, even in art education designed to develop a creative approach [25]. As a result, it is hard to rely on art objects in visual education. In other words, the mechanical introduction of art objects into the educational process cannot solve the problem of the image position in education not only because of the marginality of such experiences in teaching but also because this experience is recontextualized following the logocentric and normative order.

In psychological terms, from a student’s perspective, the issue of an image in learning is often viewed as a problem of apperception, that is, the dependence of perception on the attitudes at work in the experience. For analytical purposes, we need to divide the inner space of perception into perception and apperception. Apperception, in this case, will reveal what in psychology is commonly called “representation”. Firstly, representation is determined by processes in memory and governs the organizational order of perception. The representation (secondary image), which is thought to be primarily related to the word, will give form to a person’s vision (primary image). The image of primary perception will to a lesser extent be absorbed by the word. Rather the image set formed in experience, generalized by thought in representation (which may include past experience, with memories, speech skills of the perceiver, as well as physical theories learned by them) [26, p. 73], will provide a stable form to the work of perception.

Secondly, apperceptive experience, according to the adherents of the verbalist version of world reception, is not exclusively a personal achievement, as it might seem at first glance. In addition to the stereotyping of an individual’s actions, its configuration includes the effects of the communicative contract, educational investments, and mass-media inclusions. From this
perspective, the individuals cease to be the owners of their experience, becoming the agent of introjected verbal forms, which they tend to identify with themselves; and the position of the image, in this case, turns out to be fatally dependent on representationally oriented forms of communication and the reification consequences of their educational use.

Here we would like to make an important methodological remark concerning the limitations on applying mental predicates in this description. The point is that the appeal to mental grounding, however justified it may seem, turns out to be connected with a subject-centered ideology that fixes the researcher’s and practitioner’s look on the “inner world” of the individual. It shifts communicative processes, speech practices, and discursive forms, i.e. important mediation objects that can only provide educational change. Mentalism requires the individual or group consciousness to be introduced as a point of reference, while the pedagogical objective is to objectify the “symbolic metabolism” of educational relations. From this point of view, even when we talk about the content of experience, we do not refer to the presence of some relatively independent elements and their systems. What we mean is the fact that there are no special psychological objects in consciousness until thought or interaction bring them to life in this or that form.

Both the perception and the apperception figures act as a symbolic resource of educational communication. Psychological agents of the resource serve as actors invited to the stage, whose actions are subordinated to communicative and rhetorical objectives and rules. In this regard, collective memory in “pre-electronic” communities was related to “embodiment” incorporation (as pointed out in M. Foucault’s research on the disciplinary construction of the body). However, with changing communication technology, it is subject to the “recording” of inscription in the subject’s mind. Discipline is replaced by semiotics, whereas the subject’s body loses in some way its “pedagogical materiality”: its real physicality, previously disciplined in detail and normalized by “body training”, becomes a sign among signs, and stylistic creation reveals itself as an indicator of individuality, simulating itself [23, p. 111].

Educational contextualization of image rhetoric

This section deals with the issue related to the conditions of designing a learning situation in which the participants’ attention is focused on a visual artifact as a material of their transformative activity. This formulation of the issue once again refers to that of the relationship between culture and education. Cultural historians who are critical of cultural visualization insist on its more complex definition in their descriptions of the contemporary situation. In particular, the Dutch culture scholar M. Bal calls the supporters of cultural visualization “visual essentialists” who seek to “protect their territory from other media and semiotic systems” [27, p. 213]. She believes that the autonomization of the visual artifact is contrary to the “nature of things”. Bal associates the positions of “pure” visualists with “uncritical assumptions” coming from “art historians who have turned into “enthusiasts” of visual culture [Ibid., p. 224].

Without entering into a direct discussion with M. Bal and supporters of her position, a boundary between cultural and educational points of view must be drawn. This demarcation is necessary to highlight the reality of education as a relatively autonomous cultural and social region, subject to specific rules and forms of self-organization. The categorical system used by A. Schütz to describe “sub-worlds” or “finite fields of meanings” is quite applicable to it. The necessity of

1 Sub-world in the interpretation of A. Schütz implies “(1) a specific tension of consciousness, namely, wakefulness arising from full attention to life; (2) a specific epoché, namely, abstention from doubt; (3) a prevailing form of spontaneous activity, namely, work (a meaningful spontaneous activity that is project-based and characterized by the intention to accomplish the projected state of affairs through bodily movements embedded in the external world); (4) a specific form of experience of the oneself (the working self as a holistic self); (5) a specific form of sociality (the shared intersubjective world of communication and social action); (6) a specific temporal perspective (standard time, originating in the intersection of durée and cosmic time as the universal temporal structure of the intersubjective world)” [28, pp. 424–425].
such education specification is conditioned by the problems it solves, which can be oriented to cultural trends of different kinds (relic, topical, and futuristic). By solving them, education organizes symbolic conditions corresponding to them, and immanent learning programs are implemented. In this context, highlighting the figurative version of the learning situation and the learning objective is a specific educational construction designed to differentiate students’ sign-symbolic orientation in a dynamically changing cultural semiosis. It is for this purpose that visual relations are idealized as opposed to intellectual-thought constructions. The descriptions that provide the implementation of visual educational constructions are extracted from cultural descriptions.

An example of such constructions is the theory and practice of Elkonin’s/Davydov’s developmental education. The structure of this psychological and pedagogical system is based on differentiation and idealization of “reasoning” and “rational” thinking. “Reasoning thinking, which is based on visual images\(^1\), can be called empirical thinking. Rational thinking, internally connected with the study of the nature of its basis – with the study of concepts, it is advisable to call it theoretical” [29, p. 62]. Empirical thinking is a mental form that an individual acquires in everyday life to support it. Theoretical thinking appears in the course of historical development and is associated with the triumph of science. In a dynamic situation, reasoning thinking, focused on the generalization of object signs, is faced with an unsolvable problem – giving unity to diversity because “empirical generalization does not highlight the essential features of the object itself, as well as the internal relationship of its sides. It does not provide the distinction of the phenomenon and the essence in the process of cognition” [Ibid., p. 71]. Only theoretical thinking built on the modeling principle created by modern science can solve this essential problem. Thus, the opposition of the discursive (every day) and reasonable (theoretical) is used by Davydov and his followers as a constitutive of learning situations, providing both the content of learning and its dynamics with the help of the hyper-value of “rational thinking”. Within this concept, visual thinking occupies a subordinate position in intellectual consciousness, is deprived of abstraction ability, and is associated with an everyday worldview.

From the perspective of pedagogical constructivism, it would be entirely wrong to regard the opposition of mind and reason as the “truth” of thinking. We interpret V.V. Davydov’s theory of generalization as an exclusively educational construct based on the ideology of hierarchical discourse. In other words, both “discursive” thinking and “reasonable” thinking arise, function, and are maintained under specially constructed educational conditions. Beyond them, the vocabulary of discursiveness/reasonableness either makes no sense, or the meaning of these categories requires separate clarification.

In Davydov’s construct, the conscious mind was attributed only to an emotional function and the empirical generalization associated with it. This form of abstraction was given the meaning of imperfect thinking, whose concepts are not such in the full sense of the word. The intellectualist legend\(^2\), with the help of which the developmental of V.V. Davydov’s teaching provides the mental development of schoolchildren, in one way or another marginalizes other possibilities of mental activity, for example, the strategies of visual thinking.

The conditionality of Davydov’s construct may be emphasized by the point made by the German philosopher H. Arendt, who noted the ability of imaginative thinking to perform

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\(^1\) Authors’ underlining.
\(^2\) The intellectualist legend, according to the American psychologist Gilbert Ryle, is the absolutization of reflective thinking. According to this legend, “not only do we often think before acting, but we also think in order to act correctly... And yet the general assumption that an action performed intelligently requires prior judgment on the corresponding statements sounds implausible. It accounts for cases when, for lack of better reasoning, it is assumed that the required thinking may proceed very rapidly and completely unnoticed by the acting subject. I intend to prove that the intellectualist legend is false and that when we describe an action as intelligent, it does not entail a description of the double operation of deliberation and execution” [30, p. 38].
operations of abstraction. According to her, “the ability of the mind to operate with the invisible is required even for ordinary experience in order to recognize a dog as a dog regardless of the way the four-legged animal presents itself to us. This means that we must be able to “contemplate”, in the Kantian sense, the general character of an object that is not perceived by our senses. Kant uses the term “monogram” for such models – pure abstractions – and Chinese hieroglyphs are perhaps monograms, so to speak. In other words, what is “abstract” and invisible for us is symbolically real and given in hieroglyphs for the Chinese, for instance, the image of two joined hands to denote the concept of friendship. They think in images rather than in words. And such thinking in images always remains “real” and cannot become discursive, constructing a series of concepts, nor can it give an account of itself” [31, p. 103].

In the design of an educational situation that we suggest, visual material (a photograph, an advertisement, etc.) is not considered as a supplement to a narrative. Instead, it is regarded as the one with an independent status of a non-verbal message, whose identification and interpretation may constitute the subject matter of learning activities. As the basis for structuring, we rely on the experience of visual analysis implemented by R. Barthes in the pedagogical context. In his presentation, R. Barthes uses the term “vision”, which has a justified reason related to the intermediate status of the visual artifact, which is rather difficult to localize within the external and internal boundaries. Due to the nature of its perception, it simultaneously appears in two forms, making it possible to gain access to both representational and perceptual structures in the course of work with it. At the same time, when studying R. Barthes’s research experience, we intend to make a certain modification in the terms he used. Instead of the word “vision”, in many cases we will use the terms “image”, “visual artifact”, and “symbolic visual construction”. While dealing with these terms, we will not support the mental process, which in L.M. Vekker’s words, is “tragically invisible” [32, p. 15]. We will rather focus on the position of visual artifact, assigning certain intentionality to it and ability to program the perception of its user. In designing this analytical aspect, we followed the methodological pattern of W.J.T. Mitchell1.

A key issue in analyzing the effects of an image is the specification of the latter and defining the particular features of the constitution when it is involved in learning situations. It is considered that a word, unlike an image, is conditional in its essence2. The relationship between a word and its meaning involves its decoding and subsequent interpretation. In this instance, there is nothing in common between the signifier and the signified, at least in verbal-significant rather than iconic cultures. R. Barthes, speaking of the image, points out an important feature of its perception: it is perceived (and understood) immediately and literally, appearing to the viewer as a message without a code, and in the case of photography, the image “carries its meaning with it” [6].

It should be noted that the term “code” is usually attributed to the designation of an information set, which, as a linguistic convention, presents its referent in a compressed and alienly expressed form. The code is subject to decoding and presupposes the corresponding competence; it is impossible to decode a text expressed by signs unknown to the reader. In our

1 Mitchell seeks to analyze images as vital entities that have not only a semiotic nature but also living features. This kind of assumption, he believes, is not mystical, but is based on the observation of the human behavior who react to images as if they were living beings. With regard to the reception of images the scientist records the effect of “double consciousness”, which consists in the simultaneous presence, on the one hand, of a naive and even superstitious attitude to the image, and, on the other hand, in maintaining a sober, skeptical and critical attitude toward it [33, p. 7].

2 The term “word” is used in this text very conventionally. It is a kind of synecdoche, denoting all that R. Barthes calls “the products of the imaginary in language”: “a word as a special unit, as a certain magical monad; speech as a tool or means of expressing thought; writing as a transliteration of spoken language; a phrase as a logical, self-contained measure of language; even language breaks, language failures (when seen as a primary, spontaneous, pragmatic force) should be included here” [34, 488]. The image in educational work is influenced not so much by semantics as by the syntax of language, primarily pedagogical language with its desire to function as a complete whole, because “A teacher is a person who knows how to finish his/her phrases” [ibid., p. 504].
understanding, it is not so much the code’s essence that matters but its functional composition. This was pointed out by B. Bernstein in his well-known work “Class, Codes and Control: The structuring of pedagogic discourse”. In his interpretation, the code’s functionality is that it selects and integrates relevant meanings, separates irrelevant or illegitimate ones, regulates the rules of their implementation, excludes or silences irrelevant forms, assigns contexts, and makes a selection of inappropriate ones [35, p. 41]. The code functions as a distributive mechanism organizing receptive material and is compulsory with respect to the constitution of its user.

We will take into account the fact that the code, according to Bernstein, is related to the order of verbal functioning and does not concern the dispositive functions of images, the parsing of the action of which has its own specifications. R. Barthes draws attention to this in his research. In his interpretation, the image is usually not a code and thus does not conceal anything, nor does it have any depth. The educational clarification that follows from the denial of the code features of the image is related to the requirement of superficial analysis. That is, to analyze the image at the literal perception level and, to a certain extent, trust the eye without trusting the word (thought) that hurries to define the visual (which is conditioned by our training in a particular form of vision). Historically, changes in thinking dictate the meaning of the perceived. Having undergone appropriate training in acts of socialization, we “perceive the world not only through what we see but also through what we think and cognize, what each visual sensation tells us, what fragment of the world the eye brings in through the analysis of visual data, generalization and reconsideration” [36, p. 14]. Metaphorically, this visual level of training is “glasses” through which we see without seeing the glasses themselves. Detecting the verbal composition of “glasses” while perceiving symbolic visual constructions can act as a problem to be solved by students in the course of visual training.

In his work “The Rhetoric of The Image” Barthes, while discussing the issue of image iconicity, no longer refers to it as a message but as a sign without a code [6, p. 301]. A question, however, is whether it is legitimate to ascribe the status of a sign to the image? From what position is the image perceived as a sign? What are the conditions for distinguishing figurative forms and the educational consequences of the distinctions established? In his paper, Barthes focuses on the analysis of the drawing, which is a special type of image. Drawing, unlike photography, does not conceal but emphasizes its constructability. The constructability of drawing “manifests itself on three levels: first, to reproduce any object or scene using drawing means to carry out a series of transformations that follow certain rules; drawing a copy has no eternal “nature”: the codes underlying these or those transformations are historically changeable (this particularly concerns the laws of perspective); the process of drawing (coding) itself presupposes the differentiation of the significant and insignificant elements in an object: drawing is unable to reproduce the entire object; it is usually about the entire object. In other words, since there are no drawings without a style, the denotative level of any drawing is expressed less distinctly than the denotative level of photography; finally, the mastery of drawing, like the mastery of any code, requires training” [Ibid., p. 309].

It follows from the above that not all images act as a code, and their distinction may constitute the first and foremost objective of the students’ orientation in the process of visual learning. The

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1 Analyzing the codes of communication, B. Bernstein distinguishes two forms: limited and extended ones. The limited code levels out individual differences and “presents an utterance in a rigid form that, even when it is complex, allows the speaker and the listener to anticipate precisely and without difficulty all the words that will be used and, as a result, all the structure of the utterance” [11, p. 95]. Expanded code “facilitates the processing and verbal transmission of an individual’s unique experience. Unlike the limited code, it does not treat the conditions of the listeners as self-evident, since the speakers must adapt their language to them as well as to the individual peculiarities of the listeners. To the extent that the restricted code simplifies the construction and symbolic exchange that become common property, so much does the extended code simplify the verbal construction and symbolic exchange of individualized symbols” [Ibid., pp. 100–101].
focus on images in the process of teaching, in which constructability is in place, creates the opportunity for students to reconstruct and analyze the connotative content of the images and their impact on the position of the individual(s) perceiving the image. In turn, the manifestation of anthropological preconditions\(^1\), the experiential input of connotative reconstructions will overcome the naturalism of students’ visual perception and create conditions for students to work with their visual perspective. The specific of coded images like drawings makes them readable by models close to those guided by written texts. Their status can be considered a transitional visual form from connotative artifacts (painting) to denotative ones (photography).

At the same time, we realize that a rigid attribution of one or another visual form to a certain status can lead to “overnaturality” and erase the practical context. The latter presupposes a focus on L. Wittgenstein’s assumption, according to which “a judgment acquires meaning only in its use” [37, p. 133]. This also applies to the status of the image. Thus, a picture, which has all the objective characteristics of a message without a code, turns into a sign through a simple rhetorical device in educational communication. The teacher, informing the students that, looking at the picture, they did not notice something significant in it, encourages them to look closely at the image. This transforms the nature of its bearing in the educational interaction. The image now acts as a signed form to be decoded. Here, the image can be perceived as a code, but in other learning situations, it might not be, depending on the nature of its use.

When we look at a picture, even though we are aware that we have the picture in our hands, we do not doubt for a second that there is no gap between the image and the depicted subject. In other words, the identity of the objects portrayed and what they are in real life. In such cases where we have a photographic compilation or a photographer’s artwork, the representation of reality takes on the characteristics of an analogy or a code. Code features reveal imitation in conventionality, which involves a certain detachment of the spectator (according to Barthes), a distancing from the artifact. Imitation denotes singling out a phenomenon, considering both the “represented” and its construction. As for the photography, it means its transformative analysis performed by students. Imitation concerns the realization of students’ deconstructive actions on the surface of the picture; the detection of the constructive photographic elements. These include frame, the focus of the picture, the play of light and shadow, foreground and background, thematic choice, technical mediation (wide angle or portrait lens), etc. By completing the deconstructive task, the students find themselves in a special research position contrasting from that of a “naive” viewer who perceives a photograph as a copy of the real world.

When discussing the issue of the educational analysis of images, one cannot ignore the work of R. Barthes, who developed a specific means of image analysis that differs from linguistic categories and emphasizes the nature of the performative action of the image.

In one of his recent works, “Camera Lucida: Reflections on Photography”, Barthes uses two categories to emphasize the images’ intensiveness and the peculiarity of their effects on the spectator. The first of them, called a stadium, refers to a type of photographic image oriented at “inform, represent, take by surprise, signify, or arouse desire” [38, p. 47]. The “stadium” activates the experience of the recipients of the image, making them co-participate in what is depicted. “It is due to the stadium that I am interested in many photographs, be that because I perceive them as political testimonies, or because I consider them as good historical paintings; in these figures,

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\(^1\) The point is about the cultural conditioning of the experience of individual and group perception of artifacts. In the first respect, according to N. Mirzoev, “Our rational understanding of the world is formed by what we already know or think we know” [8, p. 82]. In the second respect, it is informed by collective experience, by what we share with others. The perceiver sees the picture in a certain state and assumes that anyone who stares at it, unless, of course, he is mentally challenged, will see the same thing. N. Mirzoev emphasizes that “vision is our common property, it is a public resource, which, nevertheless, can be useful to us in our personal needs” [Ibid., 107].
facial expressions, gestures, scenery, and actions, I participate as a person of culture” [Ibid., p. 44].

The second category, which Barthes referred to as punctum, “means, among other things: a bite, a hole, a spot, a small cut, as well as a roll of the dice” [Ibid., p. 45]. The function of the punctum image is different. Barth writes about the trauma inflicted on the viewer by photography and its expansiveness. But it is not about the one that strikes the imagination; it is about the one that puts an experience in motion and transforms it. It is not the trauma itself that is the key to the transformation, but the potential of the image in “revealing what has been hidden so reliably that the actor himself has ignored it or kept it in the unconscious” [Ibid., p. 53]. The difference in the rhetorical potential of images lies not in their content but in the nature of their connection to the spectator’s experience, their ability to affect change in his relationship with himself. Explaining the action of the punctum, This is what Barth writes, “to give examples of the punctum means in some way to open one’s soul” [Ibid., p. 69]. From this perspective, the type of change produced by an image transforming the experience of the perceiving individual can reasonably be called educational. Michel Foucault may have alluded to this when distinguishing pedagogy engaged in the transmission of legitimate content from psychagogy associated with the transmission of truth, “which is not at all aimed at acquiring certain skills, etc., but whose point is to change the very experience of the student’s existence” [39, p. 441]

On changes in educational semiosis and academic relationships

Assuming the mismatch of cultural and educational orders, a question arises what can be done to make the latter a source of constructive cultural and learning dynamics. Returning to the mechanism of cultural transformation proposed by B. Bernstein, one can state that the changes produced in education should simultaneously concern two interrelated planes; social relations (or, more narrowly, communication) and the ways of connecting words (speech) and images (vision).

First of all, it is necessary to liberalize vision, which at the level of the students means the ability to build a statement and behavior while relying on various kinds of images (graphic, optical, perceptual, mental, and verbal). In this situation, the image acts in the fundamental function, creating a context for the statement. For learning practice, this means cultivating a communicative gap and suspending verbal definitions, primarily in terms of their communicative productivity. As a result of the reorganization of speech-thought activity, speech and behavior become a condition for thought, rather than the other way round. A student acquires the experience of “gripping” the visual object with the gaze, paying attention to the details and forming its construction as a whole, reducing the attitude to the hierarchical relations between the image elements. Therefore, the description and interpretation of the visual object come after the process of perception.

Secondly, when implementing the educational communicative form of learning, the focus should shift from the implicit and explicit objectives of achieving synchronization of behavior and establishing a consensus of meanings to cultivating forms that generate differences in interaction. It is not a matter of presenting a different spectrum of opinions in a learning interaction, but rather a clash of interpretations of perceived artifacts, utterance styles, and discursive positioning. This requires a particular communicative disposition. The other person, in this case, is qualitatively different, unassumed in the act of communication. In this situation, educational communication acquires paradoxical and paralogical features and mutual disproportionality [14, p. 13].
However, one clarification should be made. When discussing “interdimensionality”, Lyotard interprets it as pre-existing differential fact. This is not the way we understand things. From our perspective, modern education is largely a product of industrialization and the construction of national communities whose success depends on the solidarity of the people functioning within them. In this context, pedagogical systems were constructed as machines of social unity production. Textual practices also served this purpose. The homogenization of people and materials was the essence of J. Gutenberg’s cultural program and a source of wealth and power unknown to any other era or technology [5, p. 159].

Given this, along with the developing experience of solidarity, a promising task for education becomes the creation of isolatory conditions, participation in incommensurable worlds, and the acquisition of the ability not to assimilate the other person. We are not talking about the functioning of education in the overabundance of the multiple worlds of human presence that Lyotard talks about. We are discussing education in a situation of diversity deficiency, the significance of overcoming the negations that education reacts to, and the absence of a “common denominator”.

Parality is not a natural state of affairs, but a demanded practical establishment. Communicative learning strategies can be oriented towards finding common ground and leveling differences. But they can also be constructed within a logic of contradiction, qualitative specificity, and determined by communicative and practical contexts. In the first case, the interaction relies on the assumption of common linguistic code and the message’s fundamental translatability.

In the second case, the interaction relies on the premise of non-transportability, the difference of codes, and direct untranslatability of statements. According to J.M. Lotman’s theory of communication, these strategic orientations can be traced to the history of humanity. The first strategy is characteristic of the 18th-19th century European culture, and “it determined our habitual scientific ideas, particularly the identification of the act of receiving and exchanging information” [40, p. 176].

The second strategy, in his opinion, is currently intensifying in the context of globalization and intense intercultural communication. The differentiation of communicative relationships and connections (textual and visual self-organization) in teaching requires a revision of communicative functions. Its traditional interpretation is oriented, in terms of formal logic, at the model of conjunction. We should discuss mastering the forms of understanding and actions that prioritize disjunctive models and switching from one mode of consciousness to another. The relationship between a cultural artifact (text, image) and other individuals is now the focus of a disjunctive communicative, educational model. This relationship is characterized by the establishment of distance between the position of the individual perceiving these phenomena and the phenomena themselves. Distance has the character of defamiliarization [41].

Non-attribution to the other person becomes a prerequisite for self-acceptance; the opportunity to see oneself not as a naturally shared position with other participants in interaction, but as a specific and relational discursive construct, or position related to a specific situation in the processes of educational semiosis. The experience of suspension of the other person is intrinsically connected with the experience of self-suspension and potentially may cause self-transformation; transformation in education is possible only through a specific discursive conflict of heterogeneous and ontologically incompatible discourses, which find their limits only in counterversive conditions. As a result, “the student becomes a boundary-breaking subject, capable of understanding the others in his own categories, and of creating boundary orders where new identities can emerge within existing configurations of power and accessible cultural domains” [42, p. 51].
Thirdly, moving the image to the central position in the establishment of the educational order is consistent with the transformation of the pedagogical position and the teacher’s role in the interactions of learning situations. The latter, operating according to the rules of educational praxis, are not so much involved in the struggle for truth as they are constituted as acts of self-determination in real educational circumstances, caring about the measure of their own effectiveness [43]. In this context, the pedagogical position corresponds to that of a mediator between relations of utterance, the interaction of signs and images, communicative processes, and connections. They constitute the main focus of the mediator’s work, taking the psychological variables of the participants out of the bracket of interaction.

The key point of this positional transformation is a shift in pedagogical priorities: from ensuring the assimilation of cultural content to organizing students’ analysis of their experience of relations with culture (sign, image) unfolding in the space of social relations. This results in a cultural content finding its discursive conditionality: “knowledge becomes not so much a process whose properties may be discovered by us, but a subject of socially constructed collective consciousness expressed in permanently mobile and ideologically rich discourses” [44, p. 92].

The transitional situation in education, in this case, corresponds with the inspiration of the symbolic struggle of cultural mediators, which, outside the procedures of its objectification will be realized in implicit and possibly destructive forms. Objectification of the circumstances of symbolic struggle in communication makes it possible to control self-reference and self-deconstruction processes, supporting the linguistic, visual, and communicative sensitivity of interaction participants to the educational semiosis.

**Conclusion**

Our discussion of the conditions and possibilities of educational change, which correspond primarily to the differentiation and diversification of the worlds of human presence, was based on the rhetoric of the visible and the conceivable, the sensually given and the mentally conceivable. This distinction had a pedagogical rather than an ontological sense. The need for such boundaries and cross-border experiences of language and image in education becomes important in terms of young people’s readiness to live in a multicultural world.

This world is consumed by reified cultural boundaries, revealing the discursive, historical-cultural, and political conditioning of such boundaries. The latter is especially important due to the increasing massification of education. Bureaucratization is inevitable under these circumstances. It creates a powerful homogenizing tendency that directs pedagogical practice toward standards and institutional control rather than free association, individual expression, free social creativity, and non-determined development. The automation and absolutization of verbal and textual mediation forms in education turn out to be the key semiotic condition for the traditional educational reproduction, which prevents the mutually facilitative relationship between education and other cultural and social areas.

Appealing to the resource of visuality as a form of pedagogical conditionality, there can emerge a new type of social agreement, capable of producing processes and phenomena that are either rigidly marginalized or inverted in traditional education. The visual re-symbolization of educational relations enables us to look at the possibility of educational change with a certain optimism.

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THEORETICAL ASPECTS OF CIVIC POSITION FORMATION IN PEDAGOGICAL SCIENCE AND PRACTICE

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The problems of the civic position formation of an individual are rooted in multiple factors. These include a challenging stage in the development of Russian society, social, cultural, economic, and political problems, rethinking the country’s past, and unclear value references. All these factors can lead to moral disorientation and a loss of ideals.

At the present stage, the formation of civic position is an interesting subject of research for many scientists. They reveal the essence of Citizenship as a concept and describe civic position formation’s psychological aspects. Moreover, citizenship is considered a social phenomenon, the formation of which depends on social relations and the organization of the educational process. During the last decade, there has been an increased interest in research on the problem of citizenship formation at an adolescent age.

In pedagogy, the following types of positions are distinguished: lifestyle, social, and internal. The similarity of the concepts of Internal Position and Attitude is emphasized, and it is explained that Attitude defines Position as a unified system of individual-personal relations between a person and their surrounding reality.

Objective and subjective factors under the influence of which a person’s civic position is formed are also explained. The objective factors refer to socio-political conditions. Meanwhile, subjective factors refer to the interests of the individual, their needs, abilities, and values.

On this basis, the following components, which are most often highlighted by scientists in the study and generalization of a person’s civic position, and contribution to its formation, are listed: cognitive (knowledge of citizenship, civic position, civil rights and responsibilities), motivational-valuable (a humanistic feature of a person’s relationship to society, work, people and themselves, civic value orientations), and activity (ability to fulfill one’s civil rights and duties, comply with social and legal standards, carry out socially significant activities for the public good). Three levels of formation of a person’s civic position are distinguished and described (low, average, high).

The relationship and differences of such concepts as Patriotism, Citizenship, Civic Position, as well as Patriot and Citizen are emphasized, and their essence is revealed. By Patriotism, we mean the feeling of love and attachment to a country and alliance with other citizens who share the same sentiment to create a feeling of oneness among the people.

As part of the study of the civic position formation, the concept of Civic activity is touched upon, which is explained and classified by the following types: official (electoral process) and unofficial (participation in socially significant activities).

The manifestation forms of a person’s civic position affecting their formation are outlined (passive, active, conformist (consumer), rebellious (protest), constructive). At the same time, emphasis is placed on an active civic position, in which society and the state are interested.

The conclusion clarifies the definition of Civic Position, which is explained as a system of positive value orientations that an individual may possess in relation to the state, law, civil society, themselves as an active citizen, carrying out socially important activities, and a focus on the public good.
The analysis of the studied topic allows us to state its undoubted theoretical and practical significance since this problem is relevant and not fully solved at the present stage of the socio-political development of Russia.

**Keywords:** civic position; attitudes; inner position; social position; attitude; cognitive component; motivational-valuable component; activity component; citizenship; citizen; patriotism; patriot; civic activity; official civic activity, unofficial civic activity; active civic position.

Several modern trends in the socio-cultural sphere aggravate the problem of developing universal value orientations among students. Such trends include migration processes, virtual forms of intercultural communication, academic mobility, etc. Therefore, in pedagogical science and practice, the task of finding new content and effective forms of education for modern youth is relevant. In particular, civic position formation, which manifests itself in communication, social, and professional activity, is essential.

In this regard, teachers need to focus on training well-educated, socially active citizens with high moral standards. They should educate people ready to take civic responsibility for their actions and make responsible decisions, with awareness of the possible consequences. Therefore, the problem of civic positions formation among individuals in modern society is relevant.

At the moment, the question of the civic position formation is the research subject of such scientists as L.A. Baikova, A.M. Knyazev, T.I. Kobeleva, Y.V. Melnik, T.A. Miroshina, N.N. Perepecha, E.P. Strelnikova, T.A. Sukharev. Their works reveal the essence of the Civic Position concept. Due to scientists such as K.A. Abulhanova-Slavskaya, B.G. Ananiev, L.S. Vygotsky, V.N. Myasischev, S.L. Rubinstein psychological aspects of civic position formation have been put forward. In the works G.M. Andreeva, E.I. Isaev, I.S. Kon, A.B. Mudrik, B.D. Parygin, V.I. Slobodchikov, D.I. Feldstein civic position as a social phenomenon is revealed, the formation of which depends on social relations and the educational process organization. E.A. Bazaley, T.N. Balobanova, V.A. Grishko, T.I. Kobeleva, Y.I. Loyuk, N.V. Popovich, L.K. Fortova discovered and explored organizational and pedagogical conditions and ways of forming students’ civic position. They also determined the criteria and the effectiveness indicators of civic position formation in the socio-cultural environment. During the last decade, interest in civic position formation research among adolescents has significantly increased. D.V. Kirillov [1] studied civic position formation among high school students in teaching humanities. T.I. Kobeleva [2] reviewed it by means of social design. K.I. Maslov [3] explored it in the university educational environment as a factor of students’ civic position development. V.V. Strakhov [4] researched the formation of students’ civic position at sports schools for children. E.P. Strelnikova [5] investigated it through extracurricular school work. A.F. Abzalov [6] examined pedagogical conditions of civic position formation in students of higher educational institutions.

In the Russian explanatory dictionaries by S.I. Ozhegov and I.D. Shvedova, the concept of Position has two definitions: “the principle underlying a person’s behavior and actions” and “the position, place occupied by a person” [7].

I.S. Kohn [8] defines the concept of Social Position, which he characterizes as a person’s place in the structure of social relations, in other words, his Social Role.

Modern scientists in the field of pedagogy noted the following Positions: lifestyle, social, internal. In the scientific studies of psychologists, the concept of Position is viewed through a position of a personality.

B.G. Ananyev [9] viewed the individual’s position (social, economic, political) in society as social roles performed by a person depending on their position and political situation. According to
Ananyev, such attitudes or roles performed by a person in certain situations represent exemplary behavior expected from any individual in given conditions. Ananyev also studied Position and Attitude as a person’s Position, which characterizes the subjective, active side of the individual in the social structure. In other words, Position is an active expression of social status, the understanding of rights and duties, which reveals a person’s status within society, a class, or a group.

When considering a Position as an activity component of a person’s formation, L.I. Bozhovich [10] distinguished the terms Internal Position and External Position. Internal Position is formed by a person’s previous experience, abilities, capacities, and emerging needs. It refers to the position a person occupies in society at a given moment and which they would like to occupy in the future. It is this Position that influences attitudes toward the outside world, other people, and themselves. Consequently, the Internal Position contributes to new personal qualities in the younger generation.

V.N. Myasishchev [11] pointed out the similarity of the terms Inner Position and Attitude. The scientist emphasized that Attitude describes Position as a unified system of individual relations of a personality with the surrounding reality. According to Myasishchev, a unified system formed in personality formation influences one’s life experience. In his research, V.N. Myasischev distinguished three types of Relations: oneself, the people around, and the outside world. In addition, the author pointed out Social Relations and emphasized their necessity and importance. Since every person enters into these relations from birth and under their influence, one’s social experience develops, and personality is formed.

When considering a person’s attitudes as a Position, S.L. Rubinstein [12] pointed out the connection between a person’s psyche and their activity, the signification of their wholeness and unity. Thanks to this, a person acquires the ability to define their position about social life.

A slightly different point of view was put forward by A.N. Leontiev [13]. He assumed that Position is not the result but the basis and forming factor of a person and their psyche. Consequently, personal development is progressed through comprehension of position through understanding. Thus, A.N. Leontiev explained the structure of an individual’s development as a subject of social relations.

A.F. Shamich [14] believed that an individual’s civic position is formed by combining objective and subjective factors. Objective factors include socio-political conditions such as political situation, the level of democracy, the economic level, the formation and development of social institutions of civil society, as well as the moral and psychological environment. The subjective factors, according to Shamich, are an individual’s interests, needs, abilities, value orientations, inner world, spiritual wealth, level of self-awareness, worldview, motives of behavior, and their overall state of striving for socially significant activity.

In A.F. Abzalov, Position is defined in terms of meaningful activity, which is in turn expressed by the interrelation of intellectual, emotional, and active components concerning a specific object of reality. These components subsequently affect the behavior of the individual in specific social situations. Behavior, in turn, determines the development of social experience, in which a set of available skills, abilities, and knowledge plays a major role. Consequently, Abzalov considered Position as an evaluation of the political, economic, and social situation, in aspects of personal and state security, and distinguished three components within it: the personal, connected with the person readiness to self-actualization; socio-political, based on the willingness to serve for the benefit of one’s homeland, to perform a civil duty and social, necessary for a person to implement both public and personal interests.

L.A. Eseleva [15] identified three components that are specific to the formation of a person’s civic position: axiological (a person’s position to the surrounding reality), behavioral (a person’s...
desire to manifest behavioral attitudes), and activity-based (a person’s willingness to act in the public interest).

According to V.V. Gavrilyuk [16], there are three components in a person’s civic position structure: cognitive, motivational-orientational, and behavioral. The cognitive component contains a set of core values implicating the conscious attitude of a person to the social reality. These values influence the way a person defines their meaning in life. The cognitive component is classified by ethical, social, legal, and political knowledge. It includes the level of understanding of this knowledge reflecting the subjective attitude of an individual to the requirements of a given state and society. The motivational-orientational component defines the position of a person to oneself, surrounding people, society, and events occurring in the world. Such positions are implemented through a system of specific standards, requirements, social norms, attitudes, a system of normative legal acts and legislation of the state. The moral feature of the legislation, according to the author, lies in the fact that it prescribes how to act in a moral sense: conscientiously, honestly, carefully, responsibly, and diligently. However, it dictates clearly the specific actions to be carried out. The behavioral component refers specifically to the behavior of an individual, more specifically, to their ability to adhere to specific rules, and comply with the necessary socio-moral duties. The significance of this component lies in the fact that it is grounded in the understanding that the development of social values stems from an individual’s actions in self-actualization while their importance and significance are proved by actual life experience. V.V. Gavrilyuk specifies that all individuals feel the need for social recognition and a sense of importance. As a result, every person is engaged in a search for the ways and means to achieve self-actualization.

K.I. Maslov considered three components of a person’s civic position: cognitive, moral, and behavioral. The cognitive component characterizes a person’s knowledge of citizenship concepts, civic position, civic activity, civil rights and duties, civil responsibility, and patriotism. The moral includes a person’s attitude to oneself, other people, society, and the formation of civil value orientations. Lastly, the behavioral is based on a person’s ability to perform their civil duties, bear civic responsibility, and be socially active.

Based on the study of A.F. Abzalov, V.V. Gavrilyuk, L.A. Eseleva, K.I. Maslov, we can conclude that researchers identify different criteria of a person’s civic position formation. Upon analyzing the works on this problem, we can distinguish the following criteria: cognitive (knowledge of citizenship, civic position, civil rights, and responsibilities); motivational-valuable (humanistic orientation of a person’s relationship to society, work, people, and oneself) and activity (ability to exercise their civil rights and responsibilities, carry out socially essential activities for the public good). These criteria are interconnected. Reducing any of these components will undoubtedly affect other components within the process, and hence, the formation level of a person’s civic position as a whole.

Each of the formation indicators of a person’s civic position has three levels: low (unstable and weak manifestation of civic behavior), medium (stable and positive civic behavior, but the active civic position is not always manifested), and high (stable and positive civic behavior, performance of socially significant activity, manifestation of active civic position, tolerance).

While analyzing theoretical approaches, K.I. Maslov singles out the following directions in the definition of Civic Position: homeland, state, civic duty, civic responsibility (V.I. Kozhokar, A.F. Nikitin, L.P. Razbegaeva, N.G. Suvorova, etc.), value attitudes to social reality (G.Y. Grevtseva, R.G. Gurova, V. Krysyak, B.T. Likhacheva, etc.), a person’s active choice of one’s social role (G.M. Kojaspirova, N.I. Eliasberg, etc.).

Nowadays, science gives a large number of definitions to the concept of Civic Position. According to the Universal Declaration of Human Rights: “Civic position is a responsible
fulfillment of civic duty;” and civic duty “is the requirements imposed on an individual in the form of obligations to the collective, social groups and society as a whole“ [17].

A.F. Abzalov interprets the definition of Civic Position as an individual’s civic worldview. Beliefs, rationale, understanding are interconnected with moral qualities, which, in turn, manifest themselves in actions, personal activity, and development of exemplary views and achieving goals.

T.I. Kobeleva defines Civic Position as an integrative system of a person’s approach to their personality as a citizen, society, civil law, expressed in actions focusing on social and public benefits.

G.M. Kojaspirova [18] believes that Civic Position is a moral quality of a person that determines the conscious and active performance of duties to the state and society.

G.Ya. Grevtseva and T.P. Skrebtsova [19] distinguished three aspects of Civic Position: worldview, value, and culture. The worldview aspect includes knowledge, beliefs, and value orientations. The value aspect includes moral, political, and legal self-awareness. The cultural aspect is responsible for behavior, attitudes, and values. In addition, according to scientists, viewing Civic Position as a set of qualities of a person brings closer such terms as Civic Position and Citizenship. The latter is characterized as “an integral quality of man as a conscious and active citizen, formed and expressed in the following manifestations: high moral, knowledge of civil rights and responsibilities, willingness to work for the common good, determination and ability to defend the public interest, irreconcilability to anti-state manifestations, and ability to combine personal interests with public ones.” This definition virtually eliminates the distinction between them.

The above analysis of the existing research shows that despite a diversity of existing definitions of the Civic Position concept, two main approaches to its interpretation can be identified. Certain researchers, E.P. Strelnikova, A.F. Shamich, for example, reveal the essence of Civic Position and define it as an integrative quality of a person. However, others, such as N.F. Kritskaya, A.M. Shalenov [20, 21], consider a person’s Civic Position to be a set of moral, active, and social attitudes.

The concept of Civic Position is closely connected with Citizenship, which is why many scientists consider both concepts together when studying this problem.

According to A.M. Knyazev [22], Citizenship is a complex, multi-layered concept which has many characteristics. This term includes social activity and activity aimed at the benefit of a society and a state; manifestation of interest in the life of a society, a country and its history; observance of established norms of behavior and duties; performance of duty to a state and citizens; readiness and ability to perform civic duties; and, having a certain level of culture and knowledge related to a state or society, a system of civil relations.

G.N. Filonov [23] considered Citizenship as a set of personal qualities expressed in the performance of significant social tasks. The latter includes loyalty to the state and readiness to protect the interests of one’s country, true faithfulness to the generally recognized principles, morals, and ethical values.

N.I. Eliasberg defined Citizenship as “a person’s system of socially significant moral values that provide a sense of involvement in the fate of one’s homeland and a readiness to take moral responsibility for its past, present, future together with active participation in the development of one’s country in forms that meet moral and legal norms“ [24].

Such terms as Patriotism, Citizenship, Citizen, Civic Position are closely connected in the history of a state. In the literature, these concepts are not separated. This forms objective difficulties in the comprehension of social events, development of scientific justifications, and
construction of scientific conclusions. The concept of a “citizen” is interconnected with the concept of a Patriot, but they also have a number of distinctive features. A citizen knows their civil rights and duties and performs them. A patriot feels love for their homeland. On this basis, a citizen has moral and state values. A patriot has universal moral values.

According to D.V. Artyukhovich, “citizen” is considered as a legal definition: “a person consisting in a permanent political and legal connection with a state, which is expressed in mutual rights and obligations” [25].

A.M. Knyazev characterizes a citizen as a person who knows one’s civil rights and duties, bears responsibility for one’s actions, and is aware of the consequences of those actions. As a result, civil society is formed, which is a subject and object of the political structure of society.

According to A.F. Abzalov, positive dynamics in the development of a person’s civic position can be achieved if the relationship Civic Position-Person is researched.

Based on the works included in this review, the following positions, connected with Personality as a concept and directly relating to the problem of its formation, are allocated. Firstly, in the conceptual idea – the primary basis of a person is determined (V.N. Myasischev). The works of B.G. Ananyev consider the essence of an individual as a “system-based quality of a person.” In A.N. Leontiev and S.L. Rubinstein, a personality acts as an active person. In other words, the conditions of a subject’s formation and development are manifested in its activity.

A.N. Leontiev said that attitude to a state according to the motivational and demanding indicator is revealed by specific needs and interests in a personality. It is manifested as a desire and readiness to participate in socially significant activities.

E.P. Strelnikova singled out the emotional and evaluative indicators of relations and defined the conscious, indifferent, and rational attitude of an individual to the state’s actions. In her opinion, this indicator is significant and necessary for forming a person’s civic position.

When studying Civic Activity, T.I. Kobeleva emphasized that it begins not from the moment of a person’s adulthood but their birth. From birth to maturity, a person participates in various activities, thereby entering into multiple relations with the state and society, accumulating everything that should characterize them as citizens. According to the researcher, “civic activity” can be conditionally divided into two types: official (electoral process, participation in referenda, or receiving a public office as a result of election or appointment) and unofficial (participation in various meetings, rallies, volunteer activities, defending their civil rights, views, interests).

The perception of oneself as a citizen of a country is understood as a person’s attitude to civil rights, i.e., the presence of such rights, which only citizens of a particular country have. According to the Constitution of the Russian Federation [26], the rights of the citizen include the right to participate in the management of state affairs both directly, and through representatives, the right to elect and be elected to bodies of state power, and bodies of local self-government, as well as to participate in a referendum, state protection of human and civil rights and freedoms within the borders of the Russian Federation is guaranteed. Defense of the homeland is the duty and obligation of any citizen of the Russian Federation. The citizen performs military service under federal law.

Considering Civic Position as a combination of qualities of an individual, one should distinguish four components in its structure: legal, moral, social, and pedagogical.

From the legal standpoint, Civic Position was studied by K.I. Maslov. He found that it represents a conscious attitude of an individual to their position and their service as an active participant in civil activity in accordance with the legal position of the citizen.

The social side of Civic Position was studied by E.F. Seehr, I.S. Kohn [8, 27]. They noted that there is a certain interrelation between a specific person and civil society as a whole and between a particular citizen of the country and a citizen as a subject of social relations.
T.I. Kobeleva and M.V. Stepanova [2, 28] considered Civic Position in terms of morality. They said that it is an ideological and moral criterion of a person manifested in tolerance, empathy, altruism, selflessness, patriotism, diligence, and readiness to serve for the benefit of one’s homeland. In addition, according to researchers, the personality must possess a number of moral values and attitudes. They are characterized by the priority of public benefit over personal gain, responsibility for one’s actions and actions, as well as for their consequences.

The civic position of a person is manifested in various forms. It is possible to distinguish such forms as passive, active, conformist (consumer), rebellious (protest), or creative. Indeed, the state is interested in the formation of an active civic position of its citizens.

According to A.M. Knyazev, active citizenship reflects the strive to a civil partnership, which is based on the manifestation of one’s abilities, respect, desire to understand another person, recognition of one’s rights and freedoms, tolerance, and a desire to achieve unity of opinion to implement social cohesion.

I.A. Shalepo [29] characterized active citizenship as a conscious activity aimed at a society in which this individual socializes. That includes specific, deliberate actions and deeds of a personal and public nature, focused on developing civic values while maintaining a balance between personal and civic interests.

The formation of an active civic position of a person includes an interest in socially significant activity, motivation and willingness to act, diligence, responsibility, awareness of personal significance and significance of each person, and the presence of organizational abilities.

A.G. Asmolov, A.M. Knyazev, T.A. Miroshina, G.N. Filonov [22, 23, 30, 31] have theoretically substantiated external and internal factors of forming a civic position. First of all, the formation of a person’s civic position is associated with the objective state of society; the socio-political situation.

According to a number of academics such as A.F. Abzalov, T.N. Balobanova, N.N. Voloboeva, T.I. Kobeleva, A.A. Leontiev, T.A. Miroshina, V.N. Myasishchev, E.P. Strelnikova, N.E. Shchurkova [2, 5, 6, 11, 13, 32, 31, 33, 34] the formation of the civic position of an individual includes the building of love for one’s homeland, the need to work for the benefit of society, understanding and execution of civic duties, and awareness that one’s actions and activities will affect the country as a whole.

Thus, Civic Position as a concept may be defined after the above study of the scientific works on the research topic, identifying the most significant relations objects for a person (state, law, society, citizen), and taking into account socio-political conditions. A civic position is a system of positive value attitudes that a person may hold towards the state, law, civil society, and themselves as an active citizen, by the execution of socially significant activities focused on the public good.

The formation of a persons’ civic position is caused not only by subjective efforts of teachers but, above all, by the objective state of society, socio-political situation. The fundamental beliefs about the state are formed during puberty based on social experience gained at school, family, and society and subsequently developed throughout an individual’s life. Thus, forming a person’s civic position occurs based on personal qualities, such as civic knowledge, civic views, civic responsibility, civic behavior, civic activity, civic conviction, and civic duty. Based on that, one of the main tasks of forming a persons’ civic position is the formation of moral patterns of behavior, patriotism, empathy, tolerance, and the need for an activity for the benefit of one’s homeland. Awareness of civic duties, responsibility for the committed acts, and their consequences builds the basis for civic behavior and civic activities, thereby forming an active civic position.

The analysis of scientific works allows us to state the obvious theoretical and practical importance of the research conducted on the problem of the person’s civic position formation.
However, it should be noted that this problem is not fully resolved in the context of socio-cultural relations and the current stage of socio-political development of Russia in the second decade of the XXI century

References


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In this paper, we look into how the new structure of the final-year undergraduate language assessment introduced by the School of Modern Languages (SML) at the University of Bristol (UoB) has affected the teaching on the final-year programme in the Department of Russian.

This paper tests whether the intended learning outcomes, the content of the course, teaching on the individual modules, the learning resources and the new assessment can be considered as ‘constructively aligned’, i.e., whether the Russian language teaching team working on the new course design succeeded in ensuring that “the learning objectives, the learning processes and the assessment mode and criteria relate systematically to each other”.

We will also explore whether the new blended synchronous and asynchronous teaching fits into the redesigned curriculum and whether the teaching programme continues to address the development of students’ discipline-related and transferable employability skills linked to the three areas of the Bristol Skills Network: knowledge and intellectual abilities; engagement and influence; personal effectiveness and wellbeing.

The key element of this research is the analysis of the anonymous student feedback questionnaire (SFQ) which includes qualitative questions related to all three written modules taught on the redesigned final year Russian language unit: the students were given an opportunity to analyse the quality and effectiveness of their learning on this unit.

Keywords: learning, teaching, and assessing; learning objectives; intended learning outcomes; unit and programme design; constructive alignment; blended learning; quality assurance; peer-assessment; feedback; discipline-related skills; transferable employability skills.

Background and Focus (goals)

In the 2019–2020 academic year, the School of Modern Languages (SML) introduced changes to the final-year language assessment, which in turn caused an overhaul of the Year 4 Russian Language Curriculum. All language departments within the SML were asked to adjust their final-year teaching programmes and the assessment regime to the new assessment format.

In the proposal for the new unit, the intended learning outcomes (ILOs) were left intact:

“By the end of this unit students will:

1. be proficient in the spoken and written language to degree standard.
2. be able to communicate fluently in the spoken language in both formal and informal registers.
3. have a high level of competence in using the written language in a range of tasks.
4. be sensitive to register and nuances of the language studied and will be able to reflect these in translation.
5. be able to demonstrate and reflect on their distinctive linguistic and cultural expertise by exploring its practical application in a range of educational and cultural contexts” [1].
It was, however, suggested that the assessment should change as follows: two separate examinations, Translation into the Foreign Language, and Composition, should be abolished and replaced with one written exam containing new elements testing ILOs 1, 3 and 5.

We should note that within the previous assessment structure, ILOs 1 and 5 were addressed through teaching Composition and Translation into Russian in a blended learning format. The final-year curriculum was designed in a way that students’ learning experience and departmental teaching practices were linked to the preparation for the final exams, as well as to careers which many Russianists aspire to pursue, e.g., working for the diplomatic service, United Nations, and other high-profile international organisations where advanced Russian language skills are needed. Role descriptions for jobs at these institutions often require evidence of advanced translation and essay-writing/analytical skills in Russian, as well as transferable employability skills, e.g., communicating and influencing, time management, being a team player, critical thinking, and problem solving.

In 2019, it became clear that, with two examinations having been taken off the final-year assessment, the Russian language unit required significant redesigning over the summer to get the unit ready for teaching in the new academic year.

Following a series of departmental discussions, we decided that Translation into Russian was to be replaced by Guided Writing comprising a) Mediation/Paraphrase from English into Russian, and b) Précis. Both skills are often required in various careers and are tested as part of an interview when Bristol graduates apply for jobs listed in the paragraph above.

In this paper, we have been focusing on seeking the answers to the following questions:
– Can the redesigned individual language modules address the development of skills that are linked to the unit’s intended learning outcomes, but which are no longer directly assessed?
– How can we ensure that crucial discipline-related skills are still addressed as part of students’ learning experience within the updated curriculum?
– How will we know that the learning objectives, teaching practices and the new assessment structures have been constructively aligned?

We will also look into the students’ perception of whether they have been developing transferable employability skills as part of their learning process.

To evaluate the effectiveness of the redesigned curriculum and assessment, we will analyse a survey completed by the students. The survey aimed to assess the quality of the learning process, the effectiveness of our teaching, the quality of the academic support given to the students on the unit, and to see whether we succeeded in aligning the pedagogic objectives of the Russian department with the new curriculum and assessment.

**Positioning the question in the learning and teaching in Higher Education (HE) Literature**

As academics, we are well aware of the fact that the curriculum of any particular course, the teaching methods, and the assessment procedures need to be interrelated and compatible. Biggs argues that “when there is alignment between what we want, how we teach and how we assess, teaching is likely to be much more effective” [2: 27]. Norton supports this: “If we accept the principles of constructive alignment expounded by Biggs, then we should start curriculum design with the question of ‘What is it that I want my students to have learned by the end of this course, module, or programme?’ frequently referred to as the learning outcome. The concomitant question is ‘How will I know that they have learned it?’” [3: 93]

When redesigning the new unit, we had in mind the questions set out in the previous paragraph. We knew from experience that “what and how students learn depends to a major extent on how they think they will be assessed” [2: 140–141].
Biggs’s analysis of the criterion-based assessment package [ibid: 167] fits well into the intended model of assessment for our unit, which incorporates criterion-referenced formative peer-assessed tasks to monitor individual progress throughout the unit, and teacher-controlled summative assessment in the form of a final-year examination.

Peer feedback was an essential part of the Translation module within the old, pre-2019 language unit. When redesigning the unit, we needed to ensure that peer feedback and elements of peer assessment were preserved. “There are great opportunities and advantages, in terms of understanding and engagement, to learners providing feedback on and assessing each other’s work. Using and/or developing assessment criteria takes students deeper into their learning and allows for feedback and reflection on learning and the sharing of what new meaning appears” [4: 2].

Our approach of incorporating the broader use of the discussion forum on Blackboard in course design is supported in Lea’s article where she argues that virtual learning environments (VLEs) offer “students the opportunity for electronic debate and discussion and, additionally, providing a permanent record of these which can be accessed repeatedly by students throughout their studies” [5: 11].

In this paper, we refer to Priorities of the UoB Education Strategy [6: 3] and relate to the author’s own reflections on teaching practice as the methods and approaches we propose within the redesigned curriculum are built on the author’s previous experience which is outlined and analysed in the recently published paper [7].

Methods and analysis

To assess the effectiveness of the redesigned curriculum, we have used a mixture of methodologies including the analysis of the results of formative assignments, peer observation of teaching in the department, followed by sharing feedback on the observed teaching with colleagues within the teaching team.

The key component of the author’s research has been the analysis of the anonymous student feedback questionnaire (SFQ). We aimed for the survey in question to be part of the students’ “learning process rather than a commentary on that process” and, as well as seeking feedback on whether objectives were being achieved, we wanted to provide the students with “an opportunity to critique those objectives” [8: 11].

The SFQ includes qualitative questions related to all three written modules taught within the redesigned RUSS30001 unit: the students were given an opportunity to analyse the quality of their learning on this unit.

The students filled in the questionnaire in weeks 19–20 of the academic year: by this time, they have completed several formative written assignments working in pairs with a partner, as well as one individual progress check comprising a written task on which they received feedback and feedforward from the tutors. It was also peer assessed in the Guided Writing/Paraphrase module. By week 19, the students will have been able to evaluate what and how they learn. They will have acquired perception of how well they are progressing on this unit, as well as what their expectations are in relation to the potential exam grade.

The questionnaire has been designed as a formative quality assurance tool: “…used formatively, SFQs make eminent sense where questions are tailored to specific courses on aspects on which feedback is required” [2: 278].

We focused on investigating the learning experience of the students across several areas:

a) Clarity of the learning objectives and the assessment criteria across the three written modules.
b) The quality of teaching and the quality of interaction with the tutors.

c) The usefulness of feedback (or, frequently, feedforward) on formative assignments received from the tutors, as well as peer assessment and peer feedback.

d) The quality of learning across the three written modules.

e) What transferable employability skills are being developed on this unit, in our students’ opinion.

Results and discussion

29% of the cohort completed the questionnaire (11 of 38 students) [table 1]. Most of the responses show how the students evaluate the new unit design, the teaching methods, their learning experience, and the formative assessment structure.

Q1-2 identify whether the students felt that learning objectives and the assessment criteria were made clear at the start of the course.

The answers were unanimously positive. They varied from a simple ‘yes’ to more detailed comments confirming clarity of the objectives and the assessment criteria on the individual modules of the unit. Student 9 noted that they “…have found the exercises where we have had to mark a piece of work ourselves very helpful in terms of becoming familiar with the marking criteria.” This matches exactly the goal we were pursuing as we wanted the students to get to know the newly designed assessment criteria through marking a practice piece completed by their partners.

Q3-6 evaluate the teaching practices, academic advice, and the quality of interaction with the tutors. Respondents showed their satisfaction with the teaching and the support they received from their tutors in all three modules. The answers vary from brief responses to nuanced comments linked to specific modules.

The analysis of the students’ evaluation of the clarity of the unit objectives and the marking criteria, the teaching and learning processes, as well as the quality of interaction with their tutors (Q1-6), confirms that the learning objectives and teaching practices applied on the unit are aligned.

Q7 checks if learning-related activities reinforce the learning objectives of the unit. Most respondents focused on activities linked directly to their assessment, e.g., “Going over Russian grammar” or ‘Regular speaking practice’. We were, however, pleased to see that Students 2 and 9 reflected on the development of transferable skills and the fact that they are being prepared not just for exams but also for what lies ahead after graduating.

Q8 evaluates students’ understanding of how the feedback from the tutors, as well as peer feedback practised in the Guided Writing (Paraphrase) module, helps the students prepare for exams. Responses confirm that the students find tutors’ feedback helpful, encouraging and motivating. Respondents note the usefulness of the peer-assessment exercise as it helped in preparation for the exam.

The responses to Q9 indicate that the majority identify the development of language-related skills as well as exam preparation to be the most useful aspects. One respondent went further: “I think the most useful aspect of the course is the collaborative aspect because I have learnt not just from my tutors but also my other course mates as well.” This comment refers to the online discussions and peer-assessment practice, the elements that are linked to the blended approach within the guided writing module.

Based on the responses to Questions 7-9, it is reasonable to conclude that students’ learning experience is aligned with the formative assessment structure.

The answers to Q10 suggest that the majority of respondents value teamwork, a major component of the Guided Writing/Paraphrase module, which comprises working in pairs, online...
forum discussions, working in breakout rooms online. Student 4 noted that they enjoy “a very friendly and convivial atmosphere” of the Paraphrase tutorials, and Student 3 mentioned that they value “personal relationships with teachers/course-mates”. This confirms that our principle of maintaining a friendly and encouraging atmosphere in the classroom helps the students to stay motivated and engaged in their learning.

**Q11-12** identify in what way the unit changed students as learners and asks them to reflect on what transferable skills they have developed. Three respondents have mentioned that their critical thinking and problem-solving skills have improved, although the most common skills referred to in the responses are time management, communication, and teamwork.

**Q13-14** seek to elicit additional suggestions to help strengthen the course. Responses from students 4, 6 and 11 include valid points which will help to enhance our teaching practice, e.g., suggestions to teach Précis and Paraphrase in alternate weeks or to use a broader range of resources, including topical films. These suggestions have been considered by the teaching team in preparation for the next academic year. Student 10 expresses the view that they are not sure if “learning to translate/paraphrase into Russian is a very useful skill for the future.” This made us think that in the introductory class, we should provide more examples and insight into how the skills taught on the unit could relate to students’ future careers.

**Table 1**

*Anonymous student feedback on the final-year Russian language written modules: E-R Guided Writing/Paraphrase; Precis, and Writing (mini-essay)*

<table>
<thead>
<tr>
<th>Question 1</th>
<th>Were the learning objectives identified and expectations made clear as far as the course information was concerned?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student 1</td>
<td>Yes</td>
</tr>
<tr>
<td>Student 2</td>
<td>Yes</td>
</tr>
<tr>
<td>Student 3</td>
<td>Yes</td>
</tr>
<tr>
<td>Student 4</td>
<td>Yes</td>
</tr>
<tr>
<td>Student 5</td>
<td>Yes</td>
</tr>
<tr>
<td>Student 6</td>
<td>Yes, the learning objectives and expectations for the course were made clear at the start of the year</td>
</tr>
<tr>
<td>Student 7</td>
<td>Paraphrase: yes, Precis: yes, Writing: yes; in all three units learning objectives are clarified from the outset and we consistently return to this throughout the course, particularly in the case of Writing and Paraphrase</td>
</tr>
<tr>
<td>Student 8</td>
<td>Yes</td>
</tr>
<tr>
<td>Student 9</td>
<td>Yes, very clear</td>
</tr>
<tr>
<td>Student 10</td>
<td>Yes, like every year, the Russian department has made everything very clear. The zoom meeting we had clarifying assessments was particularly helpful</td>
</tr>
<tr>
<td>Student 11</td>
<td>Yes</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Question 2</th>
<th>Were the assessment criteria made clear?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Mostly yes</td>
</tr>
<tr>
<td>2</td>
<td>Yes</td>
</tr>
<tr>
<td>3</td>
<td>Yes</td>
</tr>
<tr>
<td>4</td>
<td>Yes</td>
</tr>
<tr>
<td>5</td>
<td>Yes, it is displayed clearly on the course’s Blackboard site</td>
</tr>
<tr>
<td>6</td>
<td>Paraphrase: yes, Precis: yes, Writing: yes. The assessment criteria in all three units are extremely clear</td>
</tr>
<tr>
<td>7</td>
<td>Yes</td>
</tr>
<tr>
<td>8</td>
<td>Yes, very clear</td>
</tr>
<tr>
<td>9</td>
<td>Yes – I have found the exercises where we have had to mark a piece of work ourselves very helpful in terms of becoming familiar with the marking criteria</td>
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<tr>
<td><strong>Question 3</strong></td>
<td>Have you been receiving helpful academic advice during your studies on this unit?</td>
</tr>
<tr>
<td>Student 1</td>
<td>Yes</td>
</tr>
<tr>
<td>Student 2</td>
<td>Yes</td>
</tr>
<tr>
<td>Student 3</td>
<td>Yes</td>
</tr>
<tr>
<td>Student 4</td>
<td>Definitely</td>
</tr>
<tr>
<td>Student 5</td>
<td>Yes, for the most part. The advice/feedback has generally been useful for me</td>
</tr>
<tr>
<td>Student 6</td>
<td>Paraphrase: yes, Precis: yes, Writing: yes; in all three courses, academic advice is not only prompt, but extremely helpful. Ilona marks essays with an astounding turnaround for such a big cohort, and so too is Elena’s feedback. I particularly like the way that Paraphrase Анализ is based off Elena’s collective feedback. This allows access to new vocabulary (for example, when we discuss in class) but also some of the trickier sections</td>
</tr>
<tr>
<td>Student 7</td>
<td>Yes</td>
</tr>
<tr>
<td>Student 8</td>
<td>Yes, I am impressed at the level of guidance throughout the academic year</td>
</tr>
<tr>
<td>Student 9</td>
<td>Yes, absolutely – I have had more feedback in this unit than any other in my university career – the Russian department is always very good at this</td>
</tr>
<tr>
<td>Student 10</td>
<td>Yes, but I don’t think it’s been anything new to us after our first and second years</td>
</tr>
<tr>
<td>Student 11</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Question 4</strong></td>
<td>Has the academic advice been timely?</td>
</tr>
<tr>
<td>Student 1</td>
<td>Yes always</td>
</tr>
<tr>
<td>Student 2</td>
<td>Yes</td>
</tr>
<tr>
<td>Student 3</td>
<td>Yes</td>
</tr>
<tr>
<td>Student 4</td>
<td>Yes</td>
</tr>
<tr>
<td>Student 5</td>
<td>Yes, teachers are generally good at returning pieces of work. However, I would say that the deadlines for some formative pieces of work are quite hard to meet at times, especially when having to deal with other summative deadlines that are deemed to be more important. I especially think that late work should still be marked because, in some cases, students are not always able to balance these formative assessments as well as more important essays/summative assessments</td>
</tr>
<tr>
<td>Student 6</td>
<td>Paraphrase: yes, Precis: yes, Writing: yes. As I have mentioned above, all academic advice has been extremely well timed. Quite simply put, the sheer level of feedback and the rapid time we get advice is something that is not replicated in other units where it can take + 2 weeks for feedback on one essay</td>
</tr>
<tr>
<td>Student 7</td>
<td>Yes</td>
</tr>
<tr>
<td>Student 8</td>
<td>Yes</td>
</tr>
<tr>
<td>Student 9</td>
<td>Absolutely – I have been so grateful for the amount of time my Russian teachers have put into giving me feedback on time</td>
</tr>
<tr>
<td>Student 10</td>
<td>Yes</td>
</tr>
<tr>
<td>Student 11</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Question 5</strong></td>
<td>How would you describe the quality of interaction with the tutor/tutors on this unit?</td>
</tr>
<tr>
<td>Student 1</td>
<td>Very high and personalised to my needs.</td>
</tr>
<tr>
<td>Student 2</td>
<td>Fantastic. All the Russian teachers show a genuine interest in your progress.</td>
</tr>
<tr>
<td>Student 3</td>
<td>Good.</td>
</tr>
<tr>
<td>Student 4</td>
<td>Excellent. We have regular contact with tutors, and they are very responsive to emails. Even at weekends!</td>
</tr>
<tr>
<td>Student 5</td>
<td>Good interaction: my tutors usually reply fairly quickly to my emails. In addition, they let us know in advance of any changes to the lessons/upcoming tests in class etc.</td>
</tr>
<tr>
<td>Student 6</td>
<td>Paraphrase: extremely high, Precis: high, Writing: high. All three units offer an extremely high quality of interaction, but Paraphrase particularly excels at this. Elena’s classes provide an opportunity to not only interact with her, but with other students to compare and contrast answers. All three tutors have repeatedly gone above and beyond in terms of interaction</td>
</tr>
<tr>
<td>Student 7</td>
<td>Excellent – I feel well supported by my tutors for this unit</td>
</tr>
<tr>
<td>Student 8</td>
<td>High quality</td>
</tr>
<tr>
<td>----------</td>
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</tr>
<tr>
<td>Student 9</td>
<td>The best – I feel like I can ask anything, and I always receive any help I need. Also, I feel like all the tutors in the Russian dept are really good at communicating where you need to improve and are always supportive</td>
</tr>
<tr>
<td>Student 10</td>
<td>Good, I’ve felt able to contact my tutors for help if I need it</td>
</tr>
<tr>
<td>Student 11</td>
<td>Good</td>
</tr>
</tbody>
</table>

**Question 6** Are the methods of teaching effective in helping you learn?

| Student 1 | Yes |
| Student 2 | Yes |
| Student 3 | Good |
| Student 4 | Yes |
| Student 5 | Yes |
| Student 6 | Paraphrase: yes, Precis: yes, Writing: yes. As I have mentioned above, I think Elena’s анализ is invaluable |
| Student 7 | Yes |
| Student 8 | Yes |
| Student 9 | Absolutely – I think that they are very good in preparing us not just for the exams but for life beyond university, which I am very grateful for! |
| Student 10 | Yes |
| Student 11 | Yes |

**Question 7** Which activities on this course have reinforced the learning objectives?

| Student 1 | In-class discussions, examples of exemplary work, feedback received from tutors, going over Russian grammar |
| Student 2 | Completing translations in pairs is good because it promotes communication and thought about specific parts of the work |
| Student 3 | Weekly feedback |
| Student 4 | I found that for both the precis and paraphrase components of the course, it is really helpful that we do one practice exercise every single week. I also have nothing but praise for Ilona’s writing classes. They are very well-structured, and the grammar work we do is extremely helpful in improving our written work. I feel very well-prepared for the exam as a result of all 3 parts of the course. Everything we do in our Russian language classes has a clear focus on the exam |
| Student 5 | No answer |
| Student 6 | I cannot speak much to Precis as I have swapped to paraphrase now, but both Writing and Paraphrase activities are structured to enhance learning objectives |
| Student 7 | Regular speaking practice |
| Student 8 | The collaborative element of the course and discussion afterwards. The opportunity to mark other peoples’ work and learn from model translations |
| Student 9 | Working in groups and marking each other’s work has been a great way to make sure that we are not only ready for the exams but also for the workplace wherever we might end up after university |
| Student 10 | I like Ilona’s classes because the discussion on the text in groups makes me think critically and engage with the text and the grammar reviews are extremely helpful |
| Student 11 | No answer |

**Question 8** Have the formative assessment methods (your tutor’s feedback on written practice pieces and peer assessment/peer feedback) helped you in preparation for exams? If yes, how have these helped?

<p>| Student 1 | Yes, they have shown me what I’m doing well and what I need to improve for next time; each time I hand something in and receive feedback on it, I get to know what structure is required in the exam, and how to get a good mark |
| Student 2 | Yes, the feedback on language and format is always thorough and specific |
| Student 3 | Extremely helpful |
| Student 4 | Definitely! Written feedback from tutors is always detailed and helpful. This is useful since it helps me to notice patterns in the mistakes I’m making and improve as a result. The peer work we did in Elena’s paraphrase lessons was also useful, since it is good to get another student’s perspective on the work |</p>
<table>
<thead>
<tr>
<th>Student</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student 6</td>
<td>I have mentioned this above, but I simply cannot stress how much the Russian department provides in terms of feedback. Having a marked piece of work every single week allows me to track my own progress and gives me specific areas on which to improve. From feedback, I am able to develop my grammar skills, pick out vocab I may have made mistakes on / didn’t know before. Every piece of work we do, to ‘paraphrase’ Elena, is in preparation for the exam and having feedback every single week minimum is amazingly helpful. Although I may be a bit shaky in terms of my language, I know that I will go into the exam with confidence in what I need to do</td>
</tr>
<tr>
<td>Student 7</td>
<td>Yes. It has helped me to see where I have gone wrong and how I can improve for the exam. I also appreciate the positive feedback and encouragement my tutors have offered me. I find this motivating</td>
</tr>
<tr>
<td>Student 8</td>
<td>Yes, they have helped in understanding the best phrases required for specific translations to render in a more idiomatic way</td>
</tr>
<tr>
<td>Student 9</td>
<td>Yes absolutely. I now know exactly what is expected from me and it has greatly increased my confidence for the exam, because I know I can do it if I put my mind to it</td>
</tr>
<tr>
<td>Student 10</td>
<td>It’s helped me to identify problem areas to address before the exams</td>
</tr>
<tr>
<td>Student 11</td>
<td>Definitely – they have pointed out the grammar areas I need to work on</td>
</tr>
</tbody>
</table>

**Question 9** What is the most useful aspect of this course and why?

| Student 1 | Grammar revision for essay writing – so I know how to correctly form sentences which make sense |
| Student 2 | Guided writing (Paraphrase). Although it is the most challenging, it also offers various layers of working. E.g., working through a translation with someone else, peer reviewing and then going over the work in class |
| Student 3 | Regular feedback |
| Student 4 | Ilona’s writing classes, because I feel that my grammar still needs lots of improvement and we do lots of grammar practice in those classes |
| Student 5 | Précis writing has been useful to get to grips with as I understand that this is an important skill for some roles. In addition, recapping some key grammar points as well as some good phrases in the writing class has been useful ahead of my preparation for this part of the exam |
| Student 6 | Writing: having an article every week has been extremely useful. I can take this information and pick out vocab, useful phrases, statistics, and examples. Outside of language learning, I have learnt an enormous amount about Russian life & culture, particularly about modern Russia, which is not an area I was previously particularly confident in! Paraphrase: as I mention above, I think the most useful aspect of paraphrase is having an assessed piece of work every week and the analýzis. Similarly, to writing, the articles we have to read provide an insight into Russian culture and from this course I have drawn out some idiomatic expressions I wouldn’t have otherwise encountered |
| Student 7 | All aspects are useful in their own way – we practice a variety of different skills necessary for language development in each class – I can’t decide |
| Student 8 | The opportunity to learn from others and improve |
| Student 9 | I think the most useful aspect of the course is the collaborative aspect because I have learnt not just from my tutors but also my other course mates as well – whether that be vocabulary I haven’t encountered before, or just reinforcing grammar and good phrases |
| Student 10 | Yelena’s precis class is really good; working with a Russian text and summarising it in Russian is a great skill to learn and I engage with the text much better |
| Student 11 | The discussions about the mini-essays and articles in the writing classes were really informative and helped to develop my ideas about Russia while also improving my language |

**Question 10** What is the most enjoyable aspect of this course and why?

| Student 1 | I enjoy the in-depth discussions in Paraphrase classes of different ways to go about translation as it lets me hear other people’s methods which I could employ in a following translation |
| Student 2 | I would not say any of the work is enjoyable as such, but I feel like I have improved my Russian significantly and the feeling of progress is satisfying. This is a good thing. I would rather the work was laborious, so the feeling of progress is greater |
| Student 3 | Personal relationships with teachers/course mates |
| Student 4 | Elena’s paraphrase lessons because there was a very friendly and convivial atmosphere. |
| Student 5 | The most enjoyable aspects of the course have been the Political & Economic Russian classes with Elena, as I feel that it has helped me to further my knowledge about Russia and will undoubtedly be helpful for my future career. In addition, I have also enjoyed the précis writing and paraphrase classes as they have helped me to have much more in-depth understanding of the Russian language and its syntax but, at the same time, hugely widen my knowledge of key topic vocabulary. |
| Student 6 | Writing: I think the most enjoyable aspect of writing is the class discussions we have. I think the way that the class is structured to go through the article as a group and then split off into breakout rooms is a fantastic way to approach the articles. It gives me confidence before speaking in smaller teams and working in smaller groups is a nice way for me to express my own ideas and opinions. Paraphrase: Working in pairs has been a very enjoyable aspect. I have learnt a lot from reading my partner’s work and the work of others. More generally, I think the structure of this unit has also been very enjoyable. The set deadlines allow me to prioritise my work and structure my week effectively. I also think that this unit has taught me a lot about how to manage my workload, especially when working with another person and figuring out a time to collaborate. |
| Student 7 | No answer |
| Student 8 | Again, the teamwork element is highly enjoyable. |
| Student 9 | For me, the most enjoyable aspect is the quick pace – at first, I wasn’t sure if I would enjoy the quick turnarounds of work etc. but I have really got into the swing of them and feel very productive and have been learning very fast. |
| Student 10 | I really like Ilona’s class; she’s a great teacher and I always find that I learn a lot during the hour. |
| Student 11 | No answer |

**Question 11**

**How has this unit changed you as a learner?**

| Student 1 | I am forced to be more sociable and work as a team. |
| Student 2 | The intensity of the course has forced me to better manage my time. |
| Student 3 | Forced me to become more organised. |
| Student 4 | I now use a wider range of online dictionaries and resources (e.g., Yandex perevodchik) which has definitely improved my Russian. |
| Student 5 | No answer |
| Student 6 | As I mention below, this unit has changed me in terms of acquiring new skills of expressing myself clearly and working with tight deadlines in a way that is respectful of other people’s time. More generally, I think my confidence has blossomed in this unit, not just as a learner, but as a person and I will take this skill with me out into the world. |
| Student 7 | No answer |
| Student 8 | I have expanded on my critical skills and communicative skills. |
| Student 9 | I think I have become more open-minded as a learner – I am now much more willing to take on tasks that, at first, I was not sure about, and I am certainly much more open to working in a team. |
| Student 10 | I’m better at time-management because of the volume of work we receive and this year especially I’ve enjoyed working in pairs and groups because it’s been so long since we’ve seen our classmates. |
| Student 11 | I think it’s helped me see the benefit of teamwork. |

**Question 12**

**What transferable employability skills have you acquired while studying on this course?**

<p>| Student 1 | Time management, critical thinking, organisation skills, communication with team members, decision making, persuasive writing. |
| Student 2 | Pretty much all of the ones we look over in the guided writing class. I think the point about employability skills is laboured a bit, but I understand why. |
| Student 3 | Coping with deadlines. |
| Student 4 | The ones which come to mind immediately are to do with teamwork and communication, which we practised on Elena’s paraphrase course. I found it very helpful that we practised these skills by working in pairs. Elena regularly reminded us how the course related to the skills, which was helpful. |
| Student 5 | Teamwork, organisational skills, critical thinking, independence, problem solving – in other words, a variety of skills that would be an asset to any company, in my opinion. |</p>
<table>
<thead>
<tr>
<th>Student</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student 6</td>
<td>I think all of the transferable employability skills have been hit across all three units. In terms of Paraphrase, however, I think we have arguably hit more employability skills in that we have strict deadlines and have to give feedback in a timely manner that respects our opposing pairs. It has been a personal learning curve of mine to try and figure out how to get my arguments across in a cohesive way to someone I may not necessarily have worked with before and to have the confidence in my own suggestions and ideas. Working in a three for the first half in particular helped me develop skills of making my own voice heard whilst juggling with the suggestions of two other people. More generally, giving feedback in a clear, helpful manner to opposing pair has been a skill that I did not possess before the start of this unit.</td>
</tr>
<tr>
<td>Student 7</td>
<td>Time management, communication (with tutors and other students on the course), teamwork, adaptability (adapting to online learning and a heavier workload)</td>
</tr>
<tr>
<td>Student 8</td>
<td>Critical skills, Communicative skills, Interpersonal skills</td>
</tr>
<tr>
<td>Student 9</td>
<td>I have learnt many – the main one I can think of is learning to communicate when giving feedback and also when working in a group. This is something that I perhaps didn’t know how to do that well before this course.</td>
</tr>
<tr>
<td>Student 10</td>
<td>Time management, working in a team, critical thinking</td>
</tr>
<tr>
<td>Student 11</td>
<td>Communication, teamwork, and organisational skills</td>
</tr>
</tbody>
</table>

**Question 13**

What suggestions can you provide to help strengthen this course?

<table>
<thead>
<tr>
<th>Student</th>
<th>Comments</th>
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</thead>
<tbody>
<tr>
<td>Student 1</td>
<td>I think I will find it difficult to write a precis now, having not done it since TB1. This is tricky as I know I will have to write one in the exam, so would prefer if somehow, we could do one week precis, one week paraphrase rather than one term of each, so that we do them both equally all throughout the way, in preparation for exams at the end.</td>
</tr>
<tr>
<td>Student 2</td>
<td>No</td>
</tr>
<tr>
<td>Student 3</td>
<td>None</td>
</tr>
<tr>
<td>Student 4</td>
<td>It would be useful to do something ‘new’ in Elena’s paraphrase classes, as opposed to only talking about the previous week’s paraphrase. I think it would be useful to talk about the paraphrase for 10–15 minutes, but then do a different activity in class such as a different short paraphrase.</td>
</tr>
<tr>
<td>Student 5</td>
<td>No answer</td>
</tr>
<tr>
<td>Student 6</td>
<td>I am feeling a bit less confident in Precis as I had this last term, but I understand that this is a scheduling issue that cannot be changed. In terms of the course content, I can think of absolutely nothing that can help strengthen this course. Every single detail is focused on developing our skills as learners whilst looking ahead to future employability.</td>
</tr>
<tr>
<td>Student 7</td>
<td>No answer</td>
</tr>
<tr>
<td>Student 8</td>
<td>Asking for both versions of the translation so that one can receive feedback on their individual translation.</td>
</tr>
<tr>
<td>Student 9</td>
<td>I’ll be very honest, I’m not entirely sure how to improve the course because it is already so good.</td>
</tr>
<tr>
<td>Student 10</td>
<td>Although I enjoy the E-R paraphrase class I’m not sure that learning to translate/paraphrase into Russian is a very useful skill for the future as we’ll never be employed to do that as non-native speakers.</td>
</tr>
<tr>
<td>Student 11</td>
<td>Maybe using a broader range of resources – there were some videos which were good but maybe poetry, podcasts and longer topical films could be a good thing to explore.</td>
</tr>
</tbody>
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**Question 14**

Any other comments?

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<tr>
<th>Student</th>
<th>Comments</th>
</tr>
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<tbody>
<tr>
<td>Student 1</td>
<td>The paraphrase class is very useful, but so very time-consuming. With all my other classes and modules, I sometimes struggle to get everything done, as I feel I have to make paraphrase a priority, meaning I skip work for other classes. It would be useful if the texts were perhaps shorter, or if we had longer to submit each piece of work.</td>
</tr>
<tr>
<td>Student 2</td>
<td>The Russian department is ahead of the other language departments, who are still following the same ‘integrated skills’ formula. I hope that feedback is shared around, and the departments can learn from each other.</td>
</tr>
<tr>
<td>Student 3</td>
<td>No other comments</td>
</tr>
<tr>
<td>Student 4</td>
<td>Overall, I’m very happy with all 3 elements of this course. Especially considering the challenging circumstances created by COVID, I’ve been very impressed with all my Russian written language teaching this year. Thank you very much!</td>
</tr>
<tr>
<td>Student</td>
<td>Comments</td>
</tr>
<tr>
<td>---------</td>
<td>----------</td>
</tr>
<tr>
<td>Student 6</td>
<td>I really cannot emphasise how much I appreciate the Russian department and how tight a ship Elena runs. The fact that the Russian department structures the language units around separate skills is phenomenal, not to mention that Political &amp; Economic Russian is an absolute lifesaver in terms of getting in extra practice. I really cannot express how much this course is like gold dust and the Russian department goes above and beyond in every sense of the word. The support that Elena, Yelena &amp; Ilona provide is beyond anything I have ever experienced at Bristol, and I will miss this little family so much</td>
</tr>
<tr>
<td>Student 7</td>
<td>No other comments.</td>
</tr>
<tr>
<td>Student 8</td>
<td>No other comments.</td>
</tr>
<tr>
<td>Student 9</td>
<td>Overall, I have loved every minute of my Russian studies at Bristol, even this year with the pandemic the Russian department has been absolutely incredible, and I honestly couldn’t thank you enough for everything you’ve done for us students. The absolute best department – I am certainly going to miss it!</td>
</tr>
<tr>
<td>Student 10</td>
<td>No, I’m really enjoying our last year with the department!</td>
</tr>
<tr>
<td>Student 11</td>
<td>It was overall very enjoyable :)</td>
</tr>
</tbody>
</table>

Conclusions

The analysis of student responses to the survey questions confirms that, overall, the students are satisfied with the structure of the new curriculum as well as with the teaching methods and the assessment format of the unit.

The final-year curriculum has been redesigned in a way that students’ learning experience and departmental teaching practices are linked not only to the preparation for the final exams but also to the development of transferable skills sought by employers.

The analysis of the survey indicates that students realise that in addition to advanced language and analytical skills in Russian they have indeed developed transferable employability skills and attributes [7]. It is therefore reasonable to conclude that Priority 3 “Design, develop and deliver a ‘Bristol Futures’ curriculum that will ensure all students acquire the knowledge, skills and understanding needed to equip them for success within a rapidly changing world of work”, and specifically Action 3.1 of the UoB Education strategy, have been addressed in the redesigned curriculum, and, consequently, in our teaching practice: “We will provide a Bristol Skills Framework against which students can assess their skills development, evidencing and recording their personal development in order to foster and demonstrate a rounded set of graduate attributes. We will provide academic study skill resources to support students to successfully transition to study at University and progress through their academic programmes,” [6].

Responses indicate that certain structural nuances (e.g., the timetabling/sequence of the individual modules) needed rethinking. Students’ constructive suggestions have been considered in preparation for the next academic year. This aspect of quality assurance fits well in the Quality Assurance Agency’s (QAA) findings on good practice in use of student feedback: “…the priority given to the role of students in contributing to quality assurance and enhancement; this can be achieved through various mechanisms, such as student representation and surveys” [9].

Overall, in answer to the questions set out at the start of this paper, it is reasonable to conclude that the teaching practice, learning, and assessment within the new unit are constructively aligned. Our findings also confirm that departmental practice is in line with the UoB Education Strategy envisaging “course design and assessment practices that challenge our students and so empower them to achieve their full potential” [6].

Moreover, the survey results indicate that students have adapted well to the challenges caused by the Covid-19 pandemic as they have been fully engaged in their learning process within the blended and online delivery of the language teaching programme.
Ethics Approval Statement

This project gained Ethics Approval on 15th March 2021.

The research included in this paper has been conducted with full compliance of research ethics norms, and more specifically with the codes and practices established in the British Educational Research Association (BERA) Ethics Guidelines, and appropriate University of Bristol Faculty Ethics Guidelines.

This research does not deal with sensitive topics, has not been conducted using covert methods, and all participants are over the age of 18. Participants have given informed consent for their data to be used for the purposes of this research. Participants had the right to withdraw without consequence and their confidentiality has been protected by making their responses anonymous.

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INTERNET MEMES AS A WAY OF DEVELOPING FUTURE ENGINEERS’ MOTIVATION TO STUDY A FOREIGN LANGUAGE IN THEIR PROFESSIONAL ACTIVITY*

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Introduction The article considers the issue of increasing the motivation of technical university students to study a foreign language using English-language Internet memes, which are considered to be significant material for teaching Generation Z students. The purpose of the article is to theoretically substantiate and experimentally test the memes’ effectiveness in building motivation to study a foreign language. The research’s scientific novelty is identifying ways of organizing future engineers’ work with memes based on a variable methodological apparatus.

Materials and methods The author analyses the literature on the study of the motivational processes among students of a non-linguistic university studying the English language and using creolized texts to organize their English language-learning process. The research material comprises memes taken from the Internet that correspond to the sections of their discipline program.

Results and discussion A workflow for increasing students’ motivation to learn English based on their work with memes has been designed, including methodological and technological, content-motivational, and reflexive-evaluative modules. A methodological experiment has been carried out to test the proposed methods of increasing students’ motivation. An example of organizing the work with memes is given.

Conclusion The results of the methodological experiment conducted at the Trekhgorny Technological Institute confirmed the effectiveness of the proposed methods of developing students’ motivation.

It was revealed that memes could become a powerful teaching material that helps to increase the motivation of future engineers to learn English.

Keywords: Internet memes, creolized text, motivation to learn English, students of a technical university.

Introduction

A modern engineer’s knowledge of the English language is an important indicator of their competitiveness in the global space. The demand for a specialist who is ready and able to carry out effective foreign language communication determines the importance of a Foreign Language in Professional Activity class. Despite these trends, a significant percentage of students do not see ways to implement foreign language communication knowledge and, therefore, are not interested in acquiring a foreign language at a higher level [1]. Problems regarding motivation stem from a limited number of hours in the class, students’ focus on studying only their major disciplines [2, p. 29], difficulties in transmitting thoughts in a foreign language, and differences in the lexical and grammatical features of Russian and English [3]. The indicated difficulties actualize the need 

to search for new ways of teaching English to technical university students, aimed at developing their motivation and expanding their foreign language knowledge.

Analysis of the research on motivation issues allows us to define the process of motivation as a complex combination of external and internal factors that affect the student and form their motivational sphere in relation to learning English. Researchers [4, 5] distinguish between the external (ability to get good grades, find a job) and internal (interest in the material of the class) motives of students to study a foreign language. Students’ internal motives can be classified as: communicative (focus on communication), educational and cognitive (interest in the content of the material), cognitive (interest in the phenomena of language) [6], professional and cognitive, and achievement of a goal [5]. We agree with A.P. Avdeev that the motivational sphere of students to learn a language is made up of both professionally significant and professionally insignificant motives [7].

Analyzing the results of the survey conducted among 73 students of the Trekhgorny Technological Institute, a branch of the MEPhI university, revealed that external and internal motives demonstrate students’ need for their language development to solve various problems. Taking into account the components of the student’s motivational sphere, presented in the works discussed above, and based on the results of the survey, we define two groups of motives: professionally oriented (the desire to study technical aspects related to a future profession, topics within professional activities, and improving language skills as a way to ensure their competitiveness); and communicatively significant (the need to understand original English-language information and the desire to communicate in English in the global world).

Identifying ways to develop students’ motivation to learn a language, researchers declare the effectiveness of extracurricular work [8], the implementation of communicative methods in the class [9], and the use of information resources [10]. Referring to scientific sources stating the high motivational potential of using Internet content (e.g., TED Talks videos, YouTube podcasts, foreign language memes), and taking into account the needs and characteristics of today’s students who are representatives of Generation Z (i.e. the need for virtual communication, an audio-visual way of perceiving information, clip thinking [11]), we will state the importance of organizing the work of future engineers with Internet memes as a promising way of developing their motivation to learn English. Being an essential element of communication in the global network environment, memes meet students’ needs by creating authentic foreign language communication situations. Arguing the need to refer to memes as an educational resource, it is worth highlighting their advantages, such as ensuring the visualization of the verbal components of communication [12], focusing the teaching process and communication rather than linguistic structure [13], enhancing the attention and interest of students, and the implementation of cultural orientations [14].

The purpose of the article is to theoretically substantiate and experimentally test memes’ effectiveness in building motivation to study a foreign language. The scientific novelty of the research consists of identifying ways of organizing future engineers’ work with memes on the basis of a variable methodological apparatus.

Materials and Methods

The study used the following methods:

1) theoretical:
   – analysis of scientific and methodological literature devoted to the study of the motivation of technical university students studying a foreign language, which made it possible to highlight the components of the motivational sphere of future engineers in relation to learning English;
Results and discussion

Memes represent an element of culture that circulates in society by copying or imitation [15, p. 113]. Being a phenomenon of modern digital culture, memes visualize a large amount of information in a concise form, the features of which (brightness, fecundity, and aphorism) cause an emotional response and determine their wide distribution and good memorization [16, p. 195]. From the point of view of a foreign language teacher, a combination of verbal and non-verbal components that enrich the meaning of a meme is quite important. Memes containing verbal and iconic components are considered creolized texts [17]. Researchers [18] focus on the fact that it is creolized texts that are significant in language teaching for Generation Z students, since they help to activate their attention, develop creative potential, stimulate statements based on an existing idea, and, therefore, increase students’ emotional interest in English-language material.

The scientific and methodological literature notes researchers’ interest in the use of memes in the process of teaching a foreign language. It describes the possibilities of using the technology of working with creolized texts of Rage Comics [19], ‘doggo-memes’ [20], and thematic memes for studying technical terms [21]. Despite some difficulties in the use of memes in educational activities (the abundant presence of incorrect lexical units, insufficient background knowledge, lack of cultural specifics understanding), memes/creolized texts are a relevant way to update the content of the Foreign Language discipline, which requires careful selection of material and stage-by-stage organization of students’ activities.

Considering the technology of organizing students’ work with memes, we can see the absence of a single algorithm: the use of memes in teaching is determined by specific tasks (e.g. reinforcing vocabulary, determining the lexical and grammatical features, taking into account intercultural differences, enhancement of students’ attention). Z. Huang and L. Na note that the stage-by-stage work with memes in foreign language classes corresponds to the meme’s life cycle and includes the phases of its assimilation, retention, expression, and transmission [22, 23]. Considering memes as a way of developing students’ intercultural communicative competence, A.S. Budnik presents the stages of learning the aspects of memes, searching for bilingual memes and comparing them, and then developing their own memes using given templates [24]. Some researchers [25, 26] believe that the organization of teaching based on memes is consistent with the work on it at the pre-text, text, and post-text stages.

We agree with N.N. Nikolina that the use of memes in the teaching process is not limited to visual support but provides material for creating a set of activities [20]. Taking into account the
need for a comprehensive step-by-step work with memes as an authentic variable material with significant motivational potential, and relying on the considered aspects of using memes/creolized texts, we will present a model for organizing work with memes in Foreign Language in Professional Activity classes as a way to increase technical university students’ motivation for language learning. The components of the proposed model have methodological and technological, content-motivational, and reflexive-evaluative sections.

The methodological and technological section
determines the stage-by-stage course of work with memes, which develops students’ foreign language knowledge, skills and abilities and presents methods for organizing this work. Based on the studies discussed above, let us single out the following algorithm for organizing the work of students with memes:

1) presentation-stimulating stage (acquaintance with memes corresponding to the subject of the lesson, stimulating students’ interest in active work, updating vocabulary based on the meme, work on the lexical and grammatical difficulties in understanding the text part of the meme, acquaintance with the linguocultural specifics, and the meme’s origin);

2) reproductive-training (control of understanding the linguistic and content components of the meme, comparing the Russian translation with the original text, and phonetic, lexical, and grammatical exercises based on the meme’s linguistic material);

3) productive and transformational (performing productive speech activities based on the communicative situation of the meme, activating group communication, exchanging opinions in oral and written form).

According to the presented stages, effective methods and techniques of working with memes to motivate students have been determined (Table 1). Let us point out that working with multimedia tools at different stages of work with memes motivates students.

<table>
<thead>
<tr>
<th>Stage</th>
<th>Methods and techniques of work organization</th>
<th>Used instruments</th>
<th>Task variant</th>
</tr>
</thead>
</table>
| Presentation-stimulating     | – Work with visualization  
– Brainstorming  
– Forecasting, word associations  
– Descriptive activities                                   | Canva, PowerPoint Presentations, Surveymonky, Kahoot                            | – Look at the picture and describe it.  
– Write the words you associate with the picture. |
| Reproductive and training    | – Phonetic exercises  
(receptive-imitative)  
– Training grammar, lexical language activities  
(substitution, transformation) | Google Forms, assignment tools, Moodle platform quizzes                        | – Define the verb tenses in the text of the meme.  
– Find and correct the mistake.  
– Put the words of the text in the correct order.  
– Find the meme demonstrating the same grammar phenomenon. |
– Create your own meme using the given image.  
– Write an essay. |

Methodological apparatus for organizing students' work with memes

The content-motivational section reveals meaningful work directions with memes based on a careful selection of creolized texts that correspond to the Foreign Language in Professional Activity classes.
Activity class syllabus and students’ own interests. Sources of memes were: social networks (https://www.reddit.com/, https://vk.com), online meme libraries (https://memoteka.com, https://knowyourmeme.com/) and methodological articles. In this section we focused on the subject program for students majoring in Computer Science. Let us present a variant of supplementing the class material with memes (Table 2).

Table 2
A variant of introducing memes into the content of the Foreign Language in Professional Activity class

<table>
<thead>
<tr>
<th>Class section</th>
<th>Directions of work with memes</th>
<th>Meme example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Living in the Digital Age</td>
<td>Practicing questions in English (WH-questions, yes / no questions), vocabulary systematization on the topic “Computers: now and then”</td>
<td>Computer Comics (What are you doing, sweetie? I’m building a computer. – Can you hack Facebook?)</td>
</tr>
<tr>
<td>Using social networks</td>
<td>Description of the social networks’ functions, general vocabulary on the topic</td>
<td>Cards memes Condescending Wonka (Oh, you don’t use social networks for business. Tell me how you plan to stay relevant).</td>
</tr>
<tr>
<td>Computer hardware</td>
<td>Vocabulary systematization by topic, description of a problem with hardware based on the communicative situation of the meme, search for a grammatical error in the meme and its correction</td>
<td>Grandma on the computer, Computer Comics, Rage Comics (PC gaming during summer while opening steam. PC gaming during winter 5 separate crisis games running while rendering 1080p videos)</td>
</tr>
<tr>
<td>Computer software</td>
<td>Consolidation of lexical and grammatical structures while working on the situation in the meme</td>
<td>Meme characters Harry Potter was the first one to understand the python language</td>
</tr>
<tr>
<td>Programming frameworks</td>
<td>Practice asking questions in English (yes/no questions, framework description)</td>
<td>Choosing an operating system – meme</td>
</tr>
</tbody>
</table>

The reflexive-evaluative section reveals a method for diagnosing the levels of formation of a student’s motivation to study English using memes. This section is based on the criterion-evaluating apparatus presented in Table 3.

Table 3
Criteria and indicators of the students’ motivation formation

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td>Professionally directed</td>
<td>– The student’s understanding of the importance of language proficiency for effective communication in professional activities.</td>
</tr>
<tr>
<td></td>
<td>– The student’s interest in the study of lexical and grammatical structures and foreign language terms within the framework of professionally oriented topics.</td>
</tr>
<tr>
<td></td>
<td>– Active participation of the student in the classroom and completion of extracurricular work related to a foreign language in professional activities.</td>
</tr>
<tr>
<td>Communicative and personal</td>
<td>– Interest in learning the language for the development of their own foreign language communicative competence.</td>
</tr>
<tr>
<td></td>
<td>– The desire to communicate in English during classroom and extracurricular work (the desire to understand English-language films, songs and memes, and to express their own point of view),</td>
</tr>
<tr>
<td></td>
<td>– Students’ active, independent and creative, project work with English-language material during classroom and extracurricular activities</td>
</tr>
</tbody>
</table>

In the course of their work, students’ levels of motivation to learn English (low, reproductive, and productive) and diagnostic methods (polls, observation, analysis of student activities, a test by T.N. Ilyina “Motivation for studying at a university”) were determined.
The effectiveness of working with memes on the basis of the proposed model was tested by a methodological experiment, in which 74 students of Trekhgorny Technological Institute participated, divided into control (CG) and experimental (EG) groups. No systematic work with English-language memes was carried out with the students of the CG, whereas systematic work based on memes was carried out with the EG.

Let’s give a detailed example of organizing such work with students based on the “Computer Types” topic. The students were offered a meme from the “Computer Comics” series (Figure 1). Memes of this type represent rich lexical and grammatical material for creating communicative situations associated with improper work on a computer and a person’s dependence on computer technology. The undoubted didactic advantage of computer comics is the rather voluminous textual part of the creolized text, which provides opportunities for the assimilation of lexical and grammatical structures and the subsequent communication.

At the presentation-stimulating stage, the development of students’ interest to work with memes (including the designated meme) and the removal of barriers to their successful understanding was realized through brainstorming techniques:

– problematic issues (What types of computers can you see in the pictures? Which of them are used nowadays? What are the main peculiarities of these computers?)

– visual brainstorming (Look at the pictures and match the type of computer with its image. Explain your choice).

During the presentation of the meme, lexical and grammatical substitution exercises were used to help remove the linguistic difficulties of understanding the meme. Here are some examples:

– Match the sentence with the picture.

– Complete the text using the words (available, French horn, a good listener, believes).

– Put the words into the right order to make up sentences (available/discrete/quantum computers/quantities/in/are/only/small).
Acquaintance with background information (features of memes of this type, their origin, socio-cultural factors) was realized during independent search or group work with the text prepared by the teacher.

At the reproductive-training stage, work was carried out related to the implementation of speech exercises aimed at considering the lexical and grammatical features of the meme text. The control of the students’ ability to understand the meme in terms of vocabulary and grammar was carried out during the implementation of the following language exercises by students:

– receptive (*Have a look at the pictures. Remember what is written on them*)

– gap-fill exercise (*Using the words from the meme’s text complete the gaps in the following sentences, e.g. The company IBM presents cloud access to the most advanced quantum computers... – The company IBM presents cloud access to the most advanced quantum computers available*)

– reproductive (*Change the sentences according to the example: The computers available in the library have no Internet access – The computers that are available in the library have no Internet access*)

– analytical (*Look at the phrase “such a good listener” from the meme. Do you remember the difference between ‘so’ and ‘such’? Give another example*)

Consolidation of grammatical material based on a meme can be carried out when organizing students’ independent work with Internet sources: searching for other memes that demonstrate a certain grammatical phenomenon and adding their own phrases to the meme based on the required grammatical structure.

Speaking about the potential of memes to enhance students’ vocabulary, it is worth noting that these creolized texts create vivid emotional images in their minds using a play on words (quantum computers – small discrete quantities), a metaphor (classical computer runs using a French horn, a violin and a contrabassoon), irony (supercomputers believe themselves to be a superior race – I am a Mac), which creates a solid foundation for students to memorize lexical units. While working on vocabulary, the following exercises are used as part of the meme:

– Match the word with its definition (*a computer taking advantage of the quantum properties of qubits to perform certain types of calculation quickly in comparison to usual computers is…*)

– Divide the words into the groups (*1. Personal computer – a. microprocessor, word processor, Internet browser, software, hardware*)

Work at the productive and transformational stage has the greatest motivational potential since it allows the use of various methods of organizing student communication in English. Focusing on communication is the key task at this stage. As noted by Y. Han, the skills of encoding and decoding the information required to understand a meme involve not only the ability to interpret the text, but also to decipher the information hidden in the content of the meme [27]. Despite their limited textual component, memes are a capacious source of information that create opportunities for exchanging opinions and conveying new meanings. Taking into account the high motivational potential of memes for the development of the foreign language communicative competence of technical university students, we will designate the types of productive exercises used in work at the productive-transformational stage.

To develop foreign language oral skills using memes we suggest the following:

– speech question-answer exercises that require disclosure of the student’s own point of view (*Think and give your answers to the questions. How is a classical commuter connected with musical instruments? What are the advantages of Mac computers? Why does the author of the meme call them supercomputers?*)
– discussion exercises (Choose any part of the meme and comment on it)
– situational communication exercises (Transform the text of the meme into the dialogue between a customer who knows nothing about computers and a shop assistant who talks about the quantum, classical, personal and supercomputers sold there. Be creative, use your imagination).

The development of foreign language writing skills is facilitated by creative assignments:
– computer-assisted cognitive visualization (a) Following the meme's presentation of computer types, create an advertisement poster for such a computer. Choose any computer type, give its main technical characteristics and advantages. b) Using one of the services (mr-mem.ru, 1001mem.ru/create-mem) create your own meme describing computer types)
– essay (“Are quantum computers really available only in small discrete quantities?”).

Students are also interested in search work in groups based on memes. Mini-projects are an option for organizing such student activities. For example, in reference to the part of the meme about quantum computers, students were given the option of completing the following creative task: “Are quantum computers really available only in small discrete quantities? What do you know about quantum computers? Watch the video at TED Ed “The high-stakes race to make quantum computers work.” Present its main idea in 5–7 sentences, describing the principles of quantum computer work. What does the author of the meme mean by presenting the quantum computer as a technical aid available only in small discrete quantities? Create your own meme connected with quantum computers. Present your search results to the other students.

Evaluation of the proposed methods’ effectiveness was carried out in the course of diagnostic sections in accordance with the above-mentioned evaluation criteria. The results of the performed diagnostics are presented in Table 4. Along with classroom work, students were involved in project activities and independent work with memes.

<table>
<thead>
<tr>
<th>Diagnostic section</th>
<th>Levels of students’ motivation formation</th>
<th>EG (%) 35 people</th>
<th>CG (%) 39 people</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-experimental</td>
<td>low</td>
<td>32.3</td>
<td>31.4</td>
</tr>
<tr>
<td></td>
<td>reproductive</td>
<td>46.5</td>
<td>48.3</td>
</tr>
<tr>
<td></td>
<td>productive</td>
<td>21.2</td>
<td>20.3</td>
</tr>
<tr>
<td>Experimental</td>
<td>low</td>
<td>27.0</td>
<td>23.6</td>
</tr>
<tr>
<td></td>
<td>reproductive</td>
<td>26.9</td>
<td>51.1</td>
</tr>
<tr>
<td></td>
<td>productive</td>
<td>46.1</td>
<td>25.3</td>
</tr>
<tr>
<td>Post-experimental</td>
<td>low</td>
<td>18.5</td>
<td>31.4</td>
</tr>
<tr>
<td></td>
<td>reproductive</td>
<td>28.3</td>
<td>42.5</td>
</tr>
<tr>
<td></td>
<td>productive</td>
<td>53.2</td>
<td>26.1</td>
</tr>
</tbody>
</table>

The data obtained as a result of the implementation of the proposed model allow us to declare the effectiveness of its functioning, since the number of students with a productive level of motivation has increased. Systematically organized variable work with memes based on the presented material contributes to the development of future engineers’ motivation, including professionally oriented and communicative-personal motives.

The successful functioning of the model was obtained due to the observance of a number of pedagogical conditions that create a communicative environment conducive to working with memes. These conditions are represented by a number of factors:
Conclusion

Thus, when searching for new ways to modernize the English language teaching process for Generation Z students, Internet memes are relevant material with significant motivational potential. A large selection of memes of various topics, a combination of a vivid visual image with ironic content and the memes’ relevance provide ample opportunities for using these creolized texts to develop students’ knowledge, skills and abilities that make up their foreign language communicative competence.

In the course of the research, the components of a technical university student’s motivation regarding the process of learning a foreign language were determined, and a model for organizing their work with foreign-language memes was presented as a way to increase their motivation to learn English. Within the framework of the proposed model, an algorithm for students’ work with memes was determined, i.e. a methodological apparatus that ensures the effectiveness of this work. Possible meaningful directions of organizing the work of students with memes in accordance with the Foreign Language in Professional Activity program were revealed, providing a criterion-evaluative apparatus for determining developments in students’ motivation to learn English. The possibilities of implementing this model were presented using the example of work with a specific meme. The conducted methodological experiment shows positive results in the development of future engineers’ motivation to learn English.

Developing the motivation to learn a language is an important factor in organizing the educational process for technical university students, which conditions students’ deep understanding of linguistic phenomena and reveals their desire for independent work. Methods of organizing the process of learning English using memes have shown their effectiveness in the formation of professionally oriented and communicative-personal motives in relation to the language-learning process.

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PSYCHOLOGY OF ADOLESCENTS WITH INTELLECTUAL DISABILITY COMPlicated BY VISUAL IMPAIRMENT: FEATURES OF INTERPERSONAL RELATIONS

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It is customary to consider interpersonal relationships as a significant factor influencing the development of individual mental processes and personality. In recent years, studies that reveal the specifics of interpersonal relationships in persons with different types of dysontogenesis, including those with intellectual disabilities, have been of particular interest to specialists. This article presents the results of studying the interpersonal relationships of adolescents with intellectual disabilities (ID), complicated by visual impairment. When it comes to comparing the interpersonal relations in adolescents with intellectual disabilities, complicated by visual impairment and their peers with uncomplicated intellectual disabilities, the results of the study show that there are features which are general to both groups and features which are specific to only one group. In the surveyed groups, only one-third of adolescents consider their mother and father as a parental couple. More often than not, they communicate with their mother and refuse to communicate with their father. The adolescents of both groups are characterized by the following: low involvement in terms of interaction with peers; the presence of emotionally deficient or emotionally excessive reactions (with a predominance of the emotionally deficient type); poor decision-making, the desire to shift responsibility to others; lack of interest to become a leader; frequent conflicts with peers and inability to resolve them constructively. In addition, adolescents in the surveyed groups often demonstrate reactions to frustration in an active-aggressive or a passive-suffering manner. Moreover, in adolescents with uncomplicated ID, reactions of an active-aggressive type dominate, and in adolescents with ID complicated by visual impairment, reactions of a passive-suffering type are dominant. It is important to note that adolescents with ID complicated by visual impairment tend to be isolated from their peers and show high affection for home and their families.

Keywords: interpersonal relations, adolescent, intellect, intellectual disabilities, visual impairment.

Currently, a relatively large number of studies have been carried out in psychology on various aspects of interpersonal relations, in particular:

– B.G. Ananiev [1] and V.N. Myasishchev [2], speaking about the nature of interpersonal interaction, singled out three components: cognition of each other, emotional response, and interpersonal communication reactions;

– L. Anert [3], A.P. Okoneshnikova [4], E.N. Reznikov [5], S.D. Gurieva [6], studying interpersonal relations at the interethic level, noted the influence of interethnic differences on the nature of interpersonal relations;

– A.A. Rean [7], J.L. Kolominsky [8], I.S. Kon [9], A.V. Mudrik [10], N.N. Obozov [11] emphasized the role and place of interpersonal relations in the educational space.

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There are many studies concerning the interpersonal relations of children and adolescents with dysontogenetic development, including intellectual disabilities [27–29]. It is known that with ID, there are: delay and instability in the development of interpersonal relations; difficulty in the development of communicative ties; a large number of small micro-groups; frequent change of unofficial leaders, while leaders are often singled out on a random basis; a large number of children in extreme status categories, especially in the “isolated” category; instability in the manifestation of empathy and sympathy; fragmentation of social experience [30–33]. However, it should be noted that there are quite a few studies in which the specificity of interpersonal relations of adolescents with ID complicated by impaired functions of analyzers was studied, although the number of such children among students of special schools is increasing every year. Of course, studies aimed at studying interpersonal relationships in this category of adolescents are essential for organizing effective interaction between participants in the educational process.

The relevance and practical significance of the above issue determined the choice of our study – interpersonal relations of adolescents with intellectual disabilities complicated by visual impairment.

**Organization of empirical research.** The study was conducted over six years (2014–2019) on the basis of three educational institutions in Tomsk for students with intellectual disabilities. The study involved 60 adolescents with mild ID 13–16 years old, who were divided into two groups of equal size: 1) adolescents with uncomplicated ID; 2) adolescents with ID complicated by visual impairment (amblyopia, astigmatism, myopia).

To study the interpersonal relations of adolescents, the questionnaire “My environment” was used; R. Gilles’ method “Film-test,” adapted by I.N. Gilyasheva and N.D. Ignatieva; questionnaire of interpersonal relations (QIR) by V. Schutz method, “Assessment of relationship with the class.”

Before the study began, parents provided permission for their children to participate in the research.

**Empirical research results and the discussion.** All adolescents participating in the survey willingly agreed to answer the questionnaire. During the survey, the students behaved appropriately. In case of any questions, the student could receive a comment from the psychologist.

From the answers to the question: “With whom do you live?” we found out that most of the adolescents of the 1st (80%) and the 2nd (60%) groups live in complete families. The upbringing of adolescents from single-parent families was carried out primarily by mothers, often with the help of grandparents.

To the question: “Do you like spending time at home? Would you like to go home as soon as possible?” 60% of adolescents in the 1st group answered yes, 33% of adolescents said they did not want to go home if there was a conflict situation in the family, and only 7% of adolescents did not want to return home from school. A different situation was noted in the 2nd group of adolescents. In this group, adolescents were divided into two categories: in the first category, 73% of adolescents wanted to return home after school as soon as possible; in the second category, 27% of adolescents only sometimes did not want to go home.

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The adolescents of the 1st and 2nd groups, living in a boarding school, noted a reluctance to return home. Amongst the reasons for their unwillingness to return home, this category of adolescents named poor living conditions, lack of attention from family members, and frequent conflicts.

To the question: “Do your parents often talk to you about your affairs?” the answers of adolescents in the 2 groups were distributed in the same way: 20% of adolescents answered positively, 60% of adolescents noted that parents are rarely interested in their affairs, 20% of adolescents indicated that parents are indifferent to their activities. Most of the adolescents who noted their parents’ indifference to their activities lived in a boarding school.

To the question: “Do you feel comfortable at home? Are you scared to be at home?” more than half of the adolescents in the 1st (60%) and 2nd (67%) groups answered that they were quite comfortable at home.

To the question: “Do your parents often play or go out for a walk with you? Do they read books to you?” 80% of adolescents in the two surveyed groups answered that their parents rarely interact with them. In this case, the initiator of communication is often the adolescent. Unfortunately, 20% of adolescents noted a lack of interaction with their parents.

From the answers to the following questions: “If someone offended you or were you just upset, would you immediately tell your mom, dad, or friend about it? would you tell anyone?” it can be seen that from the 1st group, 47% of adolescents would not tell anyone, 33% – to their mothers, 20% – to a friend. In group 2, 47% of adolescents would tell their mothers, 33% of adolescents would not tell anyone, and 20% of adolescents would tell a friend about their problem. It is important to note that adolescents of the 1st and 2nd groups living in a boarding school prefer not to tell anyone about their problems.

To the question: “If you have something to say but find it difficult to express, what will your parents do?” 40% of the adolescents of the 1st group and 33% of the 2nd group answered that parents would patiently listen to them and help with an issue. More than half of the adolescents in the 1st (60%) and 2nd (67%) groups reported that they would not be listened to and sent to another parent in this situation. The results obtained reflect the level of intolerance of parents towards their children, which, of course, hurts parent-child relationships.

To the question: “Do you have many friends?” adolescents of the 1st group answered as follows: more than three friends – 27%, only one friend – 53%, I have no friends – 20%. In group 2, 13% mentioned more than three friends, 60% mentioned one friend, and 27% believe they have no friends. The answers show that 20–27% of adolescents surveyed do not have friends, negatively affecting their socio-psychological development.

To the question: “Would you entrust your secret to a friend and turn to him for help in a difficult situation?” only 20% in groups 1 and 2 answered yes.

To the question: “Why do you love friends?” in the two groups, the most common answers were: he is good, kind, cheerful.

To the question: “Do you often have conflicts with your friends?” more than half of the adolescents in the 1st (80%) and 2nd (67%) groups answered positively. Moreover, in most cases, conflicts were resolved with the help of an educator or teacher. In a situation where teenagers are trying to get out of a conflict situation on their own, they use non-constructive coping strategies.

Based on the results of the survey, we can say that adolescents in the two groups: 1) have parents who devote little time to them and are often indifferent to their problems; 2) build a more trusting relationship with their mothers; 3) experience difficulties in communicating with peers and, in the event of conflict situations, are not able to constructively resolve them.
At the same time, the survey showed that adolescents in the 2nd group demonstrate greater attachment to home and their family, while adolescents in the 1st group have a greater number of friends.

Using the methodology of R. Gilles, it was revealed that 60% of adolescents in the 1st group had a high indicator on the Conflict/Aggressiveness scale, and 40% of adolescents had a low one. In group 2, the opposite situation was observed – 40% of adolescents had a high indicator on this scale, and 60% of adolescents had a low one.

On the scale “Reaction to frustration” in the 1st group, the dominant reactions were of the active-aggressive type (53%): shouting, ridicule, protest, going against the rules, anger, fights. In group 2, passive-suffering reactions were more often recorded (60%): crying, resentment, complaints. Interestingly, neutral reactions were characteristic of the same number of adolescents from the two surveyed groups (13%).

According to the scale “Striving for solitude, isolation” among adolescents of the 1st group, no tendency to isolate themselves from their peers was revealed. In contrast, in the 2nd group, such a tendency was found in 20% of adolescents. It is important to note that adolescents of both the 1st and 2nd groups have a weak involvement in interaction with their peers, as evidenced by low indicators on the scale “The desire to communicate in large groups of children.” In addition, the majority of adolescents in the surveyed groups (80%) do not tend to dominate (“Domination” scale).

The results of the study, obtained on the scales “Attitude to mother,” “Attitude to father,” “Attitude to mother and father as a parental couple,” allowed us to determine the nature of relations in the family. In 40% of adolescents from group 1 and 53% of adolescents from group 2, low interaction with their father and stronger interaction with their mother was noted (adolescents with fathers who did not participate in their upbringing did not note the importance of relationships with parents on the given scale). Among adolescents of the 1st and 2nd groups living in a boarding school, the desire to communicate with their mother is more pronounced than that of their peers living in a family.

According to the scale “Attitude to mother and father as to a parental couple,” there is no difference in the average indicators in both groups. It was revealed that only 33% of adolescents perceive their mother and father as a parental couple. The results obtained reflect an objective family situation: adolescents who are brought up in complete and prosperous families, as a rule, perceive their father and mother as a parental couple, and adolescents whose parents do not live together or are in conflict relationships do not characterize them as a couple.

Based on the results obtained on the scales “Attitude towards grandmother, grandfather and other relatives,” “Attitude towards siblings,” we can note a good attitude of the majority of adolescents in the two surveyed groups towards their grandparents and siblings. However, some adolescents showed a neutral attitude towards this category of relatives. In cases where grandparents mainly carried out the upbringing of adolescents, they express high importance towards their relations with them.

The need to interact with peers is expressed in 27% of adolescents from group 1 and 24% from group 2. It is noteworthy that the relationship with their teachers is significant for 33% of adolescents in the 1st group and 40% of adolescents in the 2nd group.

The results obtained by the R. Gilles method allow us to draw the following conclusions:
1. In groups 1 and 2, a relatively large percentage of adolescents have a low rate of interaction with their father against the background of their mother’s preference. In addition, only a third of adolescents in each group consider their father and mother as a parental couple.
2. The majority of adolescents in the surveyed groups are weakly involved in interaction with peers and do not tend to dominate.

3. The adolescents of the surveyed groups more often demonstrate active-aggressive or passive-suffering reactions. Moreover, active-aggressive reactions dominate among adolescents of the 1st group, and among adolescents of the 2nd group, passive-suffering reactions dominate.

Using the questionnaire by V. Schutz in adolescents from the surveyed groups, the features of interpersonal behavior were determined based on three needs – inclusion, control, emotion.

Concerning the inclusion in adolescents of the 1st and 2nd groups, four types of behavior were identified. Socially poor behavior was observed in 40% of adolescents in the 1st group and 50% in the 2nd group. Socially excessive and socially balanced behavior was found in equal percentages – 27% each in the 1st and 20% in the 2nd group. The pathological type of interpersonal relations in the 1st group was 6%, and the 2nd group was 10%. Thus, most of the adolescents surveyed are characterized by socially undesirable behavior. There is a predominance of the socially deficient type of interpersonal behavior, in which adolescents have a low level of interaction, lack of communication, and avoidance of large peer groups.

Concerning the control among adolescents of the 1st and 2nd groups, four types of interpersonal relations are distinguished. The distribution of the types of interpersonal relations in the area of control was as follows: “abdicates” – 40% from the 1st group and 50% from the 2nd group, “autocrats” and “democrats” – 27% from the 1st group, and 20% of adolescents from the 2nd group, “pathology” – 6% from the 1st group and 10% from the 2nd group. The presented results show that “abdicates” adolescents are most common in the surveyed groups, which are characterized by obedience, indecision in decision-making, and the desire to shift responsibility onto others.

Concerning emotions, both in the 1st and the 2nd groups, three types of interpersonal relations were identified: “emotionally deficient,” “emotionally excessive,” “emotionally balanced.” At the same time, among the adolescents of the surveyed groups, the “emotionally deficient” type was more common (40% in the 1st group and 50% in the 2nd group), in which adolescents have a weak feeling of emotional attachment and tend to avoid close personal relationships with others. It is important to note that a fairly large percentage of adolescents (33%) of the 1st and 2nd groups had an “emotionally excessive” type of relationship.

The presented results indicate that more than half of the surveyed adolescents in the “emotions” category have socially inadequate types of interpersonal relationships – “emotionally deficient” or “emotionally excessive.”

Using the methodology “Assessment of the relationship of a teenager with the class,” we found that adolescents in the studied groups most often have an individualistic type of perception: in group 1 – in 47% of adolescents, in group 2 – in 60% of adolescents. Adolescents of this type perceive the group as a hindrance to their activities or are neutral towards it. The group is of no value to the personality of the adolescent. The teenager shies away from joint forms of activity, preferring individual work, and is limited in contacts.

In addition to the individualistic perception, adolescents of the two groups also have a pragmatic perception. This type of perception is typical for 33% of adolescents in the 1st group and 20% in the 2nd group. Teenagers of this type perceive the group as a means of contributing to achieving specific individual goals. In this case, the group is perceived and evaluated from its “usefulness” for the adolescents themselves. Preference is given to more competent team members who can assist, take on a complex problem, or serve as a source of the necessary information.
Only 20% of adolescents from the surveyed groups perceive the group as an independent value. For them, the problems of the group and its members come to the fore. There is interest in the success of each group member and the group as a whole, the desire to contribute to group activities to help classmates in need. There is a need for collective forms of work. This type of perception is called “collectivist.”

Thus, in most adolescents in the surveyed groups, there is a focus on themselves and a preference for an individualistic type of group perception. The group does not represent an independent value for the personality of an adolescent.

Summarizing the results of the empirical study, we can say that the interpersonal relationships of adolescents with intellectual disabilities, complicated by visual impairment, in many respects repeat those of adolescents with an uncomplicated form of intellectual disabilities. However, specific features must be taken into account when planning correctional and developmental work on the formation of optimal interpersonal relationships.

References


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PROGNOSTIC PARAMETERS AND RISKS OF STUDY OVERLOAD IN ADOLESCENT STUDENTS

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The paper presents the results of an empirical study on study overload in adolescent students. The theoretical and methodological grounding of the study is given. The objective relevance of the problem of study overload for the modern system of general education is shown. The nature and manifestations of study overload in the educational process were studied through cause-effect relations. Psychodiagnostic data was subjected to mathematical and statistical processing (correlation analysis, multiple regression analysis), classified, summarized, and interpreted. The results obtained in the empirical study allowed us to understand the prognosis and risks of study overload formation on psychological well-being in adolescence. The conclusion is given that study overload is caused not at the expense of the students’ main study load but as a result of attending additional types of educational classes. The results obtained concluded that one in five adolescent students have a significant, often maximum, pronounced excess of study load. Moreover, one in four students experience the presence of moderate study overload. To prevent study overload, we state that one should focus not only on the normative regulation of certain types of educational activities but also on the students’ subjective state. Recommendations of possible directions of preventive work with students on psychological prevention of study overload are outlined.

Keywords: students’ health, optimum study load, study overload, psycho-hygiene of educational activity, psychological prevention of study overload.

Due to the changing requirements for educational results, it is important to form new learning strategies. To this end, creating an integrated psychological and pedagogical support system for secondary school students and preventing disorders in their psychological well-being becomes particularly relevant. For many decades, in Russian education in particular, the problem of study overload, its impact on the health of schoolchildren, and the possibility of psychological prevention have been actively discussed. In today’s modern society, success largely depends on the ability to work productively with various media on the ability to systematize, constantly assimilate, and transform new learning content [1, 2]. Study overload arises in learning when there is an active forming of life attitudes and values. This becomes a highly significant risk factor for developmental disorders and reduces the personal need and focus on continuous mastery of knowledge [3].

Middle school, ontogenetically and chronologically coinciding with adolescence (11–15 years), becomes an essential stage in the students’ personalities formation and development. Many known Russian and foreign researchers of adolescence (L.I. Bozhovich, B.D. Elkonin, D.I. Feldstein, V.S. Mukhina, I.V. Dubrovina, M. Klee, G. Kreig, D. Bokum) often noted that at this stage of mental development, the formation of worldview and personal self-esteem, life

principles, attitudes towards various activities, including their health are being developed in students [4–10]. In the works of I.A. Baeva, M.A. Volkova, L.V. Tarabakina, V.R. Kuchma, and other Russian authors, it is stated that, currently, the number of students who devalue the importance of health is increasing. Often they prefer a lifestyle that is destructive to their psychological well-being and physical health [11–16]. All this considered, creating a comprehensive system of psychological and pedagogical support for the development of secondary general school students and the prevention of disorders in their psychological well-being becomes objectively relevant. In particular, for many decades, the problem of study overload, its impact on the students’ health and the possibilities of psychological prevention have been actively discussed in Russian education. New studies are regularly undertaken in this direction (M.M. Bezrukikh, M.I. Korsunskaya, S.M. Grombach, I.N. Zakharova, F.V. Ippolitov, G.A. Karakashadze, L.S. Namazova-Baranova, J.Z. Torybaeva, etc.) However, while exciting and scientifically productive, these works are often fragmented in relation to each other and focus on different aspects because of the multidimensionality and versatility of the phenomenon studied, as well as the existing contradictions [17–22]. Data from the reports made by the Scientific Center for Children’s Health under the Russian Academy of Medical Sciences indicate that the negative impact of study overload on the development of modern schoolchildren increases from elementary school to high school. It suggests that work on study overload prevention should be strengthened and intensified at each subsequent stage of education and based on the students’ age characteristics [23].

Currently, the hygienic (“quantitative”) approach to study overload prevails in most general education institutions in Russia. The approach is presented in the state bylaws “Sanitary and Epidemiological Requirements for the Conditions of Education Organization in General Education Institutions” (Sanitary Rules and Regulations), which regulates various types of study load. In Russia, Sanitary Rules and Regulations were first put into effect in 1996 by the Resolution of the Chief State Sanitary Doctor of the Russian Federation. Today, many general education institutions believe that the schedule, drawn up under the Sanitary Rules and Regulations, guarantees the absence of students’ study overload. However, some researchers are critical about such study load norms. They believe that the study load quantified by these Regulations in hours and minutes is designed for the average student and does not consider the psycho-physiological characteristics of different groups of students. In particular, some representatives of educational psychology believe that a large number of factors determine the study load. In the ranking of influences on the students’ study overload, the number of teaching hours is only ranked third or fourth [24, 25].

To address the presence of study overload in students, one should first review the content of this concept. In the “Explanatory Dictionary of the Russian Language” edited by D.N. Ushakov, the word “overload” is defined as a state of something too heavily loaded, as a state of a person excessively burdened with work [26]. The study of the synonymic line of the concept allows us to say that overload is the presence of something excessive, exceeding the norm, overwhelming. Based on these definitions, we can say that certain external factors psychologically determine the phenomenon of overload. A person gets an internal feeling of overwork, burden, inability to perform the task. Many specialists (teachers, psychologists, doctors, physiologists, hygienists), representing various scientific disciplines, define study overload according to their corresponding fields. Meanwhile, in the case of study overload, almost all researchers agree that there is no recovery of physical resources during rest. It also leads to negative emotional experiences and harms students’ cognitive, personal, and communicative development. Excessive stress and rapid fatigue are noted, which can turn into chronic fatigue syndrome with prolonged impact.
A consequence of study overload can be a sharp and prolonged decrease in mental and physical performance, decreased memory abilities and attention, and psychoneurotic disorders (sleep disorders, obsessive fears, tearfulness, moodiness, increased irritability). Other consequences include laziness, bad moods, loss of interest in learning, and reduced motivation for other socially valuable activities that require intellectual and physical activity. There is a noticeable decrease in academic performance and a slowing down in intellectual development, which leads to school maladaptation and violation of interpersonal communication. As a result, it contributes to disharmonious personality development. Hence, the general position of most researchers is that a high learning load can be considered optimal only if it contributes to the child’s mental development. If such load helps form the intellectual sphere, it creates conditions for emotional well-being and fully developed personality, i.e., it does not reach the level of study overload [27].

Study overload can be both objective (regulated by Sanitary Rules and Regulations) and subjective in nature. The subjective nature of study overload is understood as the perception of the study load by the student as excessively high. This also includes negative consequences caused by study – a constant feeling of physical fatigue, deterioration of psychological well-being (decrease in mood, inner frustration, etc.), and lack of opportunity for students to devote time to activities of interest or rest. Considering the above, one should start talking about study overload among students if two indicators are present: objective (time-related) and subjective (students’ assessment of their study load as excessively high and the presence of its negative consequences).

Indeed, it is difficult to determine the optimal level of functioning for each person, especially for the developing psyche of a child or teenager. Imagine a student who spends three to four hours a day on homework and, in addition, attends additional classes with the teacher, subject electives, and tutors. In this case, we can confidently say that such time expenditures are highly likely to cause fatigue and harm this student’s health, intellectual and personal development.

It is important to note that among the studies carried out in this direction, there are practically no practice-oriented studies that would present a system of psychoprophylactic support for students focused on study overload prevention. Thus, the study overload problem, and the development of practical methods to prevent and overcome it, cannot be considered completely resolved for students in basic general education.

When studying the nature and manifestations of study overload in the educational process, it is advisable to consider a number of factors. These include psychological predictors and risk factors as well as psychological and pedagogical cause-and-effect relationships that lead to their occurrence. We can distinguish psychological and pedagogical groups by regarding the theoretical analysis data of Russian and foreign studies carried out in this direction. One of them is external – determined by the features of the educational process, interaction with teachers, and parents. The other includes internal – determined by students’ individual (type of nervous system, level of performance) and psychological (cognitive and motivational spheres of personality, emotional-volitional self-regulation) features. Hence, the factors causing study overload can be presented as a generalized model shown in Figure 1.

The convergence of psycho-physiological indicators of a nervous system type, quantitative and qualitative performance indicators, motivation for a learning activity, and the emotional-volitional sphere is of greatest interest in the study of risk factors influencing study overload in middle school students. As noted above, the influence of the aforementioned factors on the occurrence of study overload has been considered in various specialists’ studies. As theoretical analysis of the available publications shows, there is insufficient information about the influence of these factors’ individual indicators on the study overload occurrence. The study of this phenomenon
is of particular importance for the organization of psychoprophylactic work. It allows targeted psychological influence on the specific causes of study overload in students [28, 29].

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STUDY OVERLOAD

Subjective evaluation of the study load as high Exceeding the quantitative indicators of Sanitary Rules and Regulations

Fig. 1. The system of factors influencing the study overload formation

Let us focus more closely on each of these indicators. The type of human nervous system is a physiological basis on which mental properties are formed. Based on the individual-typical features, it is possible to predict the effectiveness of the human activity, anticipate possible difficulties, and create the necessary conditions to improve activity effectiveness. I.P. Pavlov and his followers B.M. Teplov, V.D. Nebylitsyn viewed the nervous system strength as the most important parameter of higher nervous activity, which reflects the ability of nerve cells to withstand either very strong or long-acting (not necessarily very strong) excitement [30]. The strength of the nervous system allows the determination of cortex cells’ working capacity limit, underlies performance and endurance and sensitivity to stimulus action, as one of its main properties, reflects the limit of working capacity and the analyzer’s sensitivity. So, for example, students with a weak nervous system respond to a task faster but reach the maximum level of activation earlier than students with a strong nervous system. This is a critical indicator because the proper distribution of the educational material by level of complexity and volume will play an essential role in preventing the occurrence of overload.

The next indicator is performance as a characteristic of the individual’s ability to perform a particular type of activity. Considering the time and purpose of the activity itself, regarding the task to be solved, we distinguish the maximum, optimal, and reduced working capacity. In
research, we considered quantitative parameters: 1) information processing speed which influences nervous system functional mobility 2) productivity, as the ability to carry out some activities or process a certain quantity of information in unit time 3) endurance, as the ability to work for a long time without signs of weariness. Qualitative indicators that indirectly characterize the strength of the nervous system should also be considered: accuracy and reliability as the ability to perform an activity error-free and maintain accuracy over a long period, as well as the ability to maintain high performance in activities for a certain time, for example, accurate work. During the schooling period, it is important to purposefully form students’ skills by using knowledge of their individual characteristics in the organization and implementation of learning to obtain better results in activities and prevent psychological disadvantage, including study overload [31].

An important factor in the production of study overload is emotional background. As M.A. Kholodnaya, E.G. Gelfman, L.N. Demidova point out, it has a two-way influence. On the one hand, study overload generates a lack of confidence in students because of the impossibility of doing what is planned. On the other hand, school anxiety and emotional discomfort lead to lower efficiency and higher fatigue. As a result, there can be a subjective assessment of high study load and an increase in time costs. Many researchers consider anxiety an individual psychological feature because of a human tendency for frequent and intense anxiety [27]. Traditionally in educational psychology, school anxiety is seen as a manifestation of ill-being, which indicates school disadaptation, caused by various unpleasant factors. It leads to the development of disorders in psychological and personal growth and conditions of somatic character. A.M. Prikhozhan’s research showed that school anxiety is a complex psychological phenomenon that cannot be viewed only as a psychological property or as a property acquired due to individual life experiences. According to the author, the emergence and consolidation of anxiety occur according to the mechanism of a “closed psychological circle,” i.e., arising in the process of an activity, anxiety partially reduces the latter’s effectiveness. The consequence becomes either negative self-esteem or negative assessment by others, resulting in negative emotional experience intensified in relation to the situation. The preconditions for school anxiety can be situational and individual. Anxiety is not the same at different school stages, and in adolescence, it can be fixed within the framework of personal anxiety. Therefore, it is important to study the mutual influence of school anxiety factors and study overload, and determine the direction of psychological intervention to prevent school anxiety influenced by high study loads [32].

Another factor that can provoke study overload is learning activity motivation. When considering the classifications of learning motives proposed by P.M. Yakobson, M.V. Matyuhina, A.K. Markova, in which cognitive and social motives have different levels of representation, we can see that the needs of students provoke different motives. Depending on this, students’ attitudes towards the educational processes, such as perceiving, understanding, memorizing, and absorbing the educational material, are formed. In addition, students develop a subjective assessment of the study load, the amount and complexity of work performed the desire or unwillingness to devote time to learning activities. Motives, characterized by students’ orientation to mastering new knowledge and facts, primarily satisfy the basic need for understanding. In this case, a student’s interests can go far beyond the curriculum, while insufficient development of cognitive abilities and low working capacity may well provoke the study overload. Motives aimed at mastering ways of learning activities, dictated by the desire to satisfy the need for self-confidence, competence, and the desire to achieve mastery, under certain circumstances may also cause study overload. Social motives, which emerge from students’ interaction with the surrounding reality, are the result
of satisfying various needs. They are dictated by the personal meanings, requirements, and attitudes of the social environment. Motives dictated by a sense of duty and responsibility are determined by the need to conform to the social environment. Positional motives arise from a desire to get approval, and/or recognition. Motives of social cooperation, when the student is focused on the interaction with the social environment, satisfy their need for interaction. A number of studies prove that motives dictated by the desire for secondary benefit (reward, avoidance of failure), to a lesser extent, ensure success in learning activities. In this case, the content of learning activities becomes a secondary concern. The quality of knowledge decreases. The student does not strive to improve learning activities, develop cognitive abilities, or show exploratory activity. As a result, the increasing complexity of the study load from year to year can become unbearable [33].

The influence of the indicated factors on the study overload has been a subject of consideration in various specialists’ studies. However, as theoretical analysis of the available publications shows, there is insufficient information about the individual indicators’ influence, for every factor, on the study overload. The study of this phenomenon is of particular importance for the organization of psychoprophylactic work, as it allows a targeted psychological influence on the specific causes of students’ study overload.

The empirical research is supposed to find answers to the following questions: what types of learning activities contribute most to the occurrence of study overload; how middle school students with different levels of study load estimate their study load and distribute their free time; whether there is a relationship between academic performance and study overload; what individual psychological features are predisposed to the occurrence of study overload.

For this purpose, a psychological diagnostic was carried out, the results of which were subjected to mathematical and statistical processing (multiple regression analysis, correlation analysis) and interpretation. The empirical study involved a diagnostic complex, including the following:

1) questionnaires developed by M.M. Bezrukikh: “General educational (school and extracurricular) workload,” “The daily routine of a schoolchild”

2) author’s questionnaire “Subjective evaluation of the study load” (E.L. Arshinskaya)

3) the “Dotting test” method (E.P. Ilyin)

4) correction test “Landolt rings” (modified by V.N. Sysoev)

5) personal questionnaire “School Anxiety Questionnaire,” created by B. Phillips (adapted by A.M. Prikhozhan)

6) questionnaire “Attitude to school subjects” (G.N. Kazantseva).

In our study, we also relied on the quantitative data of Sanitary Rules and Regulations on study load (latest edition, September 1, 2011) as an officially accepted, objective and measurable (in minutes and hours) indicator. Psychological and pedagogical analysis of students’ learning achievements was carried out based on the grades put in class registers by teachers.

The sample of the empirical study was formed of secondary school students from several general educational institutions of Irkutsk (“Education Center № 47,” “Secondary General Education School № 24”). At all stages of the study, the total number of examinees was 527; all of them were schoolchildren from sixth to eighth grade (216 boys, 311 girls). The full-scale empirical study of students was long-term, conducted over eight years from 2010 to 2018, and was implemented in several phases. In particular, the conducting of the ascertaining stage, aimed at studying the volume of training workload, daily routine, and students’ well-being, and the study of psychological interactions, presented below, were implemented in 2012–2014 (corresponding to the period of subjects being taught, which made up the sample population of our study, from the sixth to the eighth grade).
The study overload among students was indicated with the help of questionnaires “General Training (school and extracurricular) workload,” “Student’s daily regime,” according to which all the subjects were conditionally divided into four conditional subgroups:

1) “super-overloaded” students, who were found to exceed all normative indicators of study load significantly
2) “moderately overloaded” students, who had an insignificant excess of normative study load indices
3) “non-overloaded” students, whose study load did not exceed permissible norms
4) “under-loaded” students whose study load was below the standards recommended by Sanitary Rules and Regulations.

Before proceeding to the comparative characterization and comparison of the aforementioned subgroups, it was noted that according to Sanitary Rules and Regulations, the maximum daily study load for students in grades 6–8 ranges from 370 minutes (6 hours 10 minutes) to 390 minutes (6 hours 30 minutes), and weekly – from 37 hours 10 minutes to 39 hours, which was close to the limit of the weekly workload of an adult (42 hours).

When analyzing the percentage distribution of examinees in the subgroups “super-overloaded” (1), “moderately overloaded” (2), “non-overloaded” (3), and “under-loaded” (4), it was found that more than half of the surveyed students (56.6%) had study overload by objective indicators. At the same time, every fifth student (20%) had a significant, often maximum excess of study load, and every fourth student (36.6%) had a moderate study overload. Slightly less than half of the students in grades 6–8 (45.4%) did not exceed the acceptable norms in terms of study load. The exact number of respondents (20%) with overloaded students was represented by low indicators of study load, which allowed them to form the subgroup of “underloaded students.”

The mathematical-statistical method of multiple regression analysis (MRA) was used to study the relationship between study overload and the types of learning activities that caused it. The selection of factors (variables) was carried out theoretically and empirically by conducting a correlation analysis and assessing the relationship between the factors and the result. The primary data for the multiple regression analysis were variables measured on a metric scale, each of which had a significant relationship with the study overload index ($p \leq 0.01$). No strict functional relationship between them was observed. The “Lessons” variable was excluded from the analysis even though, statistically, it significantly correlated with the dependent variable because it was closely related to the variable “Electives” ($p \leq 0.01$), which in the final model substantially reduced the predictive value of the latter. Derived variables were also excluded from the analysis (e.g., the “Homework” variable was split into two variables: “Basic Homework” and “Additional Homework”). The interpretation of empirical data concerning the significance of one variable’s linear relationship measure with the set of other variables $R$ for each model was reliable. So it was reasonable to interpret the obtained multiple regression models meaningfully. Our study obtained a rather high coefficient of multiple determination (82%), representing the proportion of the dependent variable $R^2$. Consequently, the results of our study’s statistical prediction (hypothesis) could be taken into account.

Based on the mathematical and statistical data obtained in our study, the multiple regression equation for the indicator “Study overload” was as follows:

$$SO = -339.21 + 5.39AH + 4.81IS + 2.92BH + 2.71AC + 1.99EC,$$

Numerical coefficients in this formula are indicators of the influence rate of independent variables AH, IS, BH, AC, EC on the dependent variable SO. They were interpreted as the contribution of the corresponding independent variable to the variability of the dependent variable. In the regression equation presented, the terms (coefficients) were given in decreasing order of their significance.

Thus, based on the obtained multiple regression equation (“formula of study overload”), we could state that among the factors we studied, additional homework (5.39) and individual lessons on subjects and tutoring (4.81) had the most significant influence on study overload. Basic homework (2.92) and additional classes with subject teachers (2.71) were also major contributors to study overload. “Elective courses” (1.99) was the indicator with the smallest influence on the magnification of study overload.

Consequently, to normalize the indicators of study load, it is necessary to pay attention to the activities that more likely cause study overload, namely – additional homework and individual studies, in particular with tutors. Statistical averages of the study load distribution (group mean values and standard deviations \(M \pm \sigma\)) in the previously indicated subgroups of examinees (“super-overloaded,” “moderately overloaded,” “non-overloaded,” “underloaded”) are presented in Table 1, which shows that teenagers experiencing study overload are most actively involved in all types of activities that form study overload.

<table>
<thead>
<tr>
<th>Study load indicators</th>
<th>Average group values and standard deviations ((M \pm \sigma)), in points</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Super-overloaded</td>
</tr>
<tr>
<td>School lessons</td>
<td>218 ± 15,7</td>
</tr>
<tr>
<td>Electives</td>
<td>19 ± 19,4</td>
</tr>
<tr>
<td>Additional lessons</td>
<td>16 ± 26,9</td>
</tr>
<tr>
<td>Individual additional lessons</td>
<td>18 ± 36,2</td>
</tr>
<tr>
<td>Study load</td>
<td>271 ± 53,0</td>
</tr>
<tr>
<td>Study overload</td>
<td>39 ± 51,9</td>
</tr>
<tr>
<td>Basic homework</td>
<td>143 ± 40,4</td>
</tr>
<tr>
<td>Additional homework</td>
<td>65 ± 48,5</td>
</tr>
<tr>
<td>Total homework time</td>
<td>207 ± 54,1</td>
</tr>
<tr>
<td>Homework overload</td>
<td>57 ± 54,1</td>
</tr>
<tr>
<td>Study load</td>
<td>478 ± 51,3</td>
</tr>
<tr>
<td>Study overload</td>
<td>98 ± 47,6</td>
</tr>
</tbody>
</table>

Thus, we can make a general conclusion that the study overload of middle school students is caused not at the expense of the main study load but as a result of attending additional classes. This data suggests that it is necessary to optimize the opportunities of acquiring material and work during the main types of learning activities to prevent study overload.

When studying the data obtained with the help of the author’s questionnaire “Subjective evaluation of study load,” it was established that the students of the first subgroup (“super-
overloaded”) evaluate their study load as high ($M = 2.9 \pm 0.2$), and they regard the consequences of intensive study load for themselves as significant ($M = 2.7 \pm 0.3$). “Moderately overloaded” learners are divided into two subgroups: 1) students (50%) whose subjective assessments indicated study overload by two factors ($M = 2.8 \pm 0.3$, $M = 2.5 \pm 0.4$) and 2) students (50%) who rated their study load as adequate ($M = 2.1 \pm 0.4$, $M = 1.7 \pm 0.3$). Among the students with normal quantitative indicators (“non-overloaded”), the subjective evaluation of the study load was within the norm ($M = 2.0 \pm 0.4$, $M = 1.6 \pm 0.4$). 70% of students with low values of study load (“underloaded”) had a low and sufficient level of intensity of study load, and its consequences were evaluated as insignificant ($M = 1.8 \pm 0.6$, $M = 1.4 \pm 0.8$). It is worth noting that 30% of “underloaded” students chose high rates of study load intensity by one or two factors.

The study of free time distribution in the empirically allocated four subgroups showed that the consequences of study overload were reflected in the fact that “super-overloaded” and “moderately overloaded” students more often than others did not get enough sleep and rarely went out for outside activities. Positive correlations were found in these subgroups between study load indicators and sleep deprivation: $r_{xy} = 0.43$, $p \leq 0.05$, $r_{xy} = 0.46$, $p \leq 0.05$ (in the “overloaded” subgroup), $r_{xy} = 0.30$, $p \leq 0.05$ (in the “moderately overloaded” subgroup). In comparison with the others, moderately overloaded students are characterized by paying more attention to sports, hobbies, and housework. It is quite possible that these activities take extra time away from their studies and, therefore, their study load indicators are lower. The study of correlations demonstrated that attending individual classes and electives causes the “moderately overloaded” student group to attend hobby groups less often $r_{xy} = 0.31$ ($p \leq 0.05$) and spend less time on gadgets and computers $r_{xy} = 0.29$ ($p \leq 0.05$).

Schoolchildren whose study load meets the norms (“non-overloaded”), often do not get enough sleep because they devote a lot of time to gadgets and computers. Compared to the subgroups of overloaded students (“super-overloaded,” “moderately overloaded”), they pay less attention to activities of interest (CAS activities) and housework. Consequently, we can assume that the reduced rest time in this category of students (“non-overloaded”) is due to a passion for social media and gadgets (Internet, computer games), and not for studying, as in the first two subgroups (“super-overloaded,” “moderately overloaded”). The study of correlations between the indicators of the study load and the distribution of free time in this category of students (according to Pearson) also showed that they do not get enough sleep and participate in CAS activities less often because of their homework ($r_{xy} = 0.33$, $p \leq 0.05$; $r_{xy} = -0.32$, $p \leq 0.05$, respectively). They reduce their leisure time and walks because of extracurricular activities at school ($r_{xy} = -0.34$, $p \leq 0.05$).

Students with study load below the recommended norms (“underloaded”) spend more time on recreation. They do not pay enough attention to CAS activities and read less (compared to students in other subgroups). They do the necessary homework and spend a lot of time on computers and gadgets. Thus, unlike students in the third subgroup (“non-overloaded”), their preoccupation with social media and videogames do not occur at the expense of leisure time, but at the expense of study time, or time for hobbies and reading, i.e., those activities that contribute to all-round personal development. No correlations were found between the indicators of free time distribution and the indicators of study load in this category of schoolchildren (“underloaded”).

The analysis of the examinees’ progress allows us to state that in the first two subgroups (“super-overloaded” and “moderately overloaded”), the students’ grades are higher than in the other two subgroups mentioned above (“non-overloaded” and “under-loaded”). Significant differences are found only between students with high and low study load indices (the first and fourth, the second and fourth subgroups).
A Spearman’s Rank-Order Correlation was conducted to identify statistically significant correlations between the examinees’ performance and study load indicators. As it follows from the obtained data, a high degree of statistical significance (at \( p \leq 0.01 \)) was revealed between academic performance and additional classes at school \((r_s = 0.23)\), and academic performance and time of homework \((r_s = 0.25)\). Also, a positive relationship of strong significance (at \( p \leq 0.01 \)) was found between academic performance and weekly study load \((r_s = 0.21)\), and academic performance and study overload \((r_s = 0.23)\). Significant positive relationships at the \( p \leq 0.05 \) level were found between academic performance and time spent on electives \((r_s = 0.17)\), individual studies \((r_s = 0.19)\), and daily study load \((r_s = 0.17)\). Based on these results, it is statistically plausible that many students have to work on material in extracurricular time to get higher grades. Consequently, it is logical to assume that one of the causes of study overload is incomplete comprehension of the learning material during lessons, requiring additional time and effort to compensate for gaps and deficiencies in learning at school (lessons).

Distribution of students by the level of academic performance in the four subgroups – “super-overloaded” (1), “moderately overloaded” (2), “non-overloaded” (3), “underloaded” (4) – allows us to see that in each of these subgroups there are plenty of students who get a “C”. At the same time, the percentage of “C” marks increases from the first to the fourth subgroup. In the first and second subgroups, there are more students whose average grade point average is “83”, “89,” and “94–100”. All this data allows us to conclude that an increase in study load may not be the key to academic success for all students. Even among significantly overloaded students who devote a lot of time and attention to learning, there are students whose average achievement score is only “73” and “76” points, and in the third and fourth subgroups – “not overloaded” and “underloaded” – there are students whose average achievement score is quite high, equalling “87”, “90” and “100” points.

Returning to the psychoprophylactic aspect of study overload, one should introduce preventive programs both in educational and extracurricular work. It should be carried out in relation to all subjects of the educational process – teachers, tutors, and parents. The task of the educational psychologist is to identify problems that may further cause certain difficulties or deviations in the development of children and eliminate them through preventive work [34]. A psychoprophylactic program should prevent the occurrence of certain difficulties or deviations in a child’s mental development in the first place. Consequently, prevention of study overload should be aimed at the psychological causes of overload, such as psycho-emotional stress associated with a long stay in the classroom, poorly formed intellectual skills and learning abilities, low level of learning motivation, low cognitive activity, insecurity, and fear of being called up to the board. Summarizing the results of the empirical study, we believe it is necessary to emphasize that in the educational process, to prevent study overload, it is necessary to focus not only on the normative regulation of certain types of learning activities, but also on the subjective state of students.

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E.L. Arshinskaya, G.S. Korytova, A.I. Korytova. Prognostic Parameters and Risks of Study Overload...


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THE CONCEPT OF TEACHING MATHEMATICS IN THE 1ST GRADE OF A GENERAL EDUCATION SCHOOL

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The teaching of mathematics should reflect the global trends in the development of mathematical and pedagogical scientific thought. The authors develop guidelines for studying mathematics in the 1st grade based on the Federal State Educational Standard. Thus, the structure and the form of the textbook content are described by chapter. The theoretical part should allow students to complete screening questions, univariate and multivariate tests, problems, and exercises. Each chapter of the developed textbook is divided into paragraphs, and each paragraph is divided into items. One item of theoretical material contains either a new idea to study or a set of interrelated concepts that define a new idea. According to this, it is possible to form mathematical knowledge trajectories. So, there are broad opportunities to transform knowledge elements into multimedia forms, including presentations, videos, test modules, and other newly emerging means of representation and visualization, using the achievements of artificial intelligence. It is possible to define main themes such as natural numbers counting, acquaintance with geometric shapes, comparison of objects in the value and quantity, acquaintance with a squared paper and measurement standards, the study of objects position, the sets consideration, introduction to the algorithm concept can. The authors’ conceptual directions of teaching mathematics in the 1st grade provide the foundation for mathematical education in general education schools for all the years of study.

Keywords: primary education, general education, teaching, mathematics, knowledge element.

Mathematics is one of the fundamental disciplines of education. Traditionally, mathematics is given almost the same number of hours as learning the native language. Moreover, we can say that mathematics is an element of mass culture.

Starting from the 1st grade of primary school, the teaching of mathematics should reflect the global trends in mathematical and pedagogical scientific thought development and represent the projection of mathematical science on school education without distortions and simplifications.

The appearance, development, and maintenance of interest in mathematics begin with forming clear and consistent ideas about the subject. Therefore, the content of the training should be constructed in such a way that the logic of perception of the newly introduced concepts is consistent, there should be repeated references to the studied topic, and a way to control the assimilation of the knowledge. There should be a set of tasks of various types that transforms the studied material into knowledge.

In this regard, students should have the opportunity to learn from a textbook that explains the topic, and provides examples and tasks that allow them to make conclusions to consolidate the studied material. The textbook is a necessary tool to teach new elements of knowledge and make
them familiar to the students. While reading a fiction book, we carefully follow the characters and the development of the plot. Similarly, reading a textbook, the student should see how concepts are introduced, and more complex relationships are revealed, forming a complete picture. The textbook should be designed so that students can study it with the help of a teacher or adults and independently understand and master the material.

A.A. Nikitin, A.P. Efremov, and I. V. Silantiev in 2006 introduced the concept of episteme from the pedagogy point of view as a specific conventional measurement unit [1, p. 4]. In further studies, the episteme was considered an element of knowledge in application to the learning processes and knowledge formation in general [2, p. 6]. Based on this, it became possible to form and compare the elements of knowledge from a unified point of view. To determine the qualitative and quantitative characteristics of the status, development, and perspective vision of various parts of the education content and the organization of the learning process, including the standards, curricula, plans, textbooks, and other elements of pedagogical and methodological support for learning, taking into account the equability and equivalence of the knowledge elements, taking into account the time of their presentation and assimilation [3].

Approaching the textbook writing from the point of view of dividing it into elements of knowledge, when each topic item in the textbook contains one new idea to study, a natural opportunity opens up to form the trajectories of mathematical learning. This is also related to the idea of creating hierarchical multivariate tests, when chains are formed, the links of which are the test conditions, the answers, and the corresponding conclusions [4]. Any hierarchical test is equivalent to a suitable single-level multivariate test, where the variants of the proposed solutions are true/false hierarchical tests. Such mathematical knowledge trajectories and hierarchical tests that have a given range, that is, the depth and breadth of the study of a particular topic, open up the possibility of converting them into various types of multimedia forms, including presentations, videos, test modules, and other newly emerging means of representation and visualization, as well as the use of artificial intelligence achievements.

Primary school maths education is humanitarian since mathematics teaches to think, formulate thoughts accurately, develop the ability to follow the rules, reason, draw conclusions, and make independent decisions.

To build a unified vertical of mathematical education in a secondary school, the authors set a goal to format the teaching in the 1st grade and in primary school in such a way that it is consistent with the concept of teaching proposed by the authors of multi-level textbooks in mathematics for grades 5–11 of general education schools [5–22].

When teaching mathematics in the 1st grade, six main directions can be identified that ensure the Federal State Educational Standard (FSES) implementation.

The first direction reflects the counting of natural numbers in ascending and descending order, the direct and reverse counting of numbers, the use of direct and reverse counting in determining the actions of addition and subtraction, and includes the interpretation of this using a ruler. In this regard, the elements used in addition and subtraction are considered: sum, summands, difference, minuend, subtrahend and their relationships, the properties of ‘numbers’ equalities, the commutative property of addition are studied, the tables of addition and subtraction of numbers are considered. For natural numbers from 1 to 20 and the number 0, quantitative and ordinal numbers are determined, the enumeration, ordering, and comparison of these numbers are studied, as well as finding the unknown component of addition, modeling, and solving text problems in one action for comparison, addition, and subtraction, counting with twos, fives, acquaintance with the concepts of even and odd numbers, and partition an even number in half is considered. An essential element of learning in the 1st grade is memorizing the addition and
subtraction tables from 0 to 20. The elements of this direction allow to form associations and serve as a basis for further study of natural numbers.

The second direction is related to the study of the 'object's position, including the establishment of left and right relations, in front and behind, above and below, between, as well as left and right from the point of view of another person, with movement to the left/right, up/down, in opposite directions. In addition, examples of relationships between an object and its reflection are considered. Copying images made up of points and segments on checkered paper is also considered. This direction will be developed by introducing coordinates on the plane and in space in the future.

The third direction refers to the acquaintance with geometric shapes: point, segment, straight line, plane, the angle between segments, triangle, right angle, rectangle, square, quadrilateral, polygon, circumference, circle, cube, and sphere. Some characteristics of these shapes are given. This direction serves as the basis for operating with geometric objects.

The fourth direction relates to the comparison of objects in size and quantity, acquaintance with checkered paper, the study of the concept of a measurement standard, and the consideration of measure standards examples, the use of units of length measurement, including centimeter, decimeter, and the ratio between them, and the acquaintance with ancient measures of length. The same segment may have different lengths when using different measurement standards. Thus, the relations between the concept of a segment and the properties of the segment length are determined. In addition, the comparison of objects by length is considered with the establishment of relations between them: "long/short" "high/low" "wide/narrow," and the difference comparison of the lengths “more/less” is performed. This direction will determine the area and volume of shapes, obtaining other quantitative characteristics of geometric shapes.

The fifth direction refers to the consideration of sets of elements, intersections of sets, inclusions in a set, the ability to classify and group elements by attributes, as well as to the consideration of types of elementary logical statements, including true (correct), false (incorrect), and indefinite. This direction is fundamental in modern mathematics.

The sixth direction is associated with introducing the concept of an algorithm, implementation of simple algorithms for calculations, length measurements, and geometric shapes construction. This direction serves as the primary basis for determining the algorithm and is further developed in mathematics and computer science courses.

These directions are closely related to each other, and are sometimes intertwined with one another, each helping the other develop.

Concerning these directions, the mathematics textbook for the 1st grade should have a particular structure. The general logic of the initial study of mathematics should be built, considering the mathematics studying logic in grades 5–11 to form a unified vertical of mathematical education in grades 1–11.

In this regard, it is advisable to rearrange the theoretical material with great care since the subsequent presentation, as a rule, is based on the previous material, and the logic of the presentation may be lost during the rearrangements. Omissions of the material being studied can also lead to logical gaps in perception.

The developed textbook [23, 24] consists of chapters, which consist of paragraphs divided into topic items. The textbook contains a subject index, answers, instructions for problems and exercises, and a detailed table of contents.

Each chapter contains from one to six paragraphs.

Each paragraph includes no more than 6 points of material to study. One topic item of theoretical material contains either one new idea to study or a set of interrelated concepts that
define a new idea. Some items refer to the increased level of difficulty and complexity for a given year of study. Nevertheless, they are essential and valuable for compliance with the Federal State Education Standards requirements.

Each topic item of theoretical material ends with an open question. Such topic questions are an integral part of the theoretical material, and they either develop topic item material or point to the examples of practical applications of the material considered in the topic item. The answers to the open questions may not be directly embedded in the text. As a result, students can expect a variety of correct answers to these open questions.

Each paragraph ends with a set of control questions for the theoretical material. The control questions capture the main ideas of the paragraph. The answers to these questions are embedded in the text of the studied paragraph.

Students must answer all open questions for each topic item and all control questions since these questions relate to the concepts and properties being studied.

The implementation of some ideas is transferred to tests, problems, and exercises to reduce the theoretical text's size. Therefore the tests, problems, and exercises are considered an integral part of the material being studied.

For each paragraph, there are two single-variant tests offered, which have only one correct answer. In addition, there are two multivariate tests offered for each paragraph, which have two, three, or four correct answers. When considering multivariate tests, it is mandatory to examine all correct and incorrect answers and justify them. A multivariate test is considered solved when all the correct answers are indicated correctly and all the incorrect answers are determined and explained.

Each paragraph contains eight problems and exercises. Problems and exercises represent the applications of the paragraph's theoretical part. The textbook provides keys to problems and exercises, and in some cases, provides instructions for solving the problems.

We want to mention that all tests, problems, and exercises are directly related to the theoretical material of the paragraph and are aimed at mastering, controlling, and memorizing the concepts and properties studied in the paragraph. Tests, problems, and exercises allow students to see the diversity of concepts and properties in everyday life. At the same time, the material’s presentation is constructed so that the concepts considered earlier are accepted as known, and the further presentation is based on these concepts. As a result, the studied material is repeated, an appeal to previously studied concepts, and their new relationships are discovered.

Answers to tests, problems, and exercises can directly follow the theoretical material or expand the angle of view on the studied concepts. This teaches students to reflect on the questions posed.

We assume that students should know the solutions to all tests, all problems, and exercises for the paragraphs, since some ideas found in tests, problems and exercises are further developed both in theory and in other tests, problems, and exercises.

Let us mention that there are tests, problems, and exercises of an increased difficulty level and complexity that require additional thinking, or the answer is not immediately obvious and requires several steps of reasoning. Such tests, problems, and exercises are marked with an “*.”

The presentation of the material in the textbook is supported by a variety of examples that form associations with practical, real-life situations. For example, paintings by famous artists, literary examples, including fairy tales, proverbs, riddles, epics, as well as various gaming and everyday circumstances are used. This allows us to form interdisciplinary connections between mathematics and language, physics, history, geography, biology, physical culture, art, and music.
There are two types of images in the textbook: one type is for imaginative perception and animation of the text, the other one is directly based on theoretical material, tests, problems, and exercises.

Tables and pictures in the texts are intentionally marked with letters of the Russian alphabet. This allows students to memorize the sequence of the letters in the alphabet.

The newly introduced mathematical concepts are highlighted in an italic font and are given in the textbook subject index with the page number. Some definitions and rules are enclosed into frames and require memorization and learning by heart.

The authors believe that pre-reading of upcoming topics or reading them with adults is one of the critical elements of learning in general. Pre-reading during homework can increase the class’s learning efficiency, help students overcome the fear of new material, and strengthen their confidence in studying mathematics.

The mathematics textbook for the 1st grade is accompanied by a teacher’s book, which reveals the textbook ideas and content to ensure the same perception of the educational material as the textbook’s authors imply. In this regard, we consider implementing the following:
- ensuring teachers understand the intention of the author
- provide teachers with the opportunity to give the studied material as close as possible to the material given in the textbook
- allow students to master the educational material with the help of the textbook and teachers.

The above implementation allows students to gain a high level of mathematical knowledge, corresponding to the generally accepted world practice.

Primary school students typically have a surface or intuitive knowledge of people, animals, objects, and the world around them, so we shall focus on imaginative perception. In this regard, some examples of geometric shapes and concepts are considered, numerical models are given, and mathematical concepts such as direction, sequence, and comparison are considered.

For a general statement to become clear, sometimes illustrative examples are required to create the necessary associations. Getting used to new concepts is carried out gradually on the most straightforward models with repeated actions. The introduction of new ideas is based on analogies with the knowledge previously studied or available to students.

Natural numbers are those numbers used for counting. In particular, acquaintance with the natural numbers from 1 to 9 allows one to determine the quantitative and ordinal numbers, establish the enumeration, order and compare these numbers, and explain the introduction to addition and subtraction arithmetic operations. The emphasis is on the counting and order of the natural numbers from 1 to 9. The question “How many?” helps to answer the quantitative numbers. Natural numbers from 1 to 9 are identified with their spoken word using digits. The number “one” is identified with the digit 1, the number “two” is identified with the digit 2, and so on. The ordinal numbers answer the question “Which one?/What is the order?.” Therefore, the entry “1” carries several meanings – it is a digit denoting the number 1, it is the quantitative number “one,” and it is the ordinal number “first.”

Counting from 1 to 9 is performed in ascending order. The examples in the textbook consider numbers that are neighboring and that are not neighboring for numbers from 1 to 9. A sequential counting of numbers, where every two of them are neighboring and arranged in ascending order, is called direct counting. Examples of nondirect ascending counting are also given. During direct counting, a comparison of the “lesser” type is determined for natural numbers from 1 to 9. The natural number that occurs in direct counting earlier will be less than the natural number that occurs later. The quantitative zero, which we denote with the digit 0, and the zero ordinal number are introduced. It is stated that the number 0 is less than any natural number.
In the world around us, the objects are arranged differently. To determine the object’s locations relative to each other, we normally use the following: left, right, under, on, over, between. In this regard, you can also set the “right” and “left” positions for another person’s perspective. The simplest geometric shapes are a point, a segment, and plane figures. Different directions of movement are considered: left, right, up, down. As a result, when moving along a segment from its beginning to its end, it is necessary to know the point from which the movement started, in which direction it moves, and, finally, the segment that should be passed. A connection is established between the object and its reflection. In this regard, examples of symmetrical shapes are given, and it is determined that a shape on a piece of paper is symmetrical if it is possible to draw such a segment that, by bending the sheet along this segment, the two parts would align with each other.

Next, we should explain how the ruler is designed: why the larger markings are placed on the ruler, what is the beginning of measurements on the ruler, which large markings are neighboring, how the gaps between large markings are determined. If one moves along the ruler to the right from the zero marking using larger markings, the numbers increase, and we use direct counting. A descending counting and a reverse counting of numbers from 9 to 0 are determined too. A sequential counting of numbers, where every two numbers are neighboring and arranged in descending order, is called reverse counting. Using the “less” type comparison, the “more” type is determined. It is mentioned that any natural number is greater than zero. It is determined that among two numbers, the number on the ruler to the right from the zero mark is greater than the other one. Examples of determining the largest number and the smallest number from a set of numbers are given.

Students are introduced to the addition operation, writing numeric expressions using the plus “+” and the equal “=” signs. The components and results of the addition are defined and distinguished – the summands and the sum. It is mentioned that the phrase “sum of summands” can be understood in two ways: the sum of summands means either the sum value or the entry of summands connected by the “+” sign. The commutative property of numbers, in addition, is formulated, the knowledge and understanding of the meaning of which should become an organic part of the mathematical culture of a person. When studying addition operations, it is necessary to consider the properties of the numeric expressions’ equalities. Students should learn these properties by heart. The properties of the number 0, in addition, are considered.

The table structure is defined: what are the rows, the columns, and the cells of the table. We explain how the data is entered and extracted from tables. A general addition table is formed for numbers in the range from 0 to 3. A detailed review of the addition tables on numbers in the range from 0 to 3, considering the commutative property of addition, allows to extend this property to numbers from 4 to 9 and further.

Representation of numbers from 4 to 9 as the sum of two natural numbers is considered. The communicative property of addition is formulated for numbers from 4 to 9 while considering the properties of zero when adding. As a result, the sum of two natural numbers, and the sum of zero and a natural number are considered. Based on this, tables of numbers addition from 0 to 9 are formed, and the table data entry and extraction are considered. It is emphasized that the addition tables from 0 to 9 must be learned by heart.

Next, the arithmetic subtraction is introduced, using the minus sign “−” and the equal sign “=”.” The components and results of subtraction actions are defined and distinguished as the minuend, the subtrahend, the difference. The difference means either the difference value or the record of the minuend and subtrahend, connected by the “−” sign. It is determined that the minuend is equal to the sum of the difference and the subtrahend. The properties of the number 0
in subtraction are considered. A general subtraction table is formed for numbers from 0 to 3 when the difference between the numbers is a natural number or zero.

After the subtraction operations from 0 to 3 are introduced, and the corresponding subtraction tables are arranged, the subtraction from 0 to 9 and the numbers from 4 to 9 are considered by analogy, and the subtraction table for the numbers from 0 to 9, when the difference is equal to a natural number or zero is given. In this case, the introduction and extraction of the data from the table are considered. Here the natural numbers difference comparison from 0 to 9, where the minuend is greater than the subtrahend, is considered.

Students should understand that adding two numbers is related to direct number counting, and subtracting two numbers is associated with reverse number counting. To find the sum of two natural numbers using direct counting, one should add to the first natural number the number 1 in an amount equal to the second natural number. To subtract from the first natural number the second natural number using reverse counting, one should subtract from the first natural number the number 1 in an amount equal to the second natural number. The use of two rulers in addition and subtraction for numbers ranging from 0 to 9 is analyzed. The use of rulers allows us to see how the actions of addition and subtraction are performed, and the relationship between addition and subtraction is seen too.

Next, the unknown summand in addition and its designation in the sum is considered. When writing equality, the left and right sides of the expression are equalized. It is determined that the unknown summand is equal to the difference between the sum of two numbers and the known summand.

Then the natural numbers from ten to twenty are determined, and the order of their sequence is established. Each number is designated and written using two digits 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20. There are representations of numbers from 10 to 20 as the sum of two or more summands, considering the commutative property of addition. The representation of numbers from 10 to 20 as the sum of two summands is also arranged in tables. The setup of the abacus and the representation of numbers from 0 to 20 is considered.

Let’s consider the ordinal natural numbers from the tenth to the twentieth. Neighboring numbers are defined for numbers from 10 to 20. The direct counting of numbers from 10 to 20 and the reverse counting of numbers from 20 to 10 are introduced. Numbers from 0 to 9 are called one-digit numbers because they are written using one character – one digit. Numbers from 10 to 20 are called two-digit numbers since they are written using two characters – two digits. A comparison rule of the “less” type is defined for two natural numbers. This is used to determine the comparison of the “more” type. A rule for comparing three numbers and a rule for comparing one-digit numbers with two-digit numbers is formulated. A table of comparison for the “less” type numbers from 10 to 20 is introduced.

The subtraction from 10 to 20 of one-digit is considered. It is mentioned that for the difference between the numbers from 10 to 19 and the number 10, the difference value is equal to the second number on the left in the record of the minuend. The difference between the numbers 20 and 10 is 10. The difference between the number 20 and a two-digit number from 11 to 19 is defined as the difference between the number 10 and the second number on the left in the record of the subtrahend. The table of subtraction from numbers from 10 to 20 the one-digit numbers and the table of subtraction of two-digit numbers from 10 to 20, when the difference between two numbers is a natural number or zero is considered.

Performing arithmetic operations of addition and subtraction for numbers ranging from 0 to 20, memorizing addition and subtraction tables for these numbers lay the foundation for oral and
written counting, which is in demand for every educated person throughout his life. This is an element of their culture and upbringing in general.

The concept of even and odd numbers is introduced. It is specified that the digits 0, 2, 4, 6, 8 are even, and the digits 1, 3, 5, 7, 9 are odd. An even natural number ends in an even digit. An odd natural number ends in an odd digit. An even natural number follows every odd natural number, and every even natural number is followed by an odd natural number. The rules for determining the evenness and oddness of the sum of two summands depending on the evenness and oddness of these summands are formulated. Every even natural number is represented as the sum of two identical natural numbers and can be divided into two. Any odd natural number can be represented as the sum of the number 1 and an even number, and an odd number cannot be divided into two. There is the direct counting of numbers. Sometimes it is convenient to count in twos. For natural numbers within 20, there is a sequential enumeration of numbers 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, which is counting by twos. And there is also the enumeration 5, 10, 15, 20, which is counting by fives.

Next, we consider a text as a mathematical problem. A text problem is like a short story from life, which performs some mathematical actions. Examples of text problems in one action for comparison, addition, and subtraction are considered. A text problem consists of a condition, and a question or requirement of what must be defined or resolved. The condition of a text problem is what is known. To solve a text problem, one should establish dependencies between known data and conduct reasoning that allows getting an answer to the question of the problem. When solving a text problem, modeling conditions and solutions can be used. A model of the problem is created: a description of the known data and actions that must be performed to solve and answer the problem. To solve text problems, one should learn how to read first. This allows us to recognize the relationships and make sense of the content. In this regard, the accuracy of the wording of the condition and question of the text problem is extremely important.

Each set is defined by the elements that are included in it. An attribute is a distinctive feature of an element that determines its entry into the set. The attributes can be, for example, shape, size, color. The elements can be classified by an attribute or can be grouped by individual attributes. Let’s consider examples of patterns in sets. Examples of combining into one set, an intersection of sets, and inclusion into a set are given.

Some statements accurately describe the events of reality. Such statements are called correct or true statements. Some statements describe events or facts that do not happen. Such statements are called incorrect or false statements. Sometimes it is not possible to define whether the statement is true or false. This may require additional information. Such statements are called indefinite statements. Thus, logical statements are considered, and an elementary logical statement is determined. For each type of statement, examples from literature or life are given.

Magnitudes and measurements of magnitudes are considered. A quantity is something that can be measured. After measuring the magnitudes, they can be compared. Examples of comparison by magnitudes and by quantity are given. One of the examples of magnitudes and their measurements is the concept of length and the measurement of length. The measurement of many magnitudes is reduced to the measurement of segment lengths, so it is appropriate to start studying the measurement of the magnitude with the measurement of length. Using the example of a ruler, one can determine the length of the segment equal to one centimeter. This allows determining the length of the segment between two neighboring larger markings on the ruler. With the use of natural physical characteristics of body parts, it was possible in the past to determine the length of segments. In this connection, some old Russian measures of length are given: vershok, pyad (palm, five), lokot (elbow), arshin (yard), sazhen (fathom), verst (turn (of a
plough)). It is not coincidental that a checkered paper is used in math lessons. It is a visual and convenient tool for recording and displaying various mathematical representations and concepts. When considering checkered paper made up of identical cells, the checkered paper grid, checkered paper nodes, including neighboring nodes, are determined. The standard of length and the standard of the checkered paper is considered the length of one cell’s side. To determine the length of a given segment using length standards, one should count the number of standard segments contained in the measured segment. Examples of measurement standards are given: the length of the segment connecting the neighboring nodes of the checkered paper; the length of the segment equal to 1 centimeter; the length of the segment equal to 1 decimeter. One centimeter is equivalent to two standards of checkered paper, and one decimeter is equal to 10 centimeters. If the values are given in the same units of measurement, they can be added and subtracted using the rules for adding and subtracting numbers.

The equality of segments has certain properties: a segment is equal to itself; if the first segment is equal to the second segment, then the second segment is equal to the first one; if the first segment is equal to the second segment, and the second segment is equal to the third segment, then the first and third segments are equal. Segments are equal if and only if their lengths, measured in the same units of measurement, coincide. Thus, the segments can be compared by size using an overlay or using length measures. These two comparisons are consistent: if the segments are equal, then the lengths of these segments are equal; if one segment is smaller than the other, then this segment will be shorter than the other, and if one segment is larger than the other, then this segment will be longer than the other. The property of comparing three segments is considered: if the first segment is less than the second, and the second segment is less than the third, then the first segment is less than the third segment. Using the concept of the segment length, one can establish the relations between objects on the following examples: higher – lower, further-closer, wider-narrower. The concepts of height and width are defined. Suppose we consider two magnitudes that can be compared, and one of them is larger than the other, and the smaller magnitude can be subtracted from the larger magnitude. In that case, we can compare these magnitudes and thus determine how much one magnitude is smaller or how much it is larger than the other.

When drawing a segment, it is assumed that the segment is drawn using a ruler. The length of a segment is always equal to the sum of the length of the segment from its beginning to the inner point and the length of the segment from this inner point to the end of the segment. It is defined as how to get the points of the straight line where the given segment is located. If two segments have a common end, then they form an angle between the two segments. The common end of these segments is called the angle vertex. The segments themselves are called the sides of the angle. Next, we explain how to bend a sheet of paper in order to build a right angle. Examples of polygons are considered, including a triangle, a quadrilateral, a pentagon, and a hexagon. The concepts of vertices and sides of a polygon are introduced. Polygon designations are defined using vertex designations. For the sides of a triangle, the triangle inequality is always true: the length of one side of a triangle is always less than the sum of the lengths of the other two sides. Definitions of geometric shapes are given: rectangle, square, cube, and cube sweep. An example of how to draw a square on checkered paper is given. Vertices, edges, and faces are defined for the cube, and the cube sweeps are drawn. The points equidistant from the given point are determined. Using this definition, one can find the circumference, the circle, and the sphere, and the ball. For each of these shapes, the concepts of center and radius are defined. The boundary of a circle is circumference. The boundary of the ball is a sphere.
It is necessary to understand the representation of points and segments to determine the shapes copying consisting of points and segments on checkered paper. When it is considered the representation of a point on a checkered paper, it is assumed that the point is located at the nodes of the cell. Segments connecting pairs of points are considered. Segments can have different locations: horizontal segments, vertical segments, and segments that are neither horizontal nor vertical. On the checkered paper, the movement to the right and left along the horizontal segment and up and down along the vertical segment are determined. Movement along a segment from one end to the other corresponds to movement along a horizontal segment on a certain number of cells sides and movement along a vertical segment on a certain number of cells sides. Copying a horizontal segment involves copying the point that is the beginning of the segment. Then, from the copy of the beginning of the segment, there is a movement along the horizontal grid line in the same direction as the end of the original segment, by the number of the cells’ sides equal to the length of the original segment. Thus, there is a copy of the end of the segment. Connecting a copy of the beginning and a copy of the end of the segment, we get a horizontal segment that is a copy of the original horizontal segment. Copying a vertical segment involves copying the point that is the beginning of the segment. Then, from the copy of the beginning of the segment, there is a movement that takes place along the vertical grid line in the same direction as the end of the original segment, by the number of the cells’ sides equal to the length of the original segment. Thus, we get a copy of the end segment. Connecting a copy of the beginning and a copy of the end of the segment, we get a vertical segment that is a copy of the original vertical segment. When copying a segment that is neither horizontal nor vertical, the copy of the point that is the beginning of the segment is made. Then we consider the location of the end of the original segment in relation to its beginning: how many sides the end of the segment has to the left or to the right, above or below the beginning of the segment. Having found this out, we find the end of the copied segment. Connecting a copy of the beginning and a copy of the end of the segment, we get a segment that is a copy of the original segment. Thus, to make a copy of a shape made up of points and segments on a checkered paper, it is necessary to mark copies of all points and copies of the ends of all segments, considering their location relative to each other, and then connect the ends of the copied segments.

To give the primary school student an initial understanding of an algorithm, examples of the simplest algorithms found in everyday life and those learned in math lessons shall be provided. We formulated that the algorithm consists of sets and rules for executing the algorithm. The sets for the algorithm include the following: an initial data set, a set of possible results, and a set of intermediate data. The algorithm execution rules include the algorithm start rule, the algorithmic process rule, and the algorithm termination rule. The data set for the algorithm is what is given. The set of possible results is the set of results obtained when all the steps of the algorithm are performed. A set of intermediate results is a set of those obtained when performing individual steps of the algorithm. The algorithm start rule is the definition of the first step of the algorithm. An algorithmic process rule is for determining each successive step of an algorithm using all the previous steps. The algorithm termination rule is the rule when all the algorithm steps are completed and a set of possible results is obtained. The use of the direct counting algorithm for calculating the sum of two natural numbers and the reverse counting algorithm for calculating the difference of two natural numbers is considered. The measurement of the segment length as an algorithm and the algorithms for constructing geometric shapes (a segment, a triangle, a circle) are considered.

Thus, the textbook on mathematics that is being developed for the 1st grade corresponds to the fundamental conceptual directions of the current stage of education development. It also
contains theoretical and practical material, and allows the transmitting, perceiving, and controlling knowledge, which ensures the formation of a harmoniously developing personality with fundamental mathematical knowledge.

References


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