Features of reading literacy of Russian primary students obtained from PIRLS results

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Abstract. The features of reading literacy of Russian primary school students identified in the analysis of the results of the international comparative study PIRLS are discussed in this article. Comparing the results of 2006 and 2011 we have identified changes that occurred in reading literacy within 5 years. Using multiple methods of data analysis contributed to the reliability of the findings. Identified strengths and weaknesses in the reading literacy of primary school students can reasonably make changes in the methodology of the conscious reading in primary school.

Introduction

Ability to read texts, to work with text information is highly required in the modern information age. Increasing of the volume of information with which students have faced at the moment, presence of a controversial, false information, requires a high level of reading literacy. The significance of primary education in the development of reading literacy is very high, the first school years are aimed at the development of not only the technical skill of reading, but also awareness of reading. The international study PIRLS assesses the level of reading literacy of students on completing their fourth year at school (for Russia it coincides with the end of a primary school).

The relevance of a detailed analysis of the performance of Russian graduates from primary school in PIRLS tests associated with the need to detect strong and weak points of the students' reading skills since this can be a base of future improvement of reading instruction methods. This article deals with comparison of results of PIRLS 2011 [1, 2] with results of PIRLS 2006. In both of these cycles Russian students were in the leading group. However, a considerable amount of statistical data obtained in the study, allows a detailed analysis and to identify any deficiencies of Russian schoolchildren. To obtain reliable conclusions several approaches of accurate data analysis have been applied.

First of all, items were found for which the Russian indicator was lower than the international average. The analysis shows that out of 72 items dealing with literary passages, the Russian indicator is lower than the international average in 2 items, or 2,8% of the total number of items. One of these items is related to the reader's skill to make straightforward inferences and other item is related to the reader's skill to examine and evaluate content, language and textual elements. Both items are constructed-response items. Approximately the same results were in 2006: the Russian indicator was lower than the international average in 3 items, or 5% of the total number of items. The analysis shows that out of 63 items dealing with information passages, the Russian indicator was lower than the international average for only 2 items (3,2% of the total number).

One of these items checks the ability to make straightforward inferences and other items checks the ability to focus on and retrieve explicitly stated information. Both items are multiple-choice items. In 2006, the same results were obtained: Russia's results were below the international average for 2 items (3% of total).

Since it is impossible to make any conclusions about weaknesses in Russian fourth-graders' reading performance on the base of only 4 items, another strategies of data analysis were used. In the next step the items dealing with literary and information passages were combined. This combination is possible since for both types of items the same approaches were used in the development of the instrument and in the statistical analysis. The combined list was consisted of 135 items. For each item 5 indicators were used: the Russian indicator, average international indicator, maximum indicator, difference between Russian and average international indicator, difference between Russian and maximum indicator. To find out the strongest points of Russian students' reading literacy the question was put: "What kind of items did Russian students perform best?" To answer the question we decided to combine in one group the items for which the Russian performance indicator is equal to the maximum international one. There were 13 items in this group, among them 8 items related to literary texts and 5 to information texts. It is important to remember that in the PIRLS instruments the number of literary items is more than information ones (72 and 63, correspondingly). If we calculate the

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percentage of items with maximum results from the total number of items to this type of text, then it turns out 11% and 8%, respectively. These data indicate a small advantage of Russian students at work with literary texts. The analysis of item type shows that 10 items are the multiple-choice items and 3 - constructed-response.

Comparing the results of 2006, it is important to note that Russian schoolchildren showed the maximum rate in 19 items (including 12 literary items and 7 informational items) in the previous cycle. We can see the trend towards a decrease in the number of items that Russian students performed better than others, it is somewhat alarming fact and requires a more detailed analysis.

It is very interest to assess what skills are tested in items in which our students have demonstrated the maximum performance. Among these items are presented items for all groups of readers' skills, while the ratio of different groups of items is not quite the same as laid in the PIRLS instruments. The items to form direct conclusions are less represented in the reference group. The ratio of items related to different readers' ability was almost equal to the ratio inherent in PIRLS instruments in the group of items with maximum results in 2006. To maintain the proportionality of the work on the development of a variety of readers' skills of Russian elementary school students it is advisable to pay attention to work on the formulation of direct conclusions, i.e. teach children to derive more thoughtful information from a text.

Data on the level of difficulty of items for which Russian students showed maximum performance, denied the possibility of the assumption that all of these items are items of low and medium level. Among these items there are ones of all levels of difficulty, it is pleased to note that 62% of them are advanced level items, 15% are high level items.

Summarizing, we can say that most of the items for which Russian students showed the maximum score in all international dataset – are the literary texts' items, and there are items for all groups of readers' skills (but not enough of items for the making straightforward inferences and formulation of conclusions) and items with all levels of difficulty.

On the next stage we continued to find out the answer to the question: «What are the weakest points of Russian students' reading literacy?» It has been decided to define a group of items for which the difference between the Russian indicators and the maximum PIRLS 2011 international indicators is greatest, i.e. the items for which Russia's achievements differ the most from the world's best ones. For this purpose, for each item difference between the Russian indicator and the maximum international indicator has been calculated. Then the items for which this difference is significantly below the average value on this indicator (-8.26, with a standard deviation of 6.45) have been placed into a group, which has been analyzed in order to reveal weaknesses of Russian fourth-graders in reading literacy. In this group there are 20 items; among them there are 7 literary items and 13 information items. Considering what percentage of these items make up the total number of items of this type of texts, we will get 10% and 20%, respectively. This suggests that most Russian students had difficulty with information texts. This group is dominated by items with a construct–response items: 6 out of 20 items are multiple-choice items, 14 are construct–response items.

There were 17 items in this group in 2006, the ratio of the text type and the type of items were about the same.

Among the items with minimal performance there are items of all groups of readers' skills, and the distribution of these items does not correspond to the ratio dedicated in the PIRLS instruments. Items for making straightforward inferences and interpret and integrate ideas and information prevail over others, so it is possible to talk about the need for constant attention to these groups of readers' skills to improve Russia's results.

Consideration of the level of item's difficulty belonging to a group with a minimum of indicators makes it possible to ascertain the expected result: low-level items are absent, the number of items of other levels of complexity increases in proportion to the level of difficulty.

Thus, we can say that among the items for which the Russian indicators differ significantly from the maximum performance on the international sample, there are items for all groups of readers' skills, especially significantly represented items for making straightforward inferences and interpret and integrate ideas and information . Most of these items are constructed-response items and information texts items. Among the items of this group are a lot of items of advanced and higher level.

The preliminary conclusions are the following: the Russian primary school students have a little more difficulties to work with informational texts, giving the response in the free form. Despite of the proportional development of all groups of readers' skills there is a small deficit of ability to make straightforward inferences and formulate simple conclusions.

In order to verify these preliminary conclusions, another statistical procedure, consisting of several stages, was carried out.

1. The difference between the Russian indicator of performance and the average international indicator for each item has been calculated (difference was in the range from 28.1 to -2.4). Then the items have been arranged according to the value of difference.

2. All items have been divided into three groups: the first group includes 25% of the items (34 items) for which the given characteristic is negative or rather small (the value of difference is in the range from -2.4 to 9.4). This group has been marked as the problems area group. Another group includes 25% of the items (34 items) for which the given characteristic is high (the difference is in the range from 18.1 to 28.1) and this labeled the success area group. Finally, the remaining 50% of the items (67) have been united into the group named as the prosperity area group.

3. Three items were excluded from the total consideration, because of the formal criteria these items were in the problems area group (the difference between

the Russian and the average international results did not exceed 9.4 units), but the absolute values of the results for these items exceed the 87% performance on the international sample and 96% for the Russian sample, i.e, the so-called "ceiling effect" has been made for them. Thus, it remains 31 items in the problems area group.

The detailed analysis of different parameters of the items (purpose of reading, process of comprehension, level of difficulty, type), in these three groups provides answers to many questions. One of the most important questions is "Do Russian students better read literary texts?". To check it, we analyzed the distribution in the problems area group, in the success area group, and in the prosperity area group of the items dedicated to the literary and informational texts (Fig.1).

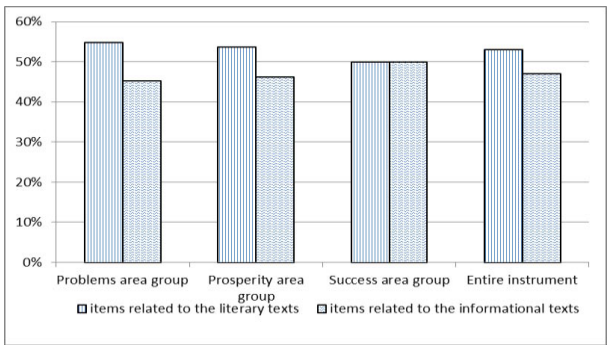

Fig. 1. The distribution of items related to the literary and informational texts.

The analysis shows that in each of the selected areas the ratio of items related to the literary and informational texts is identical to the ratio in the entire instrument, while comparing the problems area group and the success area group; we can see slight advantage when students work with information texts. Thus, a slight advantage in reading literary texts derived from extreme groups is negligible on all data set: the Russian primary school graduates show about the same success in reading with two main objectives - the purpose of acquiring reading experience and the purpose of acquiring and using information. It is important to note that analogous analysis of the PIRLS 2006 data has shown some worse situation with the reading of informational texts. This means that the situation with the reading of informational texts improved over the past five years.

The next question that can be answered is: "How are the items that characterize different reading skills presented in marked groups?" In PIRLS four groups of reading skills are evaluated: 1) focus on and retrieve explicitly stated information; 2) make straightforward inferences; 3) interpret and integrate ideas and information; 4) examine and evaluate content, language and textual elements [3, p. 23].

Figure 2 shows the relationship of readers' skills in various groups, as well as instruments dedicated ratio.

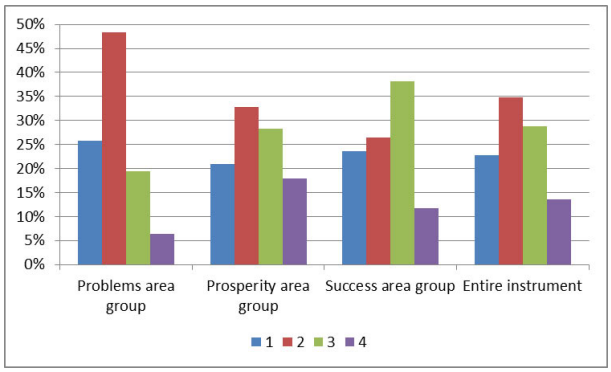

Fig.2. The ratio of items that assess different groups of readers' skills in regions of success.

There is an indication of the percentage (%) of the total number of tasks in each region of success.

In each area the ratio of readers abilities corresponds approximately to the dedicated one in PIRLS tools (especially remarkable in the prosperity area group), which is a good indicator since the balance of skills is very important to the reader. It also indicates that now in primary school the work is done on all over readers' skills. A positive aspect is the fact that among the items with which the Russian students have coped very well (the success region), a fairly significant percentage of items belongs to the third group of readers' skills.

The negative point is that in problems area group there is a significant amount of items that assess the ability to make straightforward inferences (second group of reading skills), while in the success area group the amount of these items is less. In addition to the already provided information an important data for groups of readers' skills is presented in Figure 3 and will be used to make a conclusions on each of the groups of reading skills.

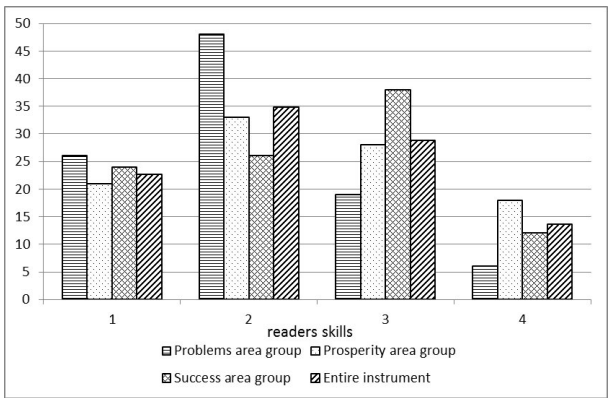

Fig. 3. Different readers' skills.

The most successful Russian students cope with the items of the fourth group of reading skills. According to the criterion χ^2 differences between the number of this items in problems area group and success area is significant with the probability of at least 99%.

In the process of improving the methods of work on the understanding of texts in elementary school one should pay attention to the reader's ability, as make straightforward inferences based on the information available in the text. In the problems area group there was quite a lot of items that assess these readers' skills

and in success area group, on the contrary, such items were few.

At the same time the criterion χ^2 difference between the number of items in the problems area group and success area group is significant with the probability not less than 90%. Furthermore, it requires to pay attention on the reader's ability to focus on and to retrieve explicitly stated information. As can be seen from the graphs, in the problems area group items that assess this reader's skill is more than incorporated in the instrument.

Without the ability to properly perceive the information proposed in the text, to make conclusions based on it the full-time work on the synthesis and interpretation of this information cannot be done. Pretty well the case with items, assess third group of readers' skills: many of these items is presented in the success area group.

Analysis of items in groups of readers' skills would be incomplete without considering the characteristics of assignments to different groups of skills when dealing with literary and informational texts. The corresponding data are presented in Figure 4.

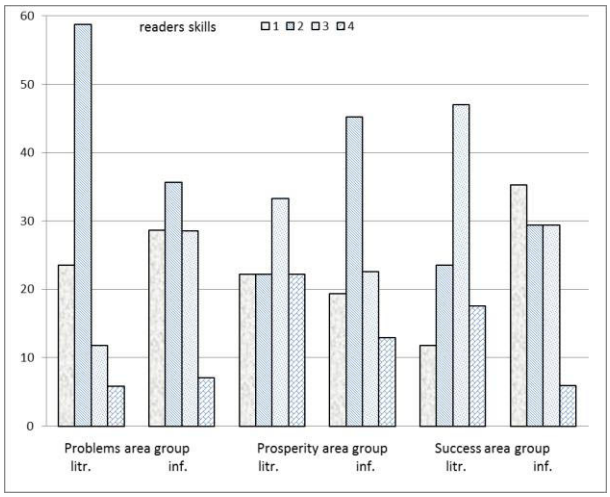

Fig. 4. The ratio of the number of items of different groups of readers' skills in areas and types of texts.

Of course, not too wide range of items does not allow rigorous conclusions, but nevertheless this data provides an opportunity to talk about the existing trends.

The ability to focus on and retrieve explicitly stated information is better developed among Russian students working with information text: items for this skill when working with informational texts in problems area group less than when working with literary texts, and in the success area group when working with information text more. This is an important feature of the reader's literacy of Russian schoolchildren, especially when working with information texts, because you must first accept the facts on which the later will be based conclusions and generalizations. In 2006, it was the weakest point in the background of our students; the changes occurred indicate that the method of working with information texts was improved then.

When working with literary text, compared with information, the situation with the second group of readers' skills is worse: in problems area group the amount of items to this skill group of the literary text is more. In the areas of prosperity items of this group of readers' skills of information texts this amount is much more than to literary text. This suggests that in the learning process when working with literary text it is necessary to strengthen the work on the ability to make straightforward inferences and simple conclusions on the basis of reading.

The third group of readers' skills is more pronounced when the Russian students are working with literary texts. In the learning process it is important to pay attention to the interpretation and integration ideas and information.

The fourth group of skills is better developed while working with literary texts: their amount in the area of success and area of prosperity is higher while working with literary texts in comparison with information ones.

The obtained data make it possible to make the following conclusions about the items that assess different readers' skills, and feasibility of making some changes in the educational process:

- Russian students cope with the items of all four groups of reading skills more successfully;
- items are consistently well performed when they are directed to examine and evaluate content, language and textual elements;
- it is important to continue to work on all kinds of readers' skills and pay an attention to work on such a seemingly simple skills like finding information, given in an explicit form;
- when working on literary texts it is necessary to pay more attention to work on the ability to focus on and retrieve explicitly stated information; to make straightforward inferences;
- when dealing with all kinds of texts one should improve the methodology for developing the ability to interpret and integrate ideas and information.

It was interesting to find out the answer to the question: “Does the type of the items (multiple-choice items and constructed-response items) influence the success of items completion by a Russian student?” The data are presented in Table 1.

Table 1. Number of different types of items in different area groups

	multiple-choice items	constructed-response items
Problems area group	17 (24% of all multiple-choice items)	14 (23% of all constructed-response items)
Prosperity area group	40 (56% of all multiple-choice items)	27 (44% of all constructed-response items)
Success area group	14 (20% of all multiple-choice items)	20 (33% of all constructed-response items)
Total	71	61

It is important to emphasize that in the problems area there are about equally represented multiple-choice items and constructed-response (taking into account the total

number of this type of items), and in the success area constructed-response items are dominated. This is a very important fact, indicating that the Russian students are gradually getting used to give free response. In 2006, in the problems area group the constructed-response items were dominated.

Conclusion

1. Russian primary school graduates showed a good level of reading literacy when working with literary and working with informational texts; by comparing the results of 2006 and 2011, we can talk about improving the work with information texts.

2. Reduction of the number of items for which Russian students have showed the best results in the international sample, and increase in the number of items for which Russia is different than the maximum for the entire sample. This requires greater attention to the process of working on the reader's literacy to preserve the competitiveness of Russian education.

3. Modern methods of work with texts in primary school aim on a balanced development of all four groups of readers' skills, which certainly contributes to the formation of high-grade reading activity of students. Along with the further improvement of methods it is important to work actively on development of all of the reading skills, also it is important to strengthen the work on skills to make straightforward inferences (especially when dealing with literary texts), and to interpret and integrate ideas and information; (especially when work with information texts).

4. For Russian students it is harder to give free answer than choose from several offered answers, while a positive trend is observed. It is important to note that in spite of the obvious conclusion about the need for learning to increase attention to tasks with a free response, implying a statement of point of view, relying on the text, it is necessary in the educational process and in the monitoring process to keep the balance of two types of items: with the choice response and a free response.

References

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