

Literacy Change as a Result of the Education Reform: Comparison Among the Post-Soviet Countries

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Abstract

In 1989–1991, after the collapse of the Soviet Union, it was an auspicious moment for structural changes in education systems in the new independent countries, which had been under control of the Soviet government for a long time. About three decades have passed since the beginning of the education reforms in the post-Soviet countries and several generations who studied within the framework of the reformed systems starting from the first grade have already grown up. Therefore, it is relevant to estimate the results of the reforms. One of the possible measures for estimating the results of the education system or education reform is the change in population literacy within certain education systems. The purpose of the article is to compare the results of education reforms of the post-Soviet countries based on the population literacy considered as a result of former learning. The data of the Programme for the International Assessment of Adult Competencies (PIAAC) organised by the Organisation for Economic Co-operation and Development (OECD) are used for literacy comparison. The OECD PIAAC survey databases of Lithuania, Estonia, Russia, Poland, the Czech Republic, Slovakia and Slovenia were used for comparison of the results of the reforms implemented in the post-Soviet countries. Data analysis showed that at the lower and upper secondary education levels, the most positive results of the education reform were observed in Lithuania, while in Russia, the results were negative.

Keywords: *PIAAC, education reform, literacy, post-Soviet countries*

Introduction

Over the last decades, in both developed and developing countries, education reform has become one of the key political matters. Improvement of the education quality becomes increasingly valued as a source of international economic competitiveness (Maroy, 2008), and it is agreed that such economic competitiveness is betokened by better educated population/employees (Zajda, 2009). Moreover, high quality of education has become a synonym for sustainable development of a country.

Education reform is generally defined as change in one or more aspects of the education system: goals and tasks, policy-making and management system or power structures, funding and budget processes, system organisation, education content, pedagogy, social relations of teaching and learning, assessment and rewards (Gaziel, 2010). The change in education is intended for modeling future society change by responding to newly emerging/comprehended values.

The fall of the Soviet Union in 1989–1991 enabled 28 new countries to implement structural changes in their education systems, which had been controlled by the Soviet government for a long time (Khavenson and Carnoy, 2016). In many post-Soviet countries, the education reform began around 1988 and celebrates its thirtieth anniversary this year. From a historical point of view, the end of the 20th century was particularly opportune and important time for the education reform in the post-Soviet countries: the restoration of independence of the countries created the necessity of systematic reform covering all fields of education. With the essential change in the political situation, the post-Soviet countries had to develop fundamentally new education systems instead of adapting them in one way or another.

The literature analysis of the post-Soviet education changes in the societies of the Eastern and Central Europe during the transition period implies that the reforms implemented in the societies of the former Soviet republics and countries controlled by the Soviet government after 1989–1991 were clearly focused on the dissolution of the communist ideology and on the necessity to validate the new countries (Silova, 2004). New education systems had to be created gradually by disproving and essentially changing the former Soviet education framework – its structure, values, content, methods and principles. The literature analysis shows that academic effects of the education reforms of these countries are considered positive but secondary compared to the political and ideological goals set for the reforms (Silova, Johnson and Heyneman, 2007).

Taking into account that about three decades have already passed and several generations who studied within the framework of the reformed systems start-

ing from the first grade have already grown up, it is important and relevant to estimate the results of these reforms. One – although not the only one – of the measures to estimate the results of the education system or education reform is change in literacy and competencies of population brought up by certain education systems. It is obvious that population literacy is determined not only by the education system implemented in a given country, but also by informal learning and social environment (which is particularly rapidly changing as it happened in the post-Soviet countries). However, change in population literacy can, to a certain extent, be considered as one of the indicators of the education reform results, albeit an approximate one.

The purpose of this paper is to compare the results of the education reforms of the post-Soviet countries based on the change in population literacy which is regarded as a result of former learning. The data of the Programme for the International Assessment of Adult Competencies (PIAAC) organised by the Organisation for Economic Co-operation and Development (OECD) are used for literacy comparison. The OECD PIAAC survey is one of the major international education surveys designed for the estimation of adults' literacy. Literacy and education system efficiency are usually analysed in the student/school context. The novelty of this analysis is the use of data concerning the literacy of adults instead of schoolchildren for the comparison of the results of the education reforms. Attempts to find similar analysis in the scientific literature proved fruitless.

The question posed in the survey is: In which post-Soviet countries did the education reforms condition the greatest positive change in population literacy?

The education reforms of the post-Soviet countries, their specific goals and implementation are not analysed in this article. The focus is on the change in population literacy as one of the possible indicators of the results of the education reforms, irrespective of philosophies of specific education reforms in the post-Soviet countries.

Concept of literacy

The results of the education reforms can be estimated by various dimensions, yet unambiguous consideration of the effect of the reform is rather difficult and perhaps even impossible. In terms of education, any estimation is often based on academic achievement. In terms of school, literacy is one of the forms of learning achievement. However, adult literacy can be considered as a result of the previous learning, when a person was a participant in the education system. Literacy

comparison of different age groups can be considered as one of the possibilities to compare the efficiency of different education systems within which adults of certain age groups studied. Such a comparison is obviously not too accurate because literacy is determined not only by the education system but also by social environment. However, education system undoubtedly contributes substantially to literacy.

The majority of international surveys of education which are focused on literacy estimate various components of literacy: numeracy, science literacy, ICT literacy, reading literacy, etc. However, the most frequent components of literacy covered by all international surveys on education are reading literacy and numeracy, which are often described as “basic” skills, in that they provide a “foundation” on which the development of other competencies rests. The reading literacy and numeracy is also covered by the PIAAC survey, the data of which are used for the analysis provided in this article. In this article, the analysis of literacy is carried out in terms of these two particular aspects.

The PIAAC survey defines the reading literacy (referred to simply as “literacy”) as the ability to understand, evaluate, use and engage with written texts to participate in society, to achieve one’s goals, and to develop one’s knowledge and potential. Reading literacy encompasses a range of skills from the decoding of written words and sentences to the comprehension, interpretation, and evaluation of complex texts. It does not, however, involve the production of text (i.e., writing) (OECD, 2016b). With the view of highlighting the growing importance of digital measures, which play a significant role in generating and compiling texts and providing access to the texts, the PIAAC developers decided that the texts must be provided to the survey participants in electronic format (only those who lacked computer skills could perform the tests in paper form). The electronic texts differ from the texts provided in paper form not only because they are displayed on computer or smartphone screens; the difference lies in many other important features, such as the possibility to add hypertext links to supplementary documents, possibility to add various navigation tools (scroll bars, menus, etc.) and to make it interactive. The PIAAC survey was the first in the world to include these particular technological innovations in literacy tests. In the PIAAC survey, numeracy is defined as the ability to access, use, interpret and communicate mathematical information and ideas in order to engage in and manage the mathematical demands of a range of situations in adult life. Numeracy involves managing a situation or solving a problem in a real context, by responding to mathematical content, information or ideas represented in multiple ways (OECD, 2016b). Although success in performing numeracy tasks partly depends on the ability to read and comprehend the text,

in the PIAAC survey, numeracy covers more than just arithmetic skills: while carrying out the tasks, the participant should comprehend the text and properly perform the tasks by identifying the required information in the text.

Research Methodology

Analysis of the academic effects of the education reforms of the post-Soviet countries is complicated because of the lack of reliable and comparable data on students' achievements in the Soviet times. The post-Soviet countries started participating in the international surveys of education, the results of which can be compared across countries, only after the fall of the Soviet Union, e.g., Lithuania, Latvia, Russia and Slovakia participated in the international mathematics and science survey IEA TIMSS for the first time in 1995. Part of the post-Soviet countries have not participated in any international surveys of education yet.

It was decided that the data of the OECD PIAAC Survey of Adult Skills should be used for the analysis as this is the largest international survey of education focused on adult literacy ever conducted. Seven post-Soviet countries participated in the PIAAC survey: Lithuania, Estonia, Russia, Poland, the Czech Republic, Slovakia and Slovenia. The PIAAC tests and questionnaires databases of the said countries were used for the analysis; these databases contain data compiled in 2012–2015. Detailed description of the methodology, basis of the constructs of the data compilation instruments, logic of sampling, ethical guidelines of the PIAAC survey is provided in the following OECD PIAAC technical reports: *Technical Report of the Survey of Adult Skills (PIAAC)* (2013), *Technical Report of the Survey of Adult Skills (PIAAC) (Second Edition)* (2016a), *Literacy, Numeracy and Problem Solving in Technology-Rich Environments – Framework for the OECD Survey of Adult Skills* (2012).

PIAAC survey sample

The respondents of the OECD PIAAC survey were persons aged 16–65. The samples of the respondents among the countries were as follows: Poland – 9366, Estonia – 7632, the Czech Republic – 6102, Slovakia – 5723, Slovenia – 5331, Lithuania – 5093, and Russia – 3892. The number of respondents representing the said seven countries in the PIAAC survey totalled 43,139.

Analysis sample

In order to estimate the results of the education reforms, the survey participants must be selected correctly. Two clusters of participants were selected

for the analysis. The first cluster includes persons who studied in the reformed school from the first grade, i.e., those who have not experienced the Soviet education system. This cluster excludes persons who were still studying during the PIAAC survey (at least the majority of them had already completed their studies). Therefore, the first cluster is designed of persons aged 25–34. The second cluster includes persons whose entire school education was provided within the framework of the Soviet education system and who had not experienced any manifestation of the last education reform. Therefore, the second cluster is designed of persons aged 45–65. These two clusters represent the post- and pre-reform education systems of a country. In addition to the selection of the appropriate age groups, it is also important to take into account the respondents' achieved education level. In terms of literacy, the entire 25–34 age group cannot be compared with the entire 45–65 age group as these two clusters contain different proportions of persons with different education levels. In the younger age cluster, there are more persons with a higher level of education completed than in the older age cluster. Therefore, it was decided to analyse only the data of the respondents with the following two lowest levels of educational attainment: lower secondary education (ISCED 2 and lower) and upper secondary education (ISCED 3). They best represent the education system of a given country. As regards the post-secondary non-tertiary and tertiary education (ISCED 4 and higher), the attainment thereof usually includes studies abroad (the Erasmus programmes and other student mobility), and thus this education is not appropriate for reliable estimation of the effects of the education system of a specific country. Moreover, the education reforms of the post-Soviet countries took the longest to implement and had the greatest emphasis at the general education school level.

Methods of analysis

Test results in two fields studied by the PIACC – reading literacy and numeracy, as well as the questionnaire questions about the highest level of education completed and age were used for the analysis. Descriptive statistics methods were applied for the analysis by using IBM SPSS Statistics 24. The analysis does not employ strict methods of statistical analysis because conclusions are made by comparing the countries, considering the fact that such estimation of the results of the education reforms is approximate as population literacy is not only the reflection of the education reform but only its part. The analysis was carried out by using weights which allow for reliable comparison of results among the countries. In the PIAAC survey, literacy is measured on a 500-point scale.

Research Results

The comparison of the reading literacy and numeracy results of the respondents with lower secondary education between two age clusters is presented in Figures 1 and 2.

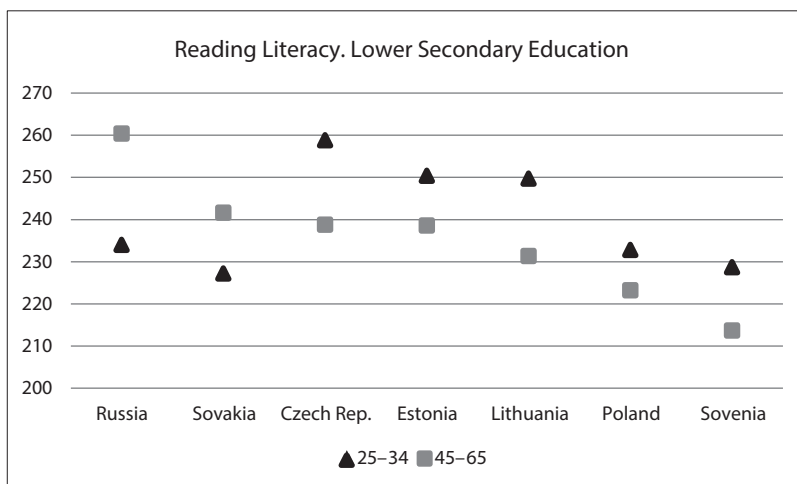


Figure 1. Comparison of the reading literacy results of the respondents with lower secondary education between two age clusters

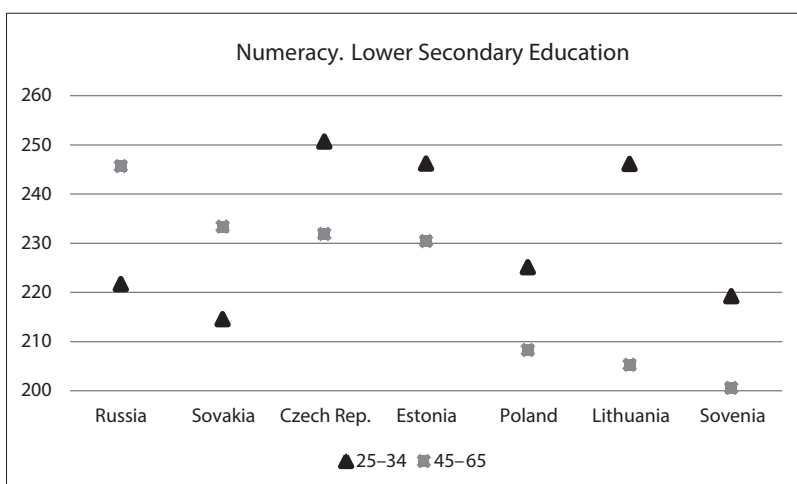


Figure 2. Comparison of the numeracy results of the respondents with lower secondary education between two age clusters

The figures show that in the Soviet education system cluster (45–65 age group), the highest results in both reading literacy and numeracy were observed for the Russian respondents, while the lowest – for the Slovenian respondents. In the reformed education system cluster (25–34 age group), the highest results were recorded in the Czech Republic, the lowest – in Slovenia. The comparison between the Soviet education system cluster and the reformed education system cluster reveals that the reading literacy and numeracy results of the younger generation of Russia and Slovakia are lower than those of the older generation. As for the remaining countries, the situation was the opposite: the reading literacy and numeracy results of the younger generation were higher than those of the older generation. In terms of numeracy, the difference in the results of the Lithuanian respondents between the two age clusters is particularly big (41 points). Therefore, it could be stated that the effect of the education reforms for lower secondary education in the Czech Republic, Estonia, Poland, Lithuania and Slovenia was positive, while in Russia and Slovakia – negative.

The comparison of the reading literacy and numeracy results of the respondents with upper secondary education between two age clusters is presented in Figures 3 and 4.

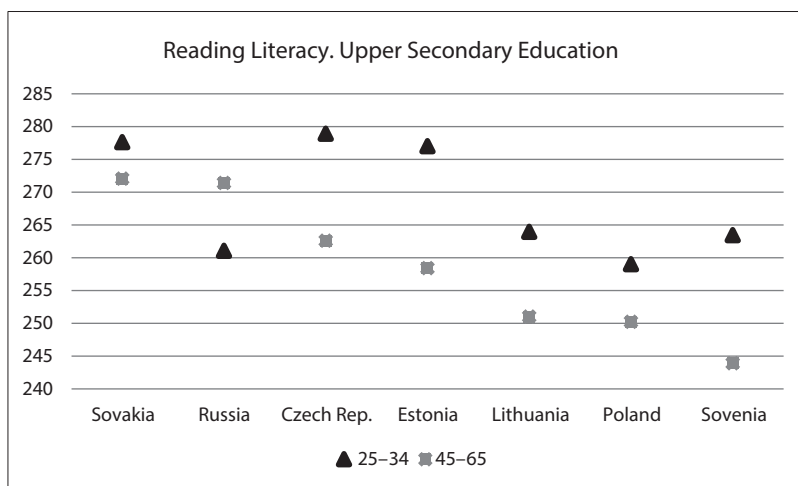


Figure 3. Comparison of the reading literacy results of the respondents with upper secondary education between two age clusters

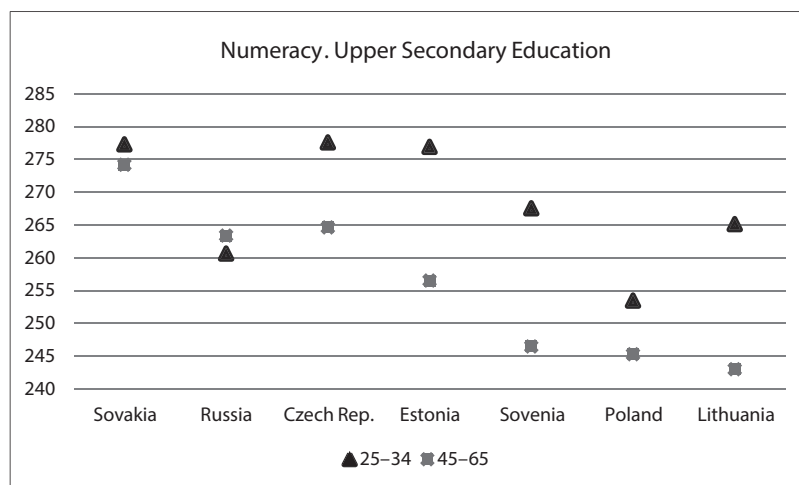


Figure 4. Comparison of the numeracy results of the respondents with upper secondary education between two age clusters

In the Soviet education system cluster (45–65 age group), the highest results in reading literacy were observed for Slovakia and Russia, in numeracy – for Slovakia, while the lowest results in both reading literacy and numeracy were recorded in Slovenia. In the reformed education system cluster (25–34 age group), the highest results in both reading literacy and numeracy were recorded in the Czech Republic, Slovakia and Estonia, while the lowest – in Poland. The comparison between the Soviet education system cluster and the reformed education system cluster provides similar results as in the case of lower secondary education. The results of the younger generation of Russia are lower than those of the older generation; the results of the younger generation of Slovakia are higher compared to lower secondary education this time, yet in terms of numeracy, the difference between the results is not considerable. As for the remaining countries, the results of the younger generation in both reading literacy and numeracy are significantly higher than those of the older generation. The difference in the results is particularly significant between the younger and older generations of Estonia, Slovenia and Lithuania.

It is worth comparing the results of the Soviet education system cluster with those of the reformed education system cluster in a summarized manner. Figure 5 shows the summarized data concerning reading literacy and numeracy, presenting the difference in points between the Soviet education system cluster and the reformed education system.

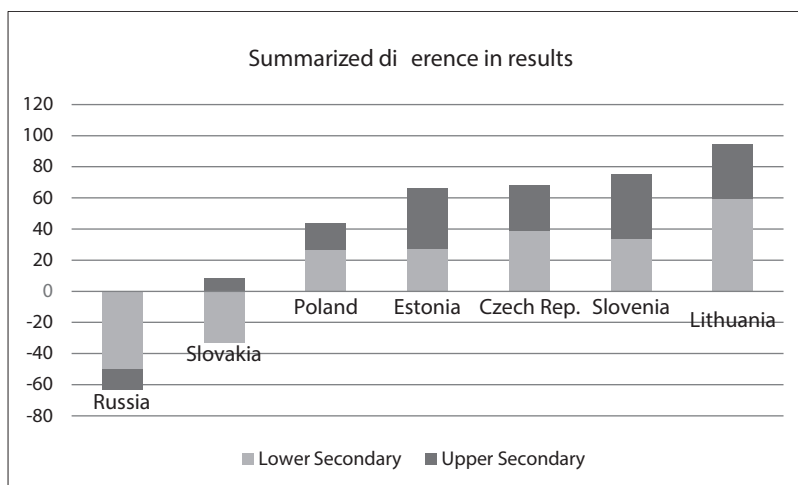


Figure 5. Overall difference in the reading literacy and numeracy results between the Soviet education system cluster (45–65 age group) and the reformed education system cluster (25–34 age group)

Figure 5 shows that the most significant positive effect of the education reform at the lower and upper secondary education levels was observed in Lithuania (94 points), the least significant positive effect – in Poland (43 points). In Russia, a negative effect of the education reform was observed at the lower and upper secondary education levels (63 points). In Slovakia, both positive and negative effects of the education reform were observed: the negative effect was observed at the lower secondary education level (33 points), while at the upper secondary education level, the effect was positive but weak (9 points).

Conclusions

1. The most positive results of the education reform at the lower secondary education level were obtained in Lithuania, the least positive – in Poland, the most negative – in Russia.
2. The most positive results of the education reform at the upper secondary education level were recorded in Slovenia, the least positive – in Slovakia, while negative results were obtained only in Russia.

3. In summary, at the lower and upper secondary education levels, the most positive results of the education reform were observed in Lithuania, while in Russia, the results of the education reform were negative.

Limitations

The analysis of the results of the education reform was carried out in terms of the population literacy change. It is obvious that the literacy change is just one of the possible measures for estimating the results of the reform. Moreover, the degree of population literacy is determined not only by the education system, it is influenced by other factors as well. It would be relevant to estimate the results of the reform in other ways; this offers great opportunities for a series of further surveys.

The presented article provides a detailed analysis of only two components of literacy – reading literacy and numeracy. Although reading literacy and numeracy are fundamental components of literacy, they do not fully cover the concept of literacy. It would be important to analyse population literacy and its change in a wider range of aspects. However, such work is limited by the actual data collected in the OECD PIAAC survey.

The comparison of the education reform results did not cover all post-Soviet countries, but only the ones the data on which are available in the OECD PIAAC survey databases. Other post-Soviet countries did not participate in this survey and did not carry out the estimation of population literacy. There has been no survey of adult literacy other than PIAAC survey so far.

This article provides an initial analysis of population literacy change as a result of education reform, which tends to focus on providing summarized results of literacy changes. More detailed analysis could be a further step in this subject.

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