

CHAPTER 4

Post-socialist Transformations, Everyday School Life and Country Performance in PISA: analysis of curriculum education reform in Latvia and Estonia

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ABSTRACT Using a natural experiment situation, this chapter describes the process of curriculum reform in Russian-medium schools in Latvia and Estonia. The research question focuses on whether those curriculum reforms were successful from the perspective of schools' interiorisation of new curriculum and PISA (Programme for International Student Assessment) performance improvement. Using the three-layered curriculum approach (intended, implemented and attained curriculum), this chapter analyses how the intentions of the laws and other reform-related documents were implemented in everyday school practice and are reflected in attained educational results. To address this issue, a series of in-depth interviews in Russian-medium schools, in conjunction with the PISA 2003-2012 trends analysis, were conducted. The results showed that intended and attained curricula have grown closer in both countries. Schools actively implement proposed reforms in teaching, and PISA performance has been constantly improving, showing that the attained curriculum is approaching what was intended, though this process is different in the two countries.

Introduction

The post-Soviet countries undoubtedly experienced significant transformations in every sphere of life after the collapse of the Soviet Union. The process of establishing new education institutions was not smooth. For the former Soviet republics, integration of their ethnic Russian populations

was one of the main challenges in national development. First, the status of being Russian changed dramatically in the early 1990s; from being at the top of the socio-economic ladder in each of the 15 Soviet republics, Russians became an ethnic minority, losing their linguistic, occupational and other privileges (Rannut, 1991; Raun, 2009; Vihalemm & Hogan-Brun, 2013). Second, several former Soviet countries had been ethnically homogeneous before becoming part of the Soviet Union and thus had little experience of bilingualism or other strategies of dealing with large populations of ethnic minorities (Pullerits, 1937).

In the Baltic countries – Estonia, Latvia and Lithuania – language and ethnic integration has been viewed as one of the major issues facing educational policymaking (OECD, 2001b; Silova, 2002b; Khavenson & Carnoy, 2016). Estonia and Latvia inherited a dual school system from the Soviet era, with schools operating in the state language (Estonian and Latvian, respectively) as well as in Russian. Currently, both countries have a *de jure* unified education system, where some schools deliver education in Russian and the national languages, Estonian or Latvian. De facto, they usually refer to two types of schools – those with instruction in Estonian or Latvian and those with instruction in Russian (Brands-Kehris & Landes, 2007; Siiner, 2014).

In both countries, educational reforms directed at Russian-medium schools started much later than those targeting the educational system based on the titular language, Latvian or Estonian. For ethnic majority schools, some changes were introduced at the end of the 1980s, followed by many more transformations during the 1990s, while Russian-medium schools remained in the shadow, mostly continuing instruction in the old style with less attention or accountability from ministries of education in Estonia and Latvia. The active phase of the Russian-medium school reform began only in the early 2000s in Latvia and in the mid-2000s in Estonia. By that time, schools using the state language as the medium of instruction in both countries had generally developed new educational values systems, using a constructivist approach and child-oriented learning, and were ready to disseminate these approaches to the entire education system.

From this perspective, the integration of Russian minorities into the national education system was the aim of the reform of Russian language schools in general and of curriculum interventions in particular. An equal curriculum, meaning that every student in the country is given approximately the same sum of skills and knowledge in a similar teaching environment, is a crucial element of such integration (Livingstone et al, 1986; Heyneman, 1998; Heyneman et al, 2001; Njeng'ere, 2014).

There is a common view that a curriculum has three layers: the intended curriculum – ‘what society would like to see taught’; the implemented curriculum – what is actually taught in the classroom and how teachers bring all the curriculum’s elements into play; and the attained curriculum – what students have learned (Livingstone et al, 1986; Martin,

1996; Bempechat et al, 2002). Hence, in the case of the Baltic countries, curriculum interventions constituted a message as to what Estonian and Latvian education officials wanted Russian students to know.

Following this three-layered curriculum approach, it can be assumed that integration has more or less been achieved when what society would like to be taught (the intended curriculum) approximately equals what is actually taught in the classroom (the implemented curriculum) and what students have learnt (the attained curriculum). The research question of our study is whether integration has been more or less achieved or at least whether the gap between the three levels of curriculum has been narrowing since the Russian-medium schools reform began. Investigating this puzzle requires (1) tracing the process of new curriculum implementation as an aspect of Russian-medium schools' integration in Latvia and Estonia; (2) relating this process to what is happening in schools (i.e. how the intended curriculum is internalised by Russian schools); and (3) measuring academic performance during the reform period as an indicator of the attained curriculum.

The three-layered curriculum is used in this study as a lens to examine the process of new curriculum implementation as a core aspect of Russian-medium schools' integration in the national school system in Latvia and Estonia. The intended curriculum was explored through an analysis of the changes in national curricula described in various documents on Russian-medium school reform in Estonia and Latvia. Both implemented and attained curricula have formed in the context of these reforms. To investigate the implemented curricula, we examined Russian-medium schools using qualitative research. Interviews were used to assess whether teachers and principals implemented the intended curriculum and what their attitudes were. As teachers and school principals are 'gatekeepers' of the curriculum and key implementers of any education reform initiative, little can be expected to change if they do not accept and internalise the proposed reform (Livingstone et al, 1986, p. 7; Spreen, 2004; Erss et al, 2014). Teachers' lack of preparedness for the liberal reforms, for instance, was cited as one reason for the crisis in education reforms in Russia in the mid-1990s (Borisenkov, 2007). Finally, to measure academic performance during the reform period as an indicator of the attained curriculum, the study looked at the trends in educational performance in Latvia and Estonia using the PISA (Programme for International Student Assessment) data for the period from 2006 to 2012.[1] PISA is an international large-scale assessment of 15-year-old pupils in reading, mathematics and science.

To be able to measure the extent to which the intended curriculum was implemented in schools and was attained by students in Latvia and Estonia, the study used the natural experiment that occurred after the break-up of the Soviet Union. During the Soviet period, considerable effort was directed towards the unification of the educational systems in the 15 constituent republics. By the end of the 1980s, this had generally been accomplished. Education systems were quite similar over all parts of the USSR (Mitter,

1992; Herbst & Wojciuk, 2017). Additionally, teachers in all three countries had similar educational backgrounds because a substantial number of Latvian and Estonian teachers in Russian-medium schools were trained in the USSR, at home, or in the Russian SSR. In Latvia, the average working experience of teachers is 22 years, and there is a very low proportion of young teachers in both Baltic countries. In 2016, only 6% and 8% of teachers in lower- and upper-secondary education were aged under 30 in Latvia and Estonia, respectively. Forty-nine per cent of teachers in Latvia and 50% in Estonia were 50 or older (OECD, 2016a,b). Since school curricula and teacher training in all Soviet Republics were characterised by substantial uniformity, it may be assumed that teachers continued to use Soviet curricula and pedagogy before the clear introduction of education reforms.

As newly independent states started building their own educational systems in the 1990s, a situation of natural experiment arose, in which initially similar groups began to live in different circumstances and under different transformation processes. While the Russian Federation largely maintained its previous curriculum standards, Latvia and Estonia changed their national curricula quite substantially with an orientation to European integration.

The educational transformations of emerging countries are often studied through the policy-borrowing perspective. When the focus is directed at comparison of the existing state with a desired education system, there is a comparison with a destination point. In the case of post-Soviet and Eastern European countries, a destination is Western European education systems. In our case, we compare Estonia and Latvia not with the destination, but with the point of origin. Russia in this comparison plays the role of departure point, where the education system had stayed the same or was very close to the initial, late Soviet, one. We believe that this allows us to answer more precisely the question of how post-socialist transformations can appear, giving examples of such transformation and describing the ways they have been approached. Using Russia as a reference country allows for the attribution of national academic achievement (attained curriculum) with respect to the reform measures (intended curriculum) and to the process of the new curriculum implementation (implemented curriculum). I start by discussing the education reforms in the Baltic countries. This discussion is followed by a description of the methodological approach used. Subsequently, the findings are presented and discussed.

Educational System and Reforms in Latvia and Estonia

In Latvia and Estonia, the Russian population has constituted the largest minority group since the two countries' sovereignty was attained in 1991. Most of the Russian population of the Baltic countries migrated there during the Soviet period. In 1934, ethnic Russians made up 8% of the population in Estonia, reaching 30% in 1989 and 26% in 2000 according to the respective

censuses. The Latvian figures are close to those of Estonia; the Russian-speaking population in Latvia increased from 9% in 1935, to 34% in 1989 and to 30% in 2000 (*Eesti arvudes. Estonie en chiffres. Resume retrospectif de 1920-1935, 1937*; Soros Foundation – Latvia, 2001; Statistical Office of Estonia, Central Statistical Bureau of Latvia and Statistics Lithuania, 2003; Statistics Estonia, 2016). In Estonia, the Russian population is primarily concentrated in the capital city of Tallinn and in Ida-Viru, the region by the Russian border, with the cities of Narva and Kohtla-Järve. Ethnic Russians in this area used to work in engineering and public administration during the Soviet period. In Latvia, Russians lived mainly in big cities, including the capital city of Riga and Daugavpils, the second-largest city in Latvia.

Following the dissolution of the Soviet Union, all Baltic countries moved rapidly to ‘de-ideologise’ the curriculum and establish the basis for the transition process. Education reforms related to the changes in curricula, textbooks and other teaching materials, and retraining of teachers started in both countries in schools with national languages of instruction (Anweiler, 1992; Mitter, 1992; OECD, 2001b; Silova, 2002a).

Estonia pursued active reforms in the education sector in the late 1980s. This was not a fully fledged reform but a preparation for one (OECD, 2001a). In addition, even in the 1960s and 1970s, Soviet Estonia manifested some differences from all the other republics. These exceptions included eleven years of schooling instead of ten, some curriculum differences in science, foreign language, music and art classes, and permission for school specialisation in almost half of the schools.

Latvia adopted its first law on education in 1991, followed by a revision of the law in 1998. The new national standard, which was approved in April 1998, focused on the practical orientation of acquired knowledge, problem-solving and active learning. The standard also placed emphasis on Latvian as the medium of instruction in all schools, as the ‘language of national unification’ (Dedze & Catlaks, 2001; OECD, 2001b; Kangro & James, 2008; Carnoy et al, 2015).

Independent Estonia’s first Law on Education was passed in 1992, followed by the Law on Basic and Upper Secondary Education in 1998. The new national curriculum was introduced in 1996 and then revised in 2011, emphasising approximately the same approaches as the national curriculum in Latvia. The new national curriculum promoted learning to learn, social competencies and fostering a sense of initiative and entrepreneurship (OECD, 2001a; Kitsing, 2011).

In both Latvia and Estonia, curriculum reforms observed in Russian-medium schools diverge from those using the national language. During the 1990s and even the early 2000s, minority schools in Estonia were left to their own devices. They taught mostly in Russian and had no strict guidelines on curriculum. In Latvia, reform of Russian-medium schools was launched in 2000, with bilingual education (BE) from primary school being the main feature of the reform. Curriculum alignment was implemented in parallel

according to the national standard. Despite the provision of in-service training for teachers and principals and substantial public discussion of the BE reform preceding the implementation of the new curriculum for Russian-medium schools, the reform was burdensome to implement for Russian-medium schools (Dedze & Catlaks, 2001; Silova, 2002b; Latvian Centre for Human Rights and Ethnic Studies, 2004; Carnoy et al, 2015; Khavenson & Carnoy, 2016). In Estonia, a comprehensive reform of the Russian-school curriculum started even later – in 2006-2007. The focus of the reform was on introducing a more practical approach that involved not only knowledge acquisition but also knowledge application, functional reading and other innovative approaches that had already become widespread in Estonian-language schools by that time. Considerable effort was directed at motivating teachers and principals to take an active role in the reform process (OECD, 2001a; Logvina, 2014). Both countries also established national assessments in the 3rd, 6th, 9th and 12th grades at the start of the 2000s in Latvia and during the 2000s in Estonia (Bethell & Kaufmane, 2005). According to the above-mentioned curriculum layers, these changes can be regarded as an intended curriculum or as a message of ‘what society would like to see taught’ that was sent to Russian-medium schools in Estonia and Latvia.

Methodology

Using the lens of the threefold curriculum, this study employed a mixed-method approach (Figure 1). Following the classification offered by Leech and Onwuegbuzie (2009), a partially mixed concurrent equal status design was used in which quantitative and qualitative parts have their own goals and allow for meta-inferences. The evidence on the intended curriculum was obtained from an analysis of the national curriculum documents for each country. The implemented curriculum was explored through qualitative interviews. Finally, the attained curriculum was measured involving the PISA data. Together, these three sources of qualitative and quantitative data were used to provide a long-term overview of the curriculum reform implementation and therefore afford the possibility of studying trends and the long-term effects of these reforms.

The goal of the qualitative part was to study the process of new curriculum implementation and internalisation by Russian-medium schools in Latvia and Estonia. This included in-depth group interviews with school principals and vice-principals and classroom observations. The interview guide included information about the school, teachers, the national curriculum and curriculum changes, teaching practices and their development with the reforms, approaches to assessment and examination, and participation in international studies such as PISA. Interviewees were asked to provide their own explanations for the improvement of their countries in PISA performance. Class observations focused on teaching approaches, elements of new-style teaching practices and the overall

classroom environment. Ministry of Education officials and those who had participated in developing the reforms were also interviewed.

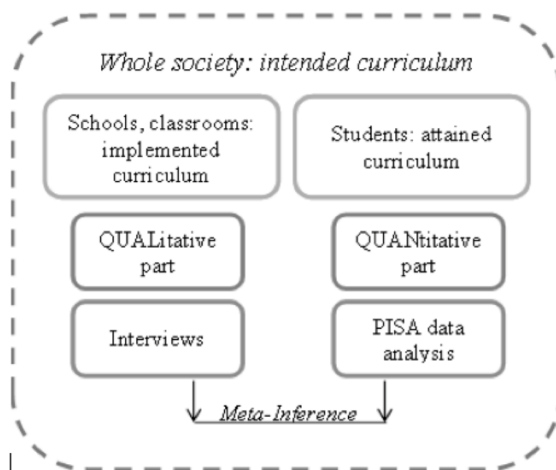


Figure 1. Conceptual framework of the study and analytical approach (scheme adopted from Teddlie & Tashakkori, 2006).

Our sample consisted of seven schools in Estonia (Tallinn, Narva, Kohtla-Järve), six schools in Latvia (Riga), and three schools in Russia (Moscow and the Moscow Region). All schools were selected using the target sample and a snowball method. One interview and one class observation were conducted in each school. Interviews lasted for approximately 90-120 minutes. Fieldwork in the Baltic countries occurred in June and November 2013 and in Russia in May-June 2013 and September 2014.

We employed thematic analysis as the analytical framework for our interviews. This implied a search for aggregated themes within the data based on commonalities and relationships across the dataset. Though some ‘a priori’ codes were defined prior to the examination of data, a number of empirical codes were developed through the data examination. These were then combined into code families or sub-codes. In this case, the ‘a priori’ code corresponded to the guide’s topics, though the loose structuring of interviews meant that many new empirical codes were identified.

The quantitative part of our study aimed to assess whether the share of attained curriculum in intended curriculum had been growing during the period of active reform introduction. The study examined the academic performance of schools with the state and Russian languages of instruction [2] in Estonia and Latvia and compared these with Russian schools in Russia. Student questionnaires and test results in reading, science and mathematics were analysed using the 2006, 2009 and 2012 PISA data.[3] Estonia and Latvia administer PISA tests in both languages (their state language and

Russian) and use test booklets and questionnaires from the Russian PISA coordinating centre. Therefore, the Russian versions of instruments are identical in all three countries. This gave us the opportunity to compare not only countries as a whole but also subgroups of pupils based on their language of instruction at school. Table I shows the sample size for the five groups by year. Samples are representative for each country and for language groups within countries.

Number of students in the following	2006	2009	2012
Russian-medium schools in Latvia	1515	1034	1064
Latvian-medium schools in Latvia	3177	3457	3230
Russian-medium schools in Estonia	1190	885	989
Estonian-medium schools in Estonia	3675	3837	3768
Schools in Russia	4871	5002	5005

Table I. Sample size for each of the five groups divided by year.

Regression analysis was used to estimate the performance trends of these different groups. Though the main factor was the interaction of the country and the language of instruction in the period from 2006 to 2012, there were other factors to be accounted for, the most important of which was socio-economic status (SES). Having included SES, the regression model was estimated for PISA 2006, 2009 and 2012.

$$S_{ij} = b_0 + b_1 S_{ti} + b_2 Cnt_j + e_i \quad (1)$$

where S_{ij} is the standardised student's PISA score (either in mathematics, science or reading); S_{ti} is the student's SES (mother's education, number of books at home, and average books at the homes of a student's classmates); and Cnt_j is a series of dummies for each country's*language of instruction group.

Results

Everyday Processes in School: implemented curriculum

Based on interviews and observations, we reconstructed everyday school life, focusing on the teaching practices and curriculum elements that were introduced with the curriculum reforms.[4]

Teaching practices and curriculum (Figures 2 and 3). Participants in Estonia and Latvia often mentioned widespread practices and curriculum elements that came with the reform, such as individualisation ('not to treat everyone equally, but to be appropriate for each individual student'); problem-oriented

teaching; real life connection; a practical and experimental approach with the common use of out-of-school learning in teaching science; knowledge application and reasoning tasks in all subjects, including mathematics; functional reading in every subject (Estonia);[5] group work (projects, tasks involving working in teams); utilisation of new learning technologies (digital textbooks, smart boards, internet sources, etc.); and the introduction of new assessment instruments containing PISA-style tasks. There was variation in how teachers and principals reacted to these changes.

While in Estonian interviews we mostly encountered positive attitudes to the newly implemented teaching practices and curriculum changes, in Latvia the principals and vice-principals usually had mixed attitudes to this ‘new-style’ of learning. They recognise that it has some advantages but complained about time available for learning with these innovative approaches: ‘experimentation should make up no more than 20%, but now it is 60%’. However, at the same time, they always acknowledged that students were keen to try these new approaches.

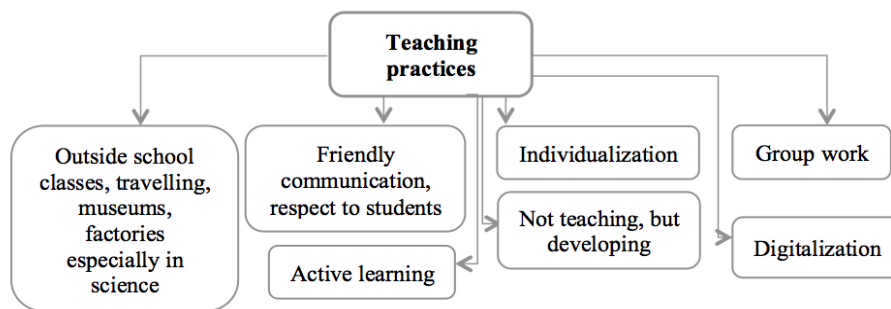


Figure 2. Teaching practices code and its sub-codes.

In both countries, a very positive attitude was shown regarding individualisation, both for educational trajectories as a whole and for everyday class work in particular. The interviews in both Baltic countries showed that teachers pay considerable attention to individual students’ performance in specific subjects; they are ready to give different tasks to different students and to assess students’ progress individually. ‘The usual thing: divide the class board into three parts for three groups’ or ‘Students have the same test but they are motivated to solve different numbers of items’ were common statements from our interviews. The one-size-fits-all approach was associated with the Soviet era, and teachers and administrators in Russian-medium schools did not promote that approach.

Many interviewees in both countries argued that the curriculum changes and the way teachers taught the new curriculum were strongly related to PISA-style learning approaches, meaning that subject curricula were elaborated based on the framework that was close to the PISA test in

order to teach and assess similar skills. Consequently, this has led to improved PISA performance in every subject, especially in reading and science.

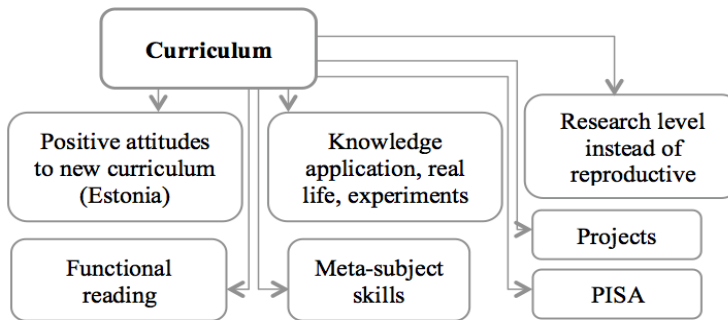


Figure 3. Curriculum code and its sub-codes.

Russian data differed from the data collected in Estonia and Latvia. A large majority of teachers in Russia continued to teach in the traditional way. The first national standard following a new, non-Soviet paradigm was only introduced in 2010 and implemented in 2012 for those in the first grade. However, according to our interviewees in Russia, teaching practice did not change much, even for those teachers who had taken in-service training courses. Moreover, for high school teachers, the new curriculum and the final-year examination send controversial messages; the former was competence-based, while the latter was a knowledge-based test. Individualisation was not successfully implemented in the Russian context. One of our interviewees explained that ‘it is impossible for a teacher to take into account the different performance of students, because this requires much additional work in preparing and grading, and teachers are overloaded’. Teachers usually cater to an average student. As we expected, the Russian curriculum has changed little during the entire post-Soviet period.

Professional development. In Estonia and Latvia, considerable attention was paid to in-service training for teachers and school administrators. As an example, participants mentioned courses developing new teaching practices in all subjects, such as individualisation, group work, projects, and links to real life; new approaches to assessment; and the development of functional reading (Estonia). Interviewees found these professional development courses useful and interesting. In both countries, professional development courses not only served to teach new practices or introduce curriculum changes but also acted as a medium for promoting new educational paradigms, values and attitudes. ‘Those courses changed our minds from the

Soviet to the modern Estonian way of running schools and even way of thinking,' explained one of the principals.

Bilingual education (Figure 4). In Latvia, bilingual education (BE) was probably the most discussed issue with all its pros and cons and its emotional milieu. It is regarded as a main driver of the Russian-medium school reform. Most principals agreed that bilingual education helps Russian students become successful in adult life; at the same time, it had been a rather arduous reform for schools. Interviewees usually expressed a cool perception of BE, especially of the way in which it was implemented. Interview questions about BE generated numerous complaints and revealed that interviewees did not consider BE to be a means of bringing full integration to the Latvian educational system.

However, from the perspective of academic performance, bilingual education was frequently offered as an explanation of Russian-medium school success in PISA. School principals argued that studying two languages and switching from one to another during the day or even during one classroom session developed children's general ability, which in turn was reflected in all other areas of school performance, including PISA. The school principals who were interviewed were pleased with the fact that PISA results improved for students from Russian-medium schools. In 2012, Russian-medium school pupils outperformed students from Latvian-medium schools in reading. This evidence helped convince teachers and principals that bilingual education was effective.

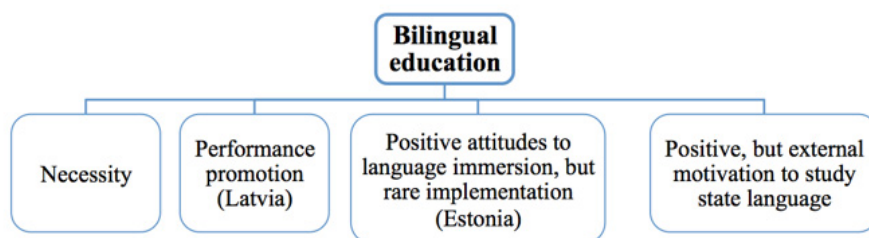


Figure 4. Bilingual education code and its sub-codes.

A number of other initiatives were launched as bilingual education was implemented – for example, teacher training in new styles of student assessment, new teaching practices, and teaching materials. These additional initiatives might have had an effect on developing constructivist approaches to teaching that may have contributed to the improvement of PISA results.

In Estonia, bilingual education was initially more a form of integrating Russian-medium school students into society. Participation for primary and middle schools in bilingual education is voluntary. The school principals

rarely mentioned bilingual education in conjunction with academic performance. However, many principals demonstrated positive attitudes to bilingual education, specifically to language immersion classes; they talked about an increase in parental readiness to send children to such classes.

Exams and PISA. Student assessment principles and frameworks often determine the ways teachers choose to teach (OECD, 2005; Erss, Kalmus, & Autio, 2016; Khavenson & Carnoy, 2016). In the Baltic countries, especially Estonia, national assessments occur in the 9th and 12th grades. Some interviewees mentioned that these assessments are rather similar to PISA: 'the exams do not copy PISA, but they are based on the same principles'. In Russia, the opposite was the case, as the national assessments are entirely knowledge-based rather than competence-based.

While in Latvia and Russia schools were not particularly keen on PISA participation, in Estonia, schools were motivated to participate in this international assessment. As PISA is treated more seriously at the state level in Estonia (Khavenson & Carnoy, 2016), the higher level of school involvement may indicate greater integration of Russian-medium schools in Estonia than in Latvia.

Teachers' and principals' attitudes and beliefs emerged as a relevant aspect of the qualitative component of this study. In Estonia, principals and vice-principals often demonstrated positive or neutral attitudes to the implemented changes. They also revealed a high level of readiness to try something new and considered themselves as active participants in the reforms. The principles of the reform appeared to be more interiorised by interviewees in Estonia. In Latvia, interviewees were usually more restrained in their evaluation of reform measures and did not express much enthusiasm for implementing the changes. Whereas in Estonian interviews, the subject pronoun 'we' emerged frequently – as in, 'we are moving', 'we are changing', and 'we are trying' – in Latvia, the subject pronoun used with reference to new policy interventions was 'they'.

Interviews with Ministry of Education officials demonstrated that in Estonia, the government tried to invest a lot of effort into convincing the school administration and teachers that the proposed changes in Russian-medium schools were beneficial in terms of integration as well as improvement of academic achievement. Personal communication by the Ministry of Education with schools played a major role in this process. Russian-medium schools reported that they felt the government had started to pay attention instead of merely imposing new requirements. In summary, interiorisation emerged as an important aspect of the acceptance of the implemented paradigm.

The interviews provided strong evidence for the elements of the intended curriculum implemented in schools. Many of these elements had become a part of teaching practices. In this respect, there were numerous indications that the declared aims of the curriculum reform were

implemented in the classroom. Finally, the study examined whether the intended curriculum had affected the attained curriculum (i.e. educational performance).

Pisa Performance Trends: attained curriculum

PISA data were analysed to examine the attainment of the intended curriculum. It was assumed that if the PISA framework overlapped with the Baltic countries' intended curriculum, the increase in PISA performance could be interpreted as curriculum attainment.[6] Trends in attained curriculum are described by comparing PISA scores in mathematics, reading and science in schools with the national and Russian language of instruction in Estonia and Latvia with schools in Russia as a reference group (Table II).

SES	Mathematics			Reading			Science		
	2006	2009	2012	2006	2009	2012	2006	2009	2012
	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
LR	-0.06 (0.07)	0.15** (0.07)	0.19*** (0.06)	0.18*** (0.07)	0.22*** (0.06)	0.36*** (0.07)	-0.12** (0.06)	0.10 (0.07)	0.25*** (0.06)
ER	-0.11 (0.07)	0.11 (0.08)	0.18*** (0.07)	-0.15** (0.07)	0.12* (0.07)	0.16** (0.06)	-0.04 (0.07)	0.18*** (0.07)	0.34*** (0.07)
LL	0.00 (0.05)	0.23*** (0.05)	0.16*** (0.05)	0.30*** (0.05)	0.32*** (0.04)	0.21*** (0.05)	0.01 (0.05)	0.26*** (0.05)	0.28*** (0.05)
EE	0.34*** (0.05)	0.49*** (0.06)	0.44*** (0.05)	0.58*** (0.05)	0.38*** (0.05)	0.43*** (0.05)	0.48*** (0.04)	0.55*** (0.06)	0.63*** (0.05)
Constant	-0.35*** (0.05)	-0.51*** (0.06)	-0.34*** (0.07)	-0.54*** (0.06)	-0.41*** (0.05)	-0.21*** (0.06)	-0.38*** (0.05)	-0.48*** (0.06)	-0.42*** (0.06)
R ²	0.13	0.15	0.14	0.16	0.18	0.19	0.14	0.13	0.18
N	14227	13881	13655	14227	13881	13655	14227	13881	13655

*** p<.01, ** p<.05, * p<.1. Robust standard errors in parentheses.

The reference category is students in Russia.

LR – Russian-medium schools in Latvia; LL – Latvian-medium schools in Latvia; ER – Russian-medium schools in Estonia; EE – Estonian-medium schools in Estonia.

Table II. Regression results for PISA 2006-2012 in three subjects.

Mathematics. Estonian-medium school students were significantly better at mastering PISA tests than students in Russian-medium schools in Latvia and Estonia and students in Latvian majority schools for the whole period. All the other three groups had the same results as Russia in 2006. In Latvia, the 2006 PISA minority school cohort started school in 1997-98 and was not subjected to the reforms, while the next PISA cohort studied at school during the curriculum changes. As the results show, PISA scores increased in 2009 and continued to be higher than in Russia in 2012.

In Estonia, a significant gain in mathematics scores occurred between 2009 and 2012. Estonia's reforms began immediately after PISA 2006, but mathematics performance was probably harder to improve than performance

in other subjects, bearing in mind that the Soviet Union used to have a very strong mathematics performance and teachers might have been reluctant to abandon their best practices by jumping to a new-style curriculum. Gradual introduction of mathematics-applied tasks resulted in significant improvement in PISA scores only in 2012.

As far as *reading* is concerned, students in Latvian-language and Estonian-language schools substantially outperformed Russia during the whole period, with the difference continuing to increase until 2012. Russian-medium schools in Estonia demonstrated a pattern more consistent with the reform than Russian-medium schools in Latvia, indicating that changes in PISA scores may follow the reform's interventions. Systematic and active introduction of functional reading in Estonia may be the reason for such a clear increase in reading scores between 2006 and 2012.

In *science*, as in reading and mathematics, both Baltic countries had attained higher results than Russia in all language groups by 2012, although the scores of Russian-medium schools in Estonia and in Latvia were equal to or worse than those in Russia at the beginning of the studied period in 2006. After 2006, Estonia launched an intervention in the Russian-medium middle school science curriculum. Russian-medium schools in Estonia made a gain in 2009 and continued the trend in 2012. In Latvia, the implementation was more gradual, with significant outperformance in 2012.

Thus, by 2012, students from Russian-medium schools in Estonia and Latvia were outperforming Russia, a country with a similar initial curriculum but that was not experiencing reform aimed at introducing changes in the curriculum. As PISA content reflects the intended curriculum, or what Latvian and Estonian societies wish students to know, the positive dynamic and high achievements demonstrated a narrowing gap between the intended and the attained curricula.

Conclusion and Discussion

After the collapse of the Soviet Union, a considerable number of ethnic Russians remained in the former Soviet republics, constituting an ethnic minority population. For the newly emerged countries, this situation brought the necessity of constructing societies that took all of the new circumstances into account. The integration of minority groups was one of the main challenges faced by the education sector. The Baltic countries carried out substantial educational reforms, dissociating themselves from the Soviet past. The first wave of educational reforms started in the early 1990s. Its possible directions, difficulties and plans were described by Phillips and Kaser (1992). However, in the case of Latvia and Estonia, the reforms implemented during the 1990s were oriented towards the national (Latvian or Estonian, respectively) language school students, at least at the primary and secondary school levels. The reform of Russian-medium schools started later with the introduction of bilingual education policies.

One of the aspects of these reforms was aligning the curriculum across schools with different languages of instruction. Allegedly, this led to a better integration of the ethnic minority population within society, or at least, this was the intention. To determine whether the new curriculum was interiorised by Russian-medium schools, this study traced the process of its implementation and assessed educational performance achieved during the reform period.

This study concludes that intended, implemented and attained curricula are drawing closer together. The intended curriculum described in official documents is clearly reflected in everyday school practices in Russian-medium schools. Schools actively implement new-style teaching, including expansion of tasks aimed at developing competences related to application and reasoning, functional reading, active learning and outside-school classes, individualisation and respect for students, among others. At the same time, PISA performance has been constantly improving, showing that the attained curriculum is approaching that intended.

The study has also shown that a positive emotional background facilitates implementation of the reform intentions. There is some discrepancy in this process between Estonia and Latvia. In Estonia, intensive interventions spanned a shorter period, focusing on particular teaching approaches and curriculum elements, and educational officials spent more time and effort to get school principals and vice-principals on their side. According to the interviews, the curriculum transformations were more positively accepted by school principals and teachers in Estonia than those in Latvia. The former have interiorised the proposed changes to a greater degree. In Latvia, the reforms were implemented in schools as in Estonia. However, there seemed to be more initial resistance there. School teachers and principals did not feel like active participants in the ongoing reforms even when they agreed with the new approaches. The quality and the depth of education reform implementation strongly depend on whether all actors accept this new wave. Even though this is well known, this step is often skipped in the planning of reforms. Involvement of all actors in the reform can facilitate the process and make it run more smoothly, ultimately saving resources in a broad sense.

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Notes

- [1] Here we assumed that the PISA test content reflects the curricula introduced in Latvia and Estonia. We based our assumption on the fact that the Baltic countries' reform philosophy was aligned with the OECD messages on education. Both countries explain their participation in PISA in terms of its measuring what they wish their students to learn (interviews and personal communication with PISA national coordinators in Latvia and Estonia).
- [2] Not all students who attended each of these schools spoke the same language at home. Pupils from Estonian families were rarely sent to a school with Russian as the language of instruction. For all three years, 4% of those who spoke Russian at home attended an Estonian-medium school and 0.8% of those who spoke Estonian at home attended a Russian-medium school. In Latvia, 8% of pupils reporting that they spoke Russian at home studied at Latvian-language schools and 2% of those who spoke Latvian at home attended Russian-medium schools. Bearing in mind that there are ethnically mixed families residing in both countries, the study was not restricted to those for whom school and home language were the same.
- [3] In Russia, 15-year-olds can attend either a general school or a vocational education institution. To consider this possibility, the Russian sample was restricted to those who attended a general school. In Estonia and Latvia, less than 1% of the 15-year-old cohort was at a vocational institution. The proportion of vocational education students in the Russia PISA samples was 14% in 2006, 5% in 2009 and 4% in 2012. Such a steep reduction between 2006 and 2009 is due to the move from three to four years of primary school. Thus, beginning with the 2009 PISA cycle, the 15-year-old cohort is normally at the 9th grade at general school, similar to the pupils from the Baltic countries.
- [4] Despite having interviews from all three countries, the study used only the Russian data to establish that there were no major changes in the curriculum during the period under scrutiny. Therefore, we could attribute the variation in PISA performance to changes in the curriculum in Russian-medium schools in the Baltic countries as the study used the natural experiment assumption.
- [5] Here and subsequently, a country name in parentheses only means that a particular sub-code had become apparent in the mentioned country to a greater extent. This does not mean that it is not relevant to the other country in the study.
- [6] No claims are made on direct causal relationships in this study that assesses the equality of different aspects of the curriculum, although the situation of a natural experiment could potentially provide less confounded inferences and provide some hypotheses as to what works.

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