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Successful PISA stories in the EU: how some Member States have been able to improve their performance over time

Final Report

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Executive summary

Mastering basic skills is a prerequisite for thriving in life, finding a fulfilling job and becoming an engaged citizen. At a micro-level, education plays an important part in determining social participation, well-being and employability; at a macro level, it is associated with higher levels of productivity and social cohesion. The development of the knowledge and technological society and the growing demand for the 21st-century skills in the labour market only increases the importance of education and the acquisition of foundational skills. However, one in five 15-year-olds in the EU fail to complete basic mathematics, science and reading tasks, according to the OECD's Programme for International Student Assessment (PISA) (i.e., they do not achieve level 2 knowledge in the PISA assessment). Furthermore, students' performance has gradually deteriorated over the period from 2009 to 2018. The cost of underperformance in education is rising. The COVID-19 pandemic, which caused school closures and learning disruption, may have further exacerbated educational inequalities, and negatively affected learning achievements in the long term.

In such a context, it is imperative to understand which education reforms and interventions 'work' and thus lead to actual improvements in the quality and equity of education and the subsequent academic success of all students, in order to be able to maximise the returns from educational investments planned to support the recovery from the crisis and ensure just, green, and digital transitions, as highlighted by *Strategic framework for European cooperation in education and training towards the European Education Area and beyond (2021-2030)*. To contribute to this understanding, the present study aims to explore which countries have been able to improve their students' performance – looking at the PISA indicators measuring student achievement and equity – over time. It explores which factors can be associated with the positive trends observed, as well as which policy reforms may have contributed to these improvements.

Methodological approach

The study explores performance trends over the period from 2009 to 2018 (the last four PISA cycles), and education policy factors that might be associated with the positive trends observed. This is achieved by testing various statistical approaches to measure the effects of selected reforms (specifically, multi-level regression models, difference-in-difference and propensity score matching methods), complementing the analysis with insights from iterative stakeholder consultations conducted during the study, as well as the results of previously conducted non-experimental quantitative research. For the analysis, seven EU countries (the so-called PISA 'success' stories) – *Bulgaria, Estonia, Latvia, Poland, Portugal, Slovenia, Sweden* – were selected. Each of these countries has demonstrated, at least to some extent, long-term improvements in either performance or equity indicators, as measured by PISA¹.

¹ Further details about the methodology are available in Annex 2.

Defining a PISA 'success story', and the challenges associated with doing so

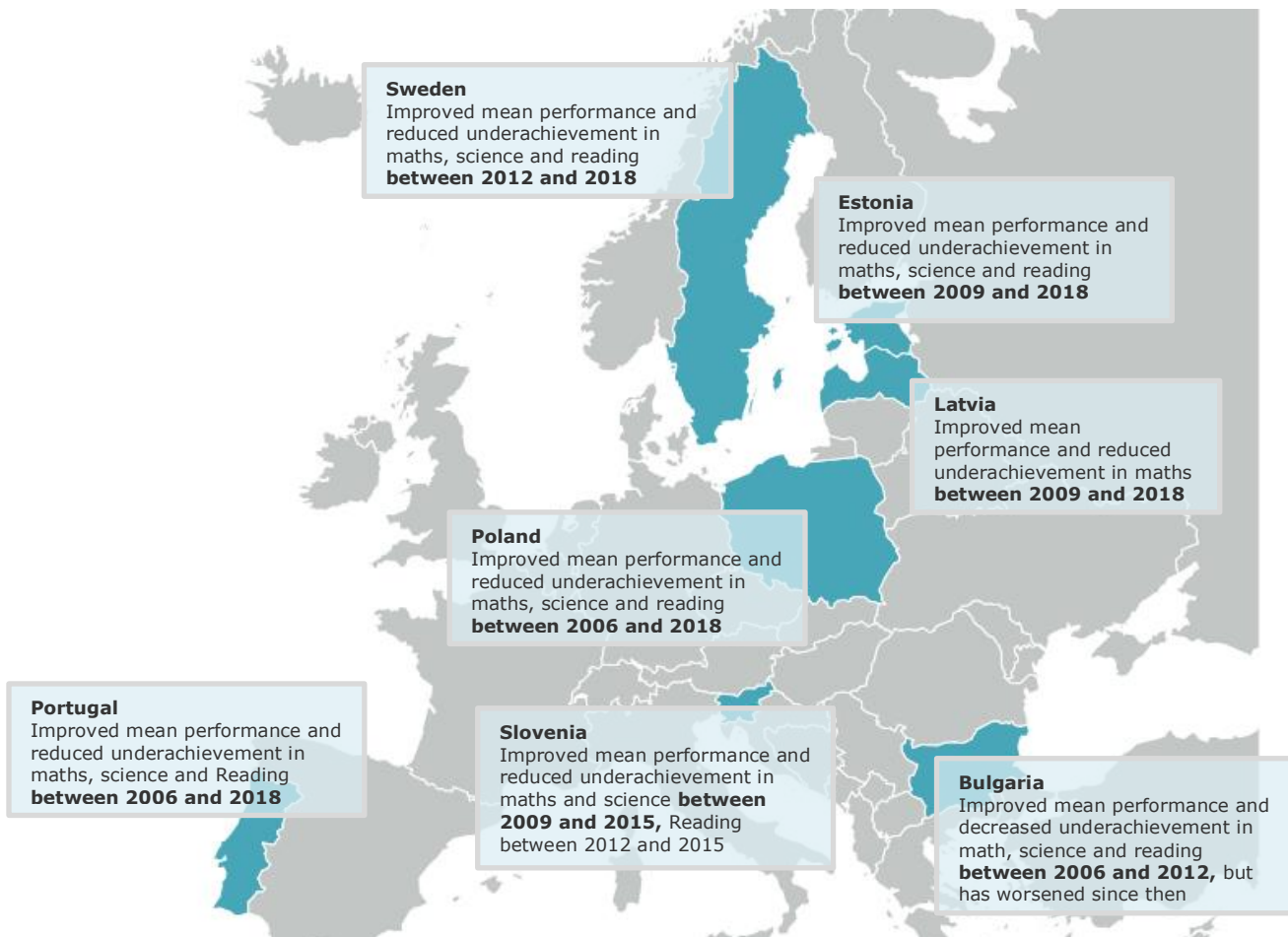
While students' educational success is usually understood in a broader sense, for the purposes of this study it mostly refers to improved academic achievement in three subject domains (reading, maths and science) as measured by PISA, accompanied by a narrowing of the gaps in academic performance among students from diverse backgrounds, based on gender, migrant background and socio-economic status (SES).

A country can be classified as a PISA success story if it managed to improve its students' performance in at least one of the domains over time (from 2009 to 2018) while decreasing its rate of underachievement, and improving the equity of its education provision (i.e. the SES gap among achievers either decreased or remained stable).

In terms of long-term changes (2009-2018) across the EU, **several Member States have managed to improve their results in at least one domain since 2009**. However, only in a few countries has this increase been statistically significant. The **changes in underachievement rates over time in individual EU Member States mirror their PISA achievement scores**, with only a few statistically significant improvements being observed. **In most cases the observed improvements were minimal.**

Remarkable stability in academic achievement across the EU has been accompanied by **persistent trends of inequality and exclusion in education systems**. Equity indicators have improved unevenly among the Member States over the last decade. While more countries have managed to narrow the gender performance gap, significant differences in academic success still remain that depend on students' socio-economic and cultural background.

In this light, **explaining a 'PISA success story' is, by definition, challenging when the success** (i.e. observed improvement) **is rather limited.**



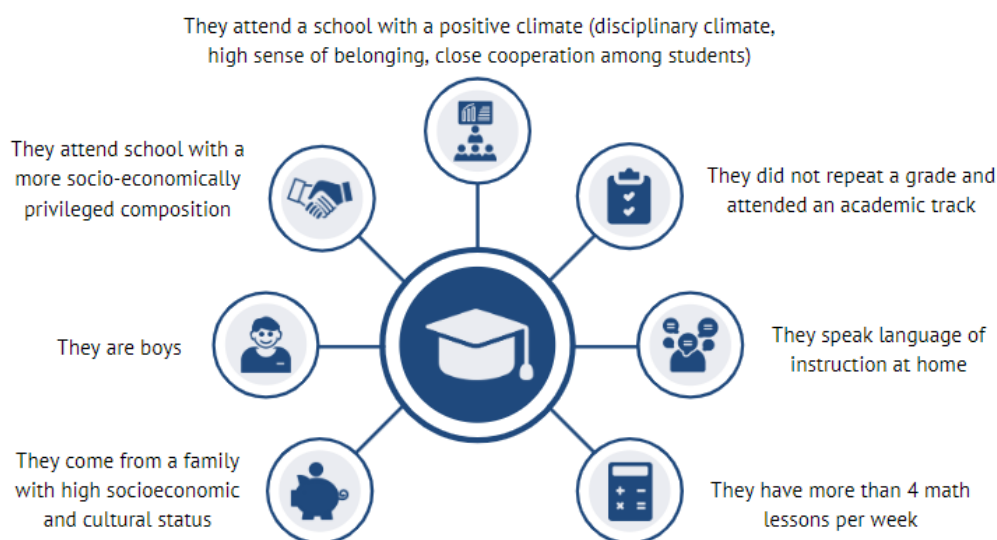
Key findings of the study

Factors associated with improvements in PISA performance

The statistical analyses (descriptive statistics and multivariate regression modelling) carried out in this study have confirmed the findings from the broader literature on the key determinants of students' academic success (as measured by PISA). These are as follows:

- **Individual and family background:** gender, socio-economic status of the family, ethnic, cultural, linguistic and migrant background – explain a great share of differences in students' performance.
- **Academic path of students** is associated with performance results. These include academic abilities of the students, the lack of which may result in **following a vocational rather than an academic educational track, and grade repetition**.
- **School or instructional factors:** multi-level regression run on the seven selected countries shows that several school-level variables were important for the academic performance of students. More specifically, **having more than four periods of mathematics per week** had a significant positive effect on students' performance in mathematics in Estonia, Latvia and Portugal. Moreover, in every country except Portugal, the **disciplinary climate variable at either the individual or school level (or both) had an effect on students' academic performance**. Lastly, **perceived cooperation between students** at school level influenced the academic performance of students in Bulgaria, Estonia, Slovenia and Sweden. In addition, Multi-level regression analyses conducted for individual countries highlighted **the importance of support from teachers** (in Sweden), **interest in the course from teachers** (in Sweden), **lack of peer victimisation** (in Portugal and Slovenia), and **higher sense of school belonging** (in Estonia).

Students in Europe perform better in PISA (math) if:



Note: Most of these factors, especially the background factors, are not amenable to change, but their effect can be alleviated by educational policies. Other factors that might seem influential at first sight were in fact reciprocal relationships, such as the disciplinary climate or sense of belonging: it is impossible in a cross-sectional design to rule out which is the cause, and which the consequence.

What policies are associated with student success: effective and promising reforms?

Analysis of PISA journeys and the accompanying reform processes in Bulgaria, Estonia, Latvia, Poland, Portugal, Slovenia and Sweden demonstrates that policy-makers have made, and are still making, significant attempts in their quest to improve educational outcomes and to address school-level inequalities by implementing various sets of reforms. In general, such reforms target structural changes, the development and assessment of competences, and the improvement of equity.

Rigorously assessing the extent to which particular reforms and interventions ‘work’ and achieve their intended outcomes proves challenging, however, due to:

- **Lack of an evidence-based education policy tradition** in Europe, shaping **specificities of reform design** (reforms rarely include built-in monitoring and evidence collection mechanisms based on experimental research into the reform process).
- **Limitations of available cross-sectional data on student achievements** (most international and national student assessments), analysis of which does not allow causal inferences to be made with regard to specific policy impacts. Consequently, isolating the impact of educational policy reforms on PISA performance through statistical modelling is a challenging undertaking.
- **Limitations around PISA data and measurements.** Analysing data coming from different PISA cycles can prove challenging, due to changes in the methodologies used, available variables, and the computation process of various indicators between cycles. The main drawback of PISA and similar assessment surveys is the cross-sectional nature of their design. The evaluation of policies and reforms aimed at improving student’s performance requires longitudinal data, with the targeted individuals being observed both before and after such intervention. In contrast to this, each cross-sectional assessment is carried out on a different set of individuals, leading to a lack of essential individual data either before or after a policy or reform. While methodological advances in recent years have made it possible to use cross-sectional data sources, limitations remain regarding the possible depth of any analysis that can be conducted across PISA cycles.

To overcome these constraints, at least to some extent, a mixed approach was applied:

- Sophisticated statistical approaches were used to measure the effects of specific reforms (namely difference-in-difference and propensity score matching methods). These methods also have their limitations, and require certain data conditions to be met, which are not always in place (only in three countries were the necessary conditions in place – in Bulgaria, Poland and Portugal).
- Iterative stakeholder consultations were also held to contextualise the quantitative findings and to better understand the process of reform implementation.

Structural changes to education systems

Given the various ways in which rigid school structures shape educational trajectories and consolidate educational inequality, some countries implemented fundamental reforms to change the structure and organisation of their education systems. These include extending the length of compulsory education (e.g., Poland, Slovenia); investing in early childhood education and care (Bulgaria); re-organisation of the school network (Portugal); as well as diversification of educational pathways (Slovenia, Sweden).

The potential and effectiveness of structural reforms

The introduction of compulsory pre-school for 6-year-olds in **Bulgaria** targeted vulnerable children at least to some extent, and was accompanied by an additional set of measures (such as professional development, ECEC curricula). The Difference-in-difference (DiD) regression model showed that **the introduction of a compulsory year of pre-school education had a positive effect on students who attended ECEC, as a direct result of the reform**. In addition, the statistical analysis showed that the reform has, to some extent, succeeded in targeting socio-economically disadvantaged students, though it has not yet ensured access to ECEC for all vulnerable students. However, the effectiveness of the reform was hindered by its rushed implementation and a lack of time to address infrastructure shortages and the financial costs associated with enabling the ECEC attendance of poorer families. These challenges are being addressed with the new re-iteration of the ECEC reform introducing mandatory pre-school education for children from 4 years old (adopted in 2020, coming into force in 2023/2024).

The education reform in 1999 in **Poland** focused on several important aspects of the education system. The main changes to the structure of the system were a move away from eight-year basic education provision to a new division separating primary (six years) and lower secondary education (three years) levels. The delaying of streaming and the extension of compulsory education are considered to be the most important and most beneficial measures introduced by 1999 reform. It is also acknowledged that other changes, including the curriculum reform and the change in the national assessment system, have potentially contributed to gradual improvement in the quality of education and the academic achievements of students.

Due to the changing demographic situation in the country and the allegedly inefficient management of its school system, a measure aimed at improving the school network (by closing small underperforming schools and introducing school clusters) was introduced in **Portugal** in 2002. According to stakeholders, the reform has potentially contributed to a reduction in school segregation and increasing academic performance among Portuguese students between 2006 and 2009, through the optimised use of resources, the increased accountability of schools, and the provision of more structured educational pathways for students. However, there is a lack of rigorous quantitative evidence regarding the effectiveness of the reform.

Sweden began a large school decentralisation reform in 1992, transferring decision-making powers over the allocation of funds to municipalities, and implementing a large-scale school voucher programme that led to the development of publicly funded but privately operated schools. The reforms aimed to improve the management of the education system, to disrupt monopoly the public schools had, to provide more choice for parents and students, and to create an environment for innovation. Several studies have tried to assess the effect of the reform on school segregation and students' outcomes, finding moderate effects on segregation and limited effects on students. However, the positive effect of this reform is not visible from the analysis of PISA data. Analysis points to a negative effect on students attending voucher schools compared to municipal schools at secondary level, with the effects being more negative for low-ability students. These results show that in certain contexts, school autonomy combined with school choice can have adverse effects on students' performance and equity.

Curricular reforms

Competence development is targeted mainly through curricular reforms and accompanying assessment policies. The curricular reforms reviewed in this study (Estonia, Latvia, Slovenia and Poland) included some similar patterns, such as an emphasis on well-being, learner agency, the ability to solve problems and to navigate an uncertain world, accompanied by school and teacher autonomy in enacting and mediating the policy changes. Greater school autonomy has been proven to be associated with improved student achievement (Hanushek, Link, & Woessmann, 2013). However, **decentralisation is only effective when there are educational indicators that guide teachers, schools and municipalities on how well the curricula is being implemented**. This

makes it **imperative to review and align the whole student assessment framework, to ensure coherence around the curriculum reform**. However, as practice shows, not all countries managed to adapt their national assessment frameworks to the new visions of competence and skills development (as observed in the cases of Bulgaria and Latvia).

The potential and effectiveness of curricular reforms

Estonia's national curriculum, and the high level of autonomy it provides to schools, is seen as important enabler of Estonia's PISA success. The national curriculum reforms (which have been taking place since 1992) are deemed to be successful, as they introduced modern education concepts early on and have followed a similar discourse throughout subsequent curricular changes. Existing studies on Estonia's performance in PISA list the curriculum reform of 1996, which introduced competences into the curriculum and provided greater academic autonomy to schools, as an important reform that has potentially contributed to the high academic achievements of Estonian students (Tire, 2021). Furthermore, as PISA studies focus on knowledge application and higher-order thinking skills, **reforms introducing competence-based curricula are also likely to improve student achievements in PISA, if they are implemented effectively and are translated into classroom practices.**

The VET reform introduced in **Slovenia** in 2006 granted greater autonomy to schools and teachers, allowing them to tailor the curriculum to the needs and interests of their students and the needs of the local labour market. The curriculum also introduced more academically oriented content, along with a focus on practical skills. According to stakeholder perceptions, the changes to the curriculum are potentially connected to improvements in the quality of the VET education system, and a decreasing performance gap between students in the VET and academic tracks. Existing studies also link greater autonomy with improved performance (Hanushek, Link, & Woessmann, 2013); however, more rigorous research is needed in specific context of Slovenia.

An increase in mean PISA scores for **Bulgaria** in all three domains shortly after the introduction of external examination is sometimes associated with the potential success of the country's assessment reform. Stakeholders link it to the increased accountability of schools and teachers, as well as the improved evidence base for education policymaking. The plausible effect of this reform could be inferred from the available scientific literature, in particular the work of Bergbauer et al. (2018). However, while some argue that assessments work as a tool for accountability, others argue that there is little evidence that high-stakes assessments can lead to educational improvements. It is argued that instead, assessments may even be harmful to students, and divert the focus of teaching away from holistic student development to teaching 'for the test' (Koretz, 2017). Furthermore, evidence from Bulgaria indicates that while there is increased availability of assessment data, some question the quality and rigour of the assessments introduced, and consequently the suitability of the data, as well as the capacity of policy-makers to use it for decision-making.

Policies focusing on equity and quality

The policies captured by this study focus on specific set of measures aimed at improving equity: delaying streaming (in Poland); introducing support networks for schools (Estonia); priority education policies and preventing grade repetition (Portugal); and addressing linguistic school segregation (Latvia). Evidence is inconclusive as to the effect of such interventions, due to limited monitoring of their implementation; however, insights from this study and the broader literature suggest that **the impact of targeted measures (such as the TEIP programme in Portugal) can be mixed in terms of students' outcomes and equity. Furthermore, such measures can be highly politicised and controversial (as the Latvian example suggests), and need to be adequately planned and resourced.**

The potential and effectiveness of interventions aimed at improving equity

Several measures have been introduced over the years to ensure equity in the **Portuguese** education system. The most important changes include the introduction of the TEIP programme (zones of educational priority), especially the second phase of the programme, which has been running since 2006, as well as the introduction in 2016 of the PNPSE programme (national programme to promote educational success). The introduction of the TEIP programme may potentially be connected with an increase in Portugal's PISA performance between 2006 and 2009; however, existing studies do not find this effect when comparing TEIP schools with schools outside the programme (Ferraz, Neves, & Nata, 2019). In relation to the PNPSE programme, the statistical analysis shows that not repeating a grade contributed to a large increase (more than 50 points) in the reading performance of students who would otherwise have repeated a grade under the conditions that were previously in place in 2009. Because students from programme schools are not distinguished from children attending other schools in PISA dataset, it is impossible to attribute this effect specifically to the PNPSE programme. Even so, it is likely that the existence of the programme contributed to the observed effect. These programmes may have been effective due to their focus on increased school autonomy, the increased capacity of participating schools and of local actors to address local challenges, and complementarity between the programmes. However, the effect of the programmes may be hindered by a lack of transparency and objectivity and the potential stigmatisation of the schools taking part in the aforementioned programmes.

In **Latvia**, gradual transitioning to Latvian as the main language of instruction in ethnic minority schools has had mixed effects on student performance. While the initial flexibility offered to schools in choosing models of bilingual education appeared to positively affect the academic performance of Russian-speaking students (as measured by PISA), the requirement to take final exams in Latvian has negatively impacted exam results. The subsequent reinforcement of Latvian instruction has not yielded achievement gains in ethnic minority students (Ivlevs & King, 2014). The implementation of this reform was hindered by strong resistance from the public (due to insufficient public buy-in and consultations), as well as limited support for the professional community in ethnic minority schools to implement such a shift (lack of necessary teaching materials, professional development and the language proficiency of educators). Minority schools continue to be formally separate from Latvian schools.

These reforms were often accompanied by an increased awareness of the need for **strengthening education monitoring and national assessment frameworks** to enable further educational improvements and evidence-based reforms. However, while the movement towards the use of evidence in education in Europe appears to be gradually asserting itself through political intent and initiative, it is yet to be systematically incorporated into the practices of the various Member States. To date, a large body of robust evidence comes from the US and UK, but less from European countries. The practice of 'evidence-based education' is rare.

Lessons for policy design and implementation

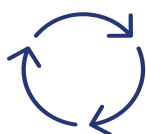
Even though the available evidence does not allow causal inferences to be made regarding the impact of most of these reforms on student outcomes (as measured by PISA), the stakeholder consultations and qualitative analysis conducted for this study bring valuable insights into the way in which reforms in the selected countries are initiated and translated into practice, which can either facilitate or impede the achievement of the intended outcomes.

The study finds that **reforms are likely to be perceived as being more effective and translate into practice more smoothly when:**

- they are implemented as part of a **comprehensive complementary set of measures**. Curriculum and assessment reforms in Estonia and Sweden demonstrate that timely support and capacity development for education professionals facilitated policy design and implementation on the ground. What can be also observed from the countries studied is that **curriculum reforms are demanding in terms of their implementation**, since they require changes in many aspects that might challenge the existing beliefs and subjective realities deeply embedded into the individual and organisational context. Factors such as **cost, the uncertainty of the outcomes, the risk aversion of stakeholders** (which triggered the reversal of the curricular reform in Poland) also **create additional obstacles** to initiating and materialising changes in the curriculum. **Buy-in, and the active engagement of teachers and schools as enactors and mediators of the reform**, as well as system-level monitoring to support the national education strategy (as shown by the Estonian example) are also important for the reform success.

Conversely, ECEC reform in Bulgaria and language reform in Latvia show how the lack of an appropriate delivery system (such as funding, infrastructure shortages, or lack of teacher support) can impede the smooth implementation of an educational intervention.

Pointers for policy



It is important to understand and commit to the complex follow-through of reform priorities. This depends on the right sequencing and the existence of appropriate institutions capable of supporting the reforms from decision to implementation. Capacity bottlenecks tend to constrain the ability of policy-makers to implement reforms effectively and to reap the full benefits of specific policy initiatives. The need to address such constraints when implementing reforms should be a priority.

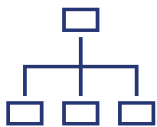


Policies are not designed in a vacuum and must be articulated within an existing policy framework. Sometimes a reform contradicts or competes with existing policies and may create obstacles to effective implementation. For instance, increasing teachers' workload or forcing teachers to invest in one policy at the expense of the other, are potential barriers to curriculum implementation.

- they are **well-planned and consistent with long-term education objectives**. The importance of leaving adequate preparation time is illustrated by the 1996 education structural reform in Slovenia. While the changes to the education system were announced in 1996, they were implemented between 1999 and 2003, leaving time for schools, teachers and other relevant stakeholders to prepare for the changes. The case

of Estonia illustrates the importance of contextualising new educational reforms within the existing landscape of educational policies, creating synergies and mutually strengthening the effects of these policies, and, importantly, ensuring a long-term vision. The example of Slovenia shows that **political stability creates a climate conducive to successful education policies**. For example, according to the national stakeholders consulted, one of the important factors that contributed to the success of the 1996 education reform in Slovenia was the fact that no government change took place before and after the reform, thus allowing its **smooth planning and implementation**.

Pointers for policy



It is important to restructure the mechanisms of national policy-making to overcome the cyclical nature of reform processes. Government needs to set a general direction, but educational decisions relating to matters such as curriculum content and national testing should be allocated to a non-political body that is set up for a long duration. Prerequisites for the successful functioning of such a body are:

- experience in managing similar institutions in the country;
- well-developed educational discourse in the country;
- sufficient potential for educational research and development has been accumulated;
- sufficient implementation capacity of the body, and a degree of autonomy.



In advancing on the path of reforms and looking at the long term, policy-makers need to confront the short-term adjustment costs: often, the benefits of better structural policies may take time to materialise. This should not be a deterrent to implementation. On the contrary, reformers need to act decisively, as the cost of the status-quo is even greater.

→ they **focus on both equity and quality**, rather than prioritising one at the expense of the other. While some countries (e.g., Portugal and Estonia) managed to effectively unite these objectives into a comprehensive set of complementary measures, in other countries one may suffer at the expense of the other. For instance, the increased support for independent schools in Sweden, while to some extent promoting innovation and raising educational standards, is also likely to have resulted in increased school segregation. In this respect, the cases of Estonia and Portugal demonstrate the importance of a long-term holistic vision on inclusion being integrated together with accompanying measures that target vulnerable groups. Contrastingly, the decentralisation and voucher reform in Sweden provides an important lesson in the oversight of equity when focusing on efficiency and innovation.

Pointers for policy



Equity and quality of education should be prioritised equally. Education systems, and the pathways through them, need to be designed in a way that both enhances equity and increases students' success, yet a wide range of policies that hinder equity are still common.

Pointers for policy



Policies that eliminate grade repetition, delay streaming and reduce school segregation help to improve equity and enhance quality. The factor of family background affects student learning outcomes not only directly, but also through school choice policies. Therefore, reforms must also consider that family background tend to increase social and academic segregation in early and general education, and policy-makers need to mitigate this.

→ they **build on the consensus of the range of actors** (including students, parents, teachers, employers and trade unions) who also take an active part in enacting and mediating policy change. **Inclusive policy design can usually be achieved through a series of consultations and discussions.** Including relevant stakeholders into policy design not only helps policy makers to better understand the needs of target groups, but is also crucial to making informed decisions. The reform processes in Latvia and Estonia are good illustrations of both stakeholder resistance when left in the background during the policy process (e.g., language reform in Latvia) and active support (assessment reform in Estonia).

A multi-stakeholder approach is key to ensuring inclusive policy design and the subsequent buy-in of key actors implementing the reform. Given the variety of stakeholder groups that are crucial for inclusive and quality education, there is a need to understand the possible mechanisms and channels that allow relevant groups to meaningfully participate in various stages of education provision and the planning of education reform.

Pointers for policy



Effective communication of long-term objectives is of great importance in making reform happen. Making the case for reform also needs to be based on evidence and on achieved public consensus. This is particularly important in education, where professionals, if not engaged, tend to block reforms.



Engaging stakeholders can take time, is complex, and can lead to a lack of results if not well organised. For effective implementation, the main issue is how stakeholders can be engaged in ways that can support the educational change. Several factors have been found to be important in engaging stakeholders, such as higher levels of involvement (partnership and co-decision-making), transparency, and communication.

→ they are **monitored and adapted regularly** to address the evolving needs of students and schools, and are context-sensitive. **Analysis of the selected reforms demonstrates that education systems often lack the capacity to effectively use and interpret monitoring data.** Only a few countries have introduced policy initiatives with built-in monitoring and evaluation systems based on hard evidence. The examples of the TEIP and the National Programme to Promote Educational Success (Plano Nacional de Promoção do Sucesso Escolar, PNPSE) in Portugal demonstrate the efforts of the

government to use piloting before scaling up the interventions nationally; however, even in these cases, no rigorous evaluation based on experimental research is foreseen. Pilot evaluations are largely based on perception studies. These criticisms are sometimes accompanied by a call for more rigorous, scientifically based evidence to lead to so-called 'evidence-based policy-making'. Partly in response to this debate, some countries are introducing large-scale randomised control trials (RCTs) as a way of evaluating educational interventions.

Pointers for policy



Strengthening evidence-based education is imperative. This can be achieved through improved monitoring and evaluation practices, ensuring policy designs that allow for experimentation and evaluation, collection and analysis of national longitudinal student assessment data and investment in research, e.g., through creation and supporting a permanent advisory research-based unit which can be called upon to provide evidenced-based advice on on-going issues.



Reinforcing the culture and tradition of evidence-based education policymaking in EU Member States is recommended. The best design for educational research to ensure the causality between a reform and its effects is a comparative design. This implies that the more reliable studies to answer a question on an anticipated effect are the (quasi)experimental studies, where a group benefiting from a reform is compared to a group of students or schools not benefiting from a reform. This also implies that reform implementation should be planned in several steps: piloting and assessment of its results, scaling up, monitoring and adjustment. Designing and assessing an education reform according to the best available evidence has been popularized as the Evidence-Based Education (EBE) movement. According to Slavin (2017, 2019), providing educator-friendly reviews, making available a broad range of proven education programs, and providing resources to help schools to implement proven programs are the three most important levers for implementing evidence-based reform. In the United States and in the United Kingdom, for instance, efforts have been made to provide these resources through Evidence for ESSA, What Works Clearinghouse or the Education Endowment Foundation.



Investing in longitudinal studies would strengthen the evidence base for education policy-making. Implementing longitudinal studies covering the whole span of education – from kindergarten to upper secondary or even tertiary education comes with high costs many education systems cannot afford. Some countries tried to increase the capacity of PISA to inform educational policies in a more fine-grained or relevant manner at a reasonable cost through introducing a longitudinal component to PISA and oversampling.

Introduction

PPMI and EQUALE are pleased to present the draft final report for the *Study on Successful PISA Stories in the EU: How Some Member States Have Been Able to Improve Their Performance Over Time*.

Mastering basic skills is a prerequisite for thriving in life, finding fulfilling jobs and becoming engaged citizens. Nevertheless, the EU has not achieved the target set out in its Strategic cooperation framework 'Education and Training 2020' (ET2020) to reduce the share of 15-year-olds achieving low levels of attainment in reading, maths and science to less than 15% by 2020, as measured by 2018 data from the OECD's Programme for International Student Assessment (PISA). The post-2020 framework (*Strategic framework for European cooperation in education and training towards the European Education Area and beyond [2021-2030]*) reinforces the previously set targets, demonstrating a strong social dimension: "Education and training have a vital role to play (...) at a time when it is imperative that its society and economy become more cohesive, inclusive, digital, sustainable, green and resilient, and for citizens to find personal fulfilment and well-being, to be prepared to adapt and perform in a changing labour market and to engage in active and responsible citizenship".² The European Education Area envisions a quality education system that allows learners to master transversal skills, promotes learning mobility and cooperation in Europe and beyond, fosters multilingualism and cultural diversity, and introduces learners to a European perspective that is complementary to national and regional perspectives. The European Education Area also highlights the importance of inclusion and gender equality, as well as highlighting the need to ensure that policies and investments in education and training also focus on inclusive green and digital transitions (European Commission, 2020, h).

Under the current period of the ET framework (2021-2030), COVID-19 and the green recovery in particular have left a mark on the education priorities at EU level and in the Member States. On the one hand, COVID-19 has aggravated socio-economic disparities in education, especially for those experiencing multiple disadvantages. On the other hand, it added impetus to the acute need to foster students' mastery of basic skills, in addition to digital and green skills, in order to ensure that no one is left behind in education systems and labour markets across Europe in the 'recovered' green economy of the future. In particular, the COVID-19 pandemic has highlighted the challenge of creating education systems that are both flexible enough to account for changes in skills needs and ways of learning during a crisis, and at the same time robust enough to provide equal opportunities for all (Blasko, da Costa, & Schnepf, 2021).

The average rate of underachievement in the EU – that is, the proportion of pupils who failed to complete basic mathematics, science and reading tasks, according to PISA in 2018 (i.e. they do not attain Level 2 knowledge in the PISA assessment) – stood at 22.5% in reading, 22.9% in mathematics, and 22.3% in science (European Commission, 2019). Furthermore, at EU level, students' performance has deteriorated gradually over the 2009-2018 period (European Commission, 2019). However, some EU countries have been able to improve their PISA results over time, putting in place structural education reforms, such as increasing the autonomy of schools, tackling inequalities from children's early years, and investing in competence-based curricula and assessments. This study aims to identify which factors may be associated with these positive trends in PISA results, and which reforms may have had an impact on student performance.

² Council Resolution on a strategic framework for European cooperation in education and training towards the European Education Area and beyond (2021-2030) 2021/C 66/01, OJ C 66, 26.2.2021, p. 1-21

1.1. How to read this report

The report is structured as follows:

Chapter 1 (the present chapter) introduces the report. It provides an overview of the study's aims, objectives and research questions (Section 1.2), as well as the methodology used, including the scope of the study (Section 1.3.1.), and the rationale behind the country success stories selected (Section 1.3.2). It goes on to outline the steps taken in the research (Section 1.3.3.), and zooms in to look at the data used for the analysis (Section 1.3.4.), and the limitations of the study (Section 1.4.5.).

Chapter 2 provides an overview of trends in performance across the EU, as measured by PISA (section 2.1.) Seven EU countries are then selected for in-depth analysis, highlighting interesting positive trends in student achievement, and identifying factors that may be associated with these trends (Section 2.2.).

Chapter 3 offers a picture of the pathways taken by the seven selected countries towards improvements in PISA performance over time across different subject domains, taking into account not only student achievement, but also the contexts of equity and inclusion. Each country's success story begins by presenting important educational context in the country as well as salient policy issues. This is followed by a detailed outlook at the country's PISA trends over time (based on descriptive statistics). This section also aims to identify policy reforms that may possibly have had a positive impact on students' academic performance or equity in the country. The analysis then focuses on the potential impact of the selected reforms using complex statistical models (where such analysis was possible), contextualised through consultations with relevant stakeholders in the country, to provide insights into what can explain the success of these reforms (i.e. the key success factors). More detailed analysis of each country, as well as a description of methodological steps taken is provided in Annex 1.

Chapter 4 provides reflections on the key lessons to be learnt from the reform journeys in the seven countries.

Chapter 5 presents the study's conclusions and their implications for policy and research.

The report also includes two Annexes. Annex 1 provides the detailed country reports. Annex 2 includes a detailed explanation of the methodological approach used.

1.2. Aims, objectives and research questions

High-quality education benefits both individual learners and society as whole. For individuals, obtaining a better education often results in lower levels of unemployment, higher lifetime earnings, higher job satisfaction (Riddell, 2016), and higher subjective well-being (Witter, Okun, Stock, & Haring, 1984). Given the potential benefits it offers to society, education can increase the human capital of the labour force, which in turn ensures higher labour productivity (Hanushek & Woessmann, 2010), and can contribute to improving social welfare and equity (Behrman & Stacey, 1997). Educational attainment can also be connected to greater civic participation in politics and democratic processes (Glaeser, Ponzetto, & Shleifer, 2007), and to decreasing crime rates (Lochner & Moretti, 2004). Hence, providing quality education has been an important focus for policy makers across the EU and around the world (Bolden & Tymms, 2020). However, it is rarely possible to rigorously determine whether the reforms have produced the intended effect and contributed to increasing the academic performance of students, due to a lack of large-scale experimental evaluations of implemented educational interventions, as well as limited

evidence of significant improvements in student performance, as demonstrated by data from the large-scale international student assessments (Bolden & Tymms, 2020).

The present study attempts to expand existing knowledge about which factors and education reforms could help to improve educational standards in the contexts of specific countries, by testing various statistical approaches to measuring the effects of particular reforms. This analysis is complemented with the results of the non-experimental quantitative research conducted, as well as stakeholder consultations.

Specific objectives

The central goal of this study is to analyse the factors that may have contributed to improvements in the quality and equity of education in the selected EU countries, all of which have shown improving trends in students' academic achievement, as measured by PISA.

To achieve this objective, the study:

- investigates to what extent individual factors (e.g. migrant background, socio-economic background, gender), as well as factors relating to schools (e.g. school climate, instruction time, school type) and systems (e.g. resources, curricula, student tracking, school autonomy, etc.) can explain differences in educational outcomes, as measured in PISA;
- analyses how national reforms may have contributed to improvements in the PISA performance of particular countries over time, and explores the success factors behind these reforms;
- formulates policy recommendations to tackle underachievement (as measured by PISA) and improve inclusiveness in the education systems of the selected countries and across the EU.

1.2.1. Study research questions

Below, we set out main research questions for the study. These are based on the specific objectives outlined above. In addition to these overarching research questions, we also outline country-specific questions based on the particular developments in PISA performance in each of the selected Member States. These questions are introduced and explained in the respective country sections in Chapter 3, and in the full country reports in Annex 1.

TABLE 1. GENERAL RESEARCH QUESTIONS

Questions
What are the trends in PISA performance over time in the EU-27?
Which countries have significantly improved their PISA performance over time (scores across three domains and shares of underachievers)?
Which countries have narrowed the underachievement gap (as measured by PISA) over time?
What is the share of low achievers among different groups of students (disaggregated by gender, migrant background, and socio-economic status) in the EU-27?
What are the differences in achievement among different groups of students (disaggregated by gender, migrant background, and socio-economic status) in the EU-27?
How do long-term performance trends compare across difference datasets (PISA, TIMSS and PIRLS)?

Which factors are associated with improved PISA performance and narrowed underachievement gap?

What individual factors (i.e. background aspects, including gender, migrant and socio-economic status) affect levels of PISA performance and underachievement rate, as well as changes in these rates over time in the selected countries?

What school-level factors (e.g. school climate, teacher activities, etc.) affect levels of PISA performance and underachievement rates, as well as changes in these rates over time in the selected countries?

Which aspects of education systems and policies (e.g. early tracking, teacher professional development systems, structural reforms, etc.) explain the differences in PISA performance and underachievement rates, as well as changes in these rates over time in the selected countries?

How do the factors at different levels interact and mediate one another?

How do the PISA success stories of the selected countries compare?

How do countries compare in terms of positive trends in educational outcomes (as measured by PISA) and the factors that are associated with such trends? What factors can explain these differences?

Which national reforms may have contributed to improvements in PISA performance over time in the selected countries, and what are the typologies of these reforms? How do the contexts of specific countries and their implementation processes affect the effectiveness of these reforms?

What are the success factors behind the selected reforms?

Source: authors.

1.3. Overview of methodological approach

1.3.1. Scope of the study

The study explores performance trends over the period 2009-2018 (the last four PISA cycles) and examines the education policy factors that may be associated with the positive trends observed.

The time span for the information gathered about key education reforms in the selected countries covers a longer period, as the effect of educational reforms on student performance may only be visible a number of years after reforms were implemented. For most countries, qualitative data collection covers a period beginning in 2000 (the so-called 'first PISA shock', which triggered various structural reforms across the EU countries). However, in cases where countries implemented influential reforms before the 2000s, such reforms have also been considered.

1.3.2. Selection of PISA success stories

While students' educational success is usually understood in a broader sense, for the purposes of this study a country can be classified a PISA success story if it managed to improve students' performance in at least one of the three subject domains – reading, mathematics and science – between 2009 and 2018, as well as decreasing its underachievement rate, while improving the equity of education provision (i.e. the socio-economic gap among achievers either decreased or remained stable).

Our selection of countries is thus based on the following criteria:

1. **Increase in mean PISA performance** – if the country experienced an increase in mean PISA performance from 2009 to 2018 in at least one of the domains – reading, mathematics and science.

2. **Decrease in underachievement rate³** – if the country shows a positive change (or stability) in the underachievement rate in those subjects in which the country has experienced an increase in its mean PISA performance between 2009 and 2018. It is important to ensure that the increase in the mean performance in PISA is linked to an overall improvement in student achievement in the country, rather than to an improvement in the performance of already high-performing students. Countries were only selected if they did not experience an increase in underachievement rate from 2009 to 2018 in tandem with an increase in mean performance score.
3. All of the countries selected demonstrate a **narrowing or no increase in the socio-economic status gap** – that is, the difference between the PISA scores of socio-economically advantaged and disadvantaged students. It is important that the education system is inclusive and does not leave behind those students from vulnerable backgrounds who are often over-represented among underachievers. The failure of a system to consider the needs and well-being of all students can further perpetuate existing inequalities in society. Consequently, an increase in mean PISA performance without a decrease in the performance gap between students with different socio-economic backgrounds may indicate that the system tends to exclude certain groups of students. As a result, countries were only selected if their mean PISA performance increased between 2009 and 2018, but they did not experience a widening socio-economic gap in PISA performance.

While the case study countries were selected on the basis of PISA trends between 2009 and 2018, PISA trends since the 2000s were also analysed to ensure that the observed improvements were not the result of a country having uncharacteristically low PISA scores in 2009 or 2012, for example, but instead show a gradual improvement.

Following their initial statistical analysis and desk-based research, the research team identified seven EU Member States – Bulgaria, Estonia, Latvia, Slovenia, Sweden, Poland and Portugal – that have (somewhat) improved their PISA performance over time, as well as demonstrating interesting developments in education policy since 2000.

It must be noted, however, that on the basis of PISA data, very few countries demonstrated significant improvements, while others displayed fairly stable trends over time. This constitutes one of the major limitations to the analysis of the possible effects of reforms (see Section 1.3.5 for a discussion on these limitations).

Based on the above criteria, a few other countries, such as Ireland and Italy, qualified to be considered a PISA success story. In view of this, additional criteria were employed to narrow down the selection – countries that had previously been less well researched (such as Latvia and Bulgaria) were prioritised, with a view to providing novel evidence on possible factors that might influence PISA improvements. The table below explains the rationale behind the final selection.

³ Underachievement rate is the proportion of pupils who fail to complete basic mathematics, science and reading tasks, according to the OECD's Programme for International Student Assessment (PISA) (i.e. those who do not attain level 2 knowledge in PISA assessment).

TABLE 2. EXPLANATION OF COUNTRY SELECTION

Country	Trends in PISA over time	Educational development
Bulgaria (BG)	<ul style="list-style-type: none"> - Mean performance in all three domains increased between 2006 and 2012 (or 2015 for maths), then decreased until 2018. - Underachievement rates in all three domains decreased between 2006 and 2012 (or 2015 for maths and science), then increased until 2018. - Performance gap between socio-economically advantaged and disadvantaged students decreased between 2012 and 2015. - Gender gap in reading performance increased between 2009 and 2012, and decreased between 2012 and 2018. 	<p>Bulgaria still lags behind in terms of the quality of education provided. Several important challenges hinder the development of the country's education system; however, education policies in recent years have focused on improving the quality and equity of the education system (with reforms in the fields of ECEC and the assessment system perceived as potentially influential).</p>
Estonia (EE)	<ul style="list-style-type: none"> - Mean performance in mathematics and reading increased between 2009 and 2018. - Underachievement in mathematics and reading decreased between 2009 and 2018. - Performance gap between socio-economically advantaged and disadvantaged students remained stable. - Gender gap in performance in mathematics decreased between 2012 and 2015. 	<p>Estonia has a long tradition of external assessments, decentralised education governance, digitalisation and positive attitudes towards education. Despite lower education spending (compared with other PISA top performers), Estonia managed to achieve the highest results among the EU Member States, which makes the country an interesting case study.</p>
Latvia (LV)	<ul style="list-style-type: none"> - Mean performance in reading increased significantly between 2000 and 2003. - Mean performance in mathematics increased between 2015 and 2018. - Mean performance in science increased until 2012, but decreased between 2012 and 2018 - Underachievement rates in all domains have remained generally stable. - Performance gap between socio-economically advantaged and disadvantaged students decreased between 2012 and 2018. - Gender gap in reading performance decreased between 2009 and 2015. 	<p>Latvia has been focusing on ensuring better-quality education by improving educational standards in key disciplines. Policy makers have also focused on ensuring greater equity in the education system by tackling language-based segregation, with particular regard to the segregation of Russian-speaking students, as well as supporting vulnerable students.</p>
Poland (PL)	<ul style="list-style-type: none"> - Mean performance in all three domains increased between 2009 and 2018. - Underachievement rate in mathematics decreased over time. - Performance gap between socio-economically advantaged and disadvantaged students remained stable. - Gender gap in performance in reading decreased between 2009 and 2018. 	<p>Poland is an interesting case study, due to a structural reform of the education system that took place in 1999. This reform introduced the concept of a "middle school" (a separate school for lower-secondary education). This reform replaced basic school (up to grade 8) with separate primary and lower-secondary schools. The reform focused on improving quality of education and ensuring more equal opportunities. However, this reform was reversed in 2016 (despite its observed positive impact), due to negative public opinion about middle schools.</p>
Portugal (PT)	<ul style="list-style-type: none"> - Mean performance in all three domains increased between 2006 and 2009. - Underachievement rates in all domains decreased between 2006 and 2009. - Performance gap between socio-economically advantaged and disadvantaged students remained stable. - Gender gap in performance in reading decreased between 2012 and 2015, but increased between 2015 and 2018. 	<p>Portugal is an interesting case, as the country has implemented various strands of reforms that may have helped to improve the quality and equity of education. In the early 2000s, the country focused heavily on a results-based approach to education. However, in more recent years, several programmes have been implemented to improve inclusiveness in the education system.</p>

Slovenia (SI)	<ul style="list-style-type: none"> - Mean performance in reading increased between 2012 and 2018. - Mean performance in science and mathematics remained stable. - Underachievement rate in mathematics and reading decreased between 2012 and 2018. - Performance gap between socio-economically advantaged and disadvantaged students decreased between 2009 and 2018. - Gender gap in performance in reading decreased between 2009 and 2018. 	<p>The government in Slovenia has focused on tackling underachievement and improving the reading competences of its population through programmes in the sectors of education and culture, which makes Slovenia an interesting case study. The country restructured its education system in 1990s. Moreover, VET education is very popular in the country, which makes it different from most other EU Member States.</p>
Sweden (SE)	<ul style="list-style-type: none"> - Mean performance in all three domains decreased between 2000 and 2012, and increased between 2012 and 2018. - Underachievement rates in all three domains increased until 2012, then decreased until 2018. - Performance gap between socio-economically advantaged and disadvantaged students remained stable. - Gender gap in reading performance decreased between 2012 and 2018. 	<p>Sweden is an interesting case study due to its long-term commitment to providing quality education that focuses not only on the academic performance of students, but also on their well-being and holistic development. However, the country has a unique arrangement regarding private (independent) schools, which has shaped its education system over the last two decades and which may have contributed to the quality of education, but has been detrimental to its equity.</p>

1.3.3. Research process

This section provides a brief overview of the key components of the study's methodology, which has been designed to gather and analyse evidence in relation to the main research questions outlined above.

This study employed a **mixed-methods approach**, featuring the elements of both qualitative and quantitative data analysis, as well as **data triangulation** throughout the implementation of the project. The activities carried out were as follows:

- **Initial scoping research and selection of PISA success stories** (January – March 2021). During the Inception stage, the team conducted initial desk research and descriptive statistical analysis of trends in PISA performance across the EU, which also fed into the selection of countries for in-depth analysis. The PISA trends were contrasted with trends in achievement observed in other cross-national education surveys⁴. Initial background research was also conducted into the countries of interest.
- **Mapping and documentation of educational developments and reforms in the selected countries** (April – August 2021). This activity included extensive desk research to map the key education policy developments that have taken place in the seven countries since the 2000s, as well as the potential effectiveness of these reforms, as evidenced by existing research (if any). In addition, primary data were collected (via stakeholder interviews) on the key barriers to and enablers of the successful implementation of the selected reforms that may have had an impact on PISA success (see Annex 2 for more details).
- **Advanced statistical analysis** (April – October 2021). To link these educational policies or reforms with any changes in the PISA data, statistical analyses were conducted, firstly with a descriptive purpose. The analyses performed covered various aspects (e.g. student performance, equity, segregation, school climate), to provide the broadest and clearest view of the situation within each of the selected

⁴ International large-scale assessment surveys for grades 4 and 8 TIMSS (for years 2003, 2007, 2011, 2015 and 2019) and PIRLS (for years 2001, 2006, 2011, 2016) were referred to and analysed for cross-validation of the trends observed in the PISA survey and for comparison with the observed trends.

countries. These analyses provided a complete picture of the situation in each country, making it possible to assess whether the targeted policies or reforms be discerned from the variations observed, meaning that the intended reforms had really been implemented (for instance, that a reform designed to reduce grade repetition led to an actual reduction in the share of students repeating a grade). This was an intermediary step before trying to estimate whether the reform had any effect or impact on achievement or equity. The next step taken for each country was to review all major reforms since the 1990s, and, where any presuppositions existed, to identify any that could be linked to changes in PISA outcomes through difference-in-differences (DiD) and propensity score matching (PSM) methods. The detailed steps in this analysis are explained in the relevant country reports (see Annex 1).

- **Final analysis and reporting** (September – February 2020). The main objective of this task was to conduct a transversal analysis of the findings collected via various research activities, to develop evidence-based conclusions and policy recommendations.

1.3.4. Data and measurements

All the data used for quantitative analyses were extracted from the OECD PISA data sets (PISA cycles 2000, 2003, 2006, 2009, 2012, 2015 and 2018)⁵. The research team mainly focused on data from 2009 to 2018. However, data since the 2000s was analysed to better understand the long-term trends in each country's PISA performance. As the data sets for the students and the school questionnaire are separate, they were merged for each cycle, to ensure a full data set that would encompass all student and school-level variables.

All statistical analyses were conducted using SAS 9.4. As the PISA samples are not simple random samples, methodological procedures for such samples (including replications and plausible values) were respected. These procedures enabled the research team to calculate the standard error for each parameter, and thus determine whether this parameter is either statistically significant (at the significance level of 0.05, indicating that there is a 5% risk of concluding that a difference exists when there is no actual difference), or is not significant. The full list of the variables used for the statistical analysis is provided in the Annex 2 – Methodological approach section 2.1.3. Variables used for statistical analysis.

1.3.5. Study limitations

As with any research study, this report is subject to specific limitations in terms of data and analysis, which should be taken into account when interpreting its findings. These include:

- **Limitations relating to the definition of a success story in PISA.** The focus of this study is to analyse what factors may be associated with improved PISA performance over time; however, a very limited number of countries have demonstrated statistically significant improvements. Furthermore, those improvements that have been documented are very modest (a few percentage points), which also makes it difficult to statistically attribute increases in performance results to the effects of certain variables.
- **Limitations in the assessment of the effectiveness of education policies and reforms.** Throughout the report, various policies, reforms and initiatives are presented that seek to improve the quality and equity of school education in the selected countries, with a view to enhancing students' academic success and well-being. While the study attempts to assess the effectiveness of these reforms in a non-experimental way, using DiD and PSM methods, these methods require certain

⁵ The data set can be downloaded on the OECD website (<https://www.oecd.org/pisa/data>).

data conditions to be met, which were not always in place. Until the data were closely examined, it was also impossible to determine whether such conditions would be met. In reality, these conditions were rarely met; consequently, the application of the DiD and PSM methods was limited to a few selected cases. In addition, limited existing evidence is available to evaluate the impact of educational reforms in the selected countries, as well as in broader contexts. This lack of data led to a call for more rigorous, scientifically based evidence to enable so-called 'evidence-based' or 'evidence-informed' policy-making. Partly in response to this debate, many countries have begun investing in large-scale randomised control trials (RCTs) as a way of evaluating educational interventions (Lortie-Forgues & Inglis, 2019).

RCT methodology is not without its critics; however, RCTs are superior to non-experimental quantitative research and to qualitative studies (Hammersley, 2015). Given the limited availability of evaluative evidence employing RCTs to investigate the impact of policies, the present study cannot definitively claim which specific reforms help to tackle underachievement or improve inclusion. Instead, where certain pre-conditions are met, it can only offer a few pieces of the puzzle using statistical models.

- **Limitations in establishing causal links between specific reforms and PISA performance.** International surveys such as PISA provide the opportunity to investigate links between student performance and a wide range of dimensions at the levels of individual students, schools, or education systems. Most of the analyses that can be derived from PISA are correlational – observed associations – and investigate the link between two or more variables. Causal associations are more restrictive, since they require differential change in outcomes in two groups of students to be unequivocally linked to observed factors that evolve differently for the two groups. The central and strong assumption is that all unobserved factors remain unchanged, or affect the two groups under comparison in the same way (Jakubowski & Borgonovi, 2012). But in education, treatments (e.g. reforms) often show an endogenous trait, meaning that this constraint/assumption is not met (Cordero, Cristobal, & Santín, 2018). Consequently, isolating the impact of educational policy reforms on PISA performance through statistical modelling is a challenging undertaking. Among others, two statistical methods (econometric approaches) enable the limitation described above to be (at least partly) dealt with, and can be applied to investigate the impacts of reforms: difference-in-differences (DiD) and the propensity score matching (PSM). These are the approaches this study has attempted to apply (with certain limitations, as mentioned in the point above).
- **Limitations regarding PISA data and measurements.** Analysing data from different PISA cycles can prove challenging, due to the changes between cycles in the methodologies used, the available variables, and the computation processes for various indicators. The main drawback of PISA and similar assessment surveys is the cross-sectional nature of their design. To evaluate policies and reforms that aim to improve student performance requires longitudinal data, with the targeted individuals being observed both before and after such interventions. In contrast to this, each cross-sectional assessment is carried out on a different set of individuals, leading to a lack of the essential data on individuals either before or after a policy or reform. While methodological advances in recent years have made it possible to use cross-sectional data sources, limitations remain as to the possible depth of the analysis that can be conducted across PISA cycles.

2. Overview of the EU's performance in PISA between 2009 and 2018

2.1. General trends across the EU

Like most countries around the globe, EU Member States aim to improve their PISA scores in all three PISA domains (reading, mathematics, and science) (The Council of the European Union, 2009) in their quest to enhance the quality and equity of their education systems. However, existing studies show that only a few countries manage to achieve this (Rowley, McNeill, Dufur, Edmunds, & Jarvis, 2019). For example, between the latest two PISA cycles (2015 and 2018), no EU Member State significantly improved its mean performance in reading; only Latvia, Poland and Slovakia did so in mathematics; and only Poland significantly increased its mean performance in science (OECD, 2019, a).

Several Member States have, however, managed to improve their results in at least one domain since 2009, although only in a few of these countries has this increase been statistically significant (see Table 3).

TABLE 3. CHANGES IN PISA MEAN SCORES BETWEEN 2009 AND 2018

	Reading	Mathematics	Science
Mean performance increased between 2009 and 2018	Estonia (+22), Ireland (+22), Poland (+11), Slovenia (+12), Czech Republic (+12) , Sweden (+8), Lithuania (+7), Denmark (+6), Malta (+6), Croatia (+3), Romania (+3), Portugal (+2), Germany (+1)	Poland (+21), Latvia (+14), Ireland (+12), Estonia (+11), Malta (+9), Sweden (+8), Bulgaria (+8), Slovenia (+7), Czech Republic (+7), Denmark (+6), Portugal (+6), Lithuania (+5), Croatia (+4), Italy (+4), Romania (+3)	Sweden (+4), Poland (+3), Estonia (+2)
Mean performance decreased between 2009 and 2018	Greece (-25), Netherlands (-24), Slovakia (-19), Hungary (-18), Finland (-16), Belgium (-12), Italy (-10), Bulgaria (-9), Latvia (-5), France (-3), Luxembourg (-2)	Finland (-33), Greece (-15), Germany (-13), Slovakia (-11), Hungary (-9), Belgium (-7), Luxembourg (-6), Netherlands (-7), Spain (-2), France (-1)	Finland (-35), Slovakia (-26), Hungary (-22), Italy (-21), Netherlands (-19), Greece (-18), Germany (-17), Bulgaria (-15), Croatia (-14), Ireland (-12), Lithuania (-9), Belgium (-8), Denmark (-7), France (-5), Latvia (-7), Luxembourg (-7), Slovenia (-5), Spain (-5), Czech Republic (-4), Malta (-4), Romania (-2), Portugal (-1)

Source: compiled by the authors using OECD data.

Note: statistically significant increases are marked in blue; statistically significant decreases are indicated in red.

Changes in individual EU Member States' underachievement rates over time mirror their PISA achievement scores, and only few statistically significant improvements are observed (see Table 4).

TABLE 4. CHANGE IN UNDERACHIEVEMENT RATE IN EU MEMBER STATES BETWEEN 2009 AND 2018

	Reading	Mathematics	Science
Underachievement rate decreased between 2009 and 2018	Ireland (-5.4 pp), Slovenia (-3.3 pp), Czechia (-2.4 pp), Estonia (-2.2 pp), Croatia (-0.8 pp), Malta (-0.4 pp), Poland (-0.3 pp)	Poland (-5.8 pp), Latvia (-5.2 pp), Ireland (-5.1 pp), Slovenia (-3.9 pp), Malta (-3.5), Bulgaria (-2.7 pp), Denmark (-2.5 pp), Estonia (-2.5 pp), Sweden (-2.3 pp), Czechia (-2.0 pp), Croatia (-2.0 pp), France (-1.2 pp), Italy (-1.2 pp), Lithuania (-0.8 pp), Portugal (-0.5 pp), Romania (-0.4 pp)	Slovenia (-0.2 pp), Sweden (-0.1 pp)
Underachievement rate increased between 2009 and 2018	Netherlands (+9.8 pp), Slovakia (+9.2 pp), Greece (+9.2 pp), Hungary (+7.7), Finland (+5.4 pp), Latvia (+4.8 pp), Belgium (+3.6), Luxembourg (+3.3 pp), Bulgaria (+6.1 pp), Portugal (+2.6 pp), Italy (+2.3 pp), Germany (+2.2 pp), France (+1.1 pp), Sweden (+1.0 pp), Denmark (+0.8), Romania (+0.4 pp)	Finland (+7.1 pp), Slovakia (+4.1 pp), Luxembourg (+3.3 pp), Greece (+5.4 pp), Germany (+2.4 pp), the Netherlands (+2.4 pp), Hungary (+3.3 pp), Spain (+0.9 pp), Belgium (+0.6 pp)	Hungary (+10.0 pp), Slovakia (+10.0 pp), Bulgaria (+7.7 pp), Croatia (+6.9 pp), Finland (+6.9 pp), Greece (+6.5 pp), Italy (+5.2 pp), Lithuania (+5.2 pp), Germany (+4.8 pp), Latvia (+3.8 pp), Netherlands (+2.4 pp), Latvia (+3.8 pp), Luxembourg (+3.1), Portugal (+3.1 pp), Spain (+3.1 pp), Romania (+2.5 pp), Denmark (+2.1 pp), Belgium (+2 pp), Ireland (+1.8 pp), Czechia (+1.5 pp), France (+1.2 pp), Malta (+1.0 pp), Poland (+0.7 pp), Estonia (+0.5 pp)

Source: compiled by the authors using European Commission and OECD data. Note: blue text indicates statistically significant decreases in underachievement; red text marks statistically significant increase in underachievement.

Remarkable stability in academic achievement across the EU has been accompanied by **persistent trends of inequality and exclusion in education systems**. While Member States strive for equity and inclusion, it is evident that equal access to education and learning opportunities is not yet open to everyone. The socio-economic and ethnic backgrounds of students often play a role in determining their academic achievements. Socio-economically advantaged, non-immigrant students are more likely to be among the high achievers. Indeed, the PISA 2018 results show that across the EU, socio-economically advantaged students on average score 97 points higher in the reading assessment than students of low socio-economic status⁶. However, this gap varies substantially between EU Member States. Studies show that socio-economic background has a stronger effect on students' academic achievements in post-communist EU Member States than in Western European countries (Schlicht, Stadelmann-Steffen, & Freitag, 2010). Moreover, the differences between non-immigrant and immigrant students are expected to be larger if immigrant students do not speak the language of instruction at home. PISA results also demonstrate that gender gaps persist in academic performance across the EU. Gender differences in underachievement rates in mathematics and sciences are fairly small, but girls significantly outperform boys in reading (European Commission, 2019).

⁶ Socio-economic status in PISA is "a measure of a student's access to family resources (financial capital, social capital, cultural capital and human capital) and the social position of the student's family/household". Socio-economic status is estimated by measuring the resources available to a student, and is derived from several variables measured by the PISA assessment. Socio-economically advantaged students are those who have access to greater resources, while socio-economically disadvantaged students have limited access to financial, social, cultural and human capital. For more information, see: OECD (2019). PISA 2018 Results (Volume II): Where All Students Can Succeed, PISA, OECD Publishing, Paris, <https://doi.org/10.1787/b5fd1b8f-en>.

School segregation⁷, which can be the result of various factors, further contributes to performance differences between various groups of students. PISA data show that those EU Member States in which low achievers and/or socio-economically disadvantaged students are concentrated in the same schools, tend to have higher underachievement rates (European Commission, 2019).

The table below presents those countries that have managed between 2009 and 2018 to narrow⁸ the differences in PISA scores between boys and girls, migrant and non-migrant students, and between students from different socio-economic backgrounds. The gender gap in performance may favour girls or boys depending on the domain and country. In reading, the score for girls is higher in all countries. In mathematics, the score is higher for boys in all countries except two (Finland and Malta). In science, the score is higher for girls in some countries, and for boys in others.

TABLE 5. CHANGES IN SOME EQUITY INDICATORS IN THE EU BETWEEN 2009 AND 2018*

	Reading	Mathematics	Science
Narrowed gender performance gap between 2009 and 2018	Italy (-21 pp), Bulgaria (-21 pp), Lithuania (-20 pp), Croatia (-18 pp), Poland (-17 pp), Slovakia (-17 pp), Ireland (-16 pp), Latvia (-15 pp), Czech Republic (-15 pp), France (-15 pp), Germany (-14 pp), Estonia (-14 pp), Portugal (-14 pp), Slovenia (-13 pp), Sweden (-11 pp), Luxembourg (-10 pp), Hungary (-11 pp), Romania (-9 pp), Belgium (-5 pp), Greece (-5 pp), Finland (-4 pp)	Netherlands (-16 pp), Greece (-14 pp), Luxembourg (-12 pp), Spain (-12 pp), Denmark (-12 pp), Belgium (-10 pp), France (-10 pp), Germany (-9 pp), Lithuania (-4 pp), Hungary (-3 pp), Portugal (-3 pp), Ireland (-2 pp), Poland (-2 pp), Malta (-2 pp), Bulgaria (-2 pp), Croatia (-2 pp), Czech Republic (-1 pp)	Lithuania (-11 pp), Malta (-14 pp), Denmark (-9 pp), Romania (-9 pp), Croatia (-7 pp), Poland (-6 pp), Slovenia (-4 pp), Spain (-5 pp), Bulgaria (-5 pp), Germany (-4 pp), Czech Republic (-3 pp), France (-2 pp), Luxembourg, Belgium (-2 pp), Ireland (-1 pp)
Narrowed migrant performance gap between 2009 and 2018	Italy (-30 pp), Luxembourg (-17 pp), Ireland (-15 pp), Croatia (-8 pp), France (-8 pp), Latvia (-7 pp), Belgium (-6 pp), Greece (-6 pp), Hungary (-1 pp), Lithuania (-1 pp)	Italy (-25 pp), Spain (-23 pp), Luxembourg (-22 pp), Belgium (-15 pp), Ireland (-15 pp), France (-15 pp), Denmark (-14 pp), Malta (-11 pp), Estonia (-10 pp), Latvia (-5 pp), Greece (-5 pp), Lithuania (-5 pp), Germany (-4 pp)	Malta (-33 pp), Italy (-31 pp), Spain (-26 pp), Luxembourg (-23 pp), Ireland (-21 pp), Denmark (-14 pp), Latvia (-14 pp), Croatia (-13 pp), Belgium (-12 pp), Estonia (-12 pp), France (-12 pp), Germany (-6 pp), Lithuania (-3 pp)
Narrowed SES performance gap between 2009 and 2018	Bulgaria (-24 pp), Malta (-19 pp), Croatia (-11 pp), Ireland (-11 pp), Italy (-9 pp), Slovenia (-8 pp), Belgium (-6 pp), Greece (-6 pp), Hungary (-5 pp), Denmark (-3 pp), France (-3 pp), Sweden (-2 pp)	Belgium (-5 pp), Denmark (-10 pp), France (-5 pp), Germany (-11 pp), Greece (-7 pp), Hungary (-7 pp), Ireland (-13 pp), Lithuania (-8 pp), Malta (-1 pp), Slovenia (-10 pp), Spain (-5 pp), Sweden (-7 pp), Bulgaria (-18 pp), Croatia (-5 pp)	Bulgaria (-23 pp), Italy (-15 pp), Greece (-16 pp), Malta (-15 pp), Ireland (-12 pp), Denmark (-6 pp), Germany (-6 pp), Slovenia (-5 pp), Luxembourg (-5 pp), Sweden (-5 pp), Croatia (-4 pp), Belgium (-4 pp), France (-2 pp), Lithuania (-1 pp)
Decreased rate of school segregation between 2009 and 2018**	Bulgaria, Czech Republic, Croatia, France, Germany, Hungary, Ireland, Italy, Luxembourg, Malta, Netherlands, Portugal, Romania, Slovenia	Bulgaria, Czech Republic, France, Germany, Hungary, Ireland, Italy, Malta, Netherlands, Portugal, Slovakia, Slovenia, Spain	Bulgaria, Czech Republic, France, Germany, Hungary, Ireland, Italy, Latvia, Luxembourg, Malta, Netherlands, Slovakia, Slovenia, Spain

Source: compiled by the authors using OECD and European Commission data.

*Austria has been excluded from trend comparisons because in Austria the comparability cannot be guaranteed between Austria's PISA 2009 data and data from other PISA cycles.

**The intraclass correlation has been computed from a multi-level model weighted at Level 1.

⁷ Based on PISA data, four indicators were computed to measure school segregation: academic segregation, social segregation, ethnic segregation and linguistic segregation. See Section 1.3.4. for more details.

⁸ Decrease is not necessarily statistically significant.

While EU Member States invest a lot of administrative and financial resources in educational reforms with the aim of improving their educational standards and increasing students' academic performance (Bolden & Tymms, 2020), the trends presented show that, to date, **only a few EU Member States have managed to improve students' academic success.**

Potential explanations for this limited success lie in the contexts in which such reforms have been implemented, as well as the specific characteristics of the reforms. Bolden and Tymms (2020) identify a few factors that hinder the effectiveness of reforms:

- 1) The **timing and short-sightedness** of existing reforms (pertinent to all policy fields): most national governments are typically in office for only four to five years at a time before having to seek re-election. This means that the policy-makers often prioritise measures and interventions that can be implemented quickly and show immediate results. Such reforms also tend to be introduced frequently, which may discourage education practitioners from properly implementing the changes in their classrooms, as these are soon likely to be replaced by newer reforms.
- 2) **Resistance to change** on the part of the education community and the public is also common, as both teachers and the public are often not well informed or consulted about planned interventions, which therefore do not enjoy the necessary buy-in on the ground. In addition, schools are rarely given sufficient support in the implementation of reforms. Moreover, policy makers often fail to consider that reforms can only change certain aspects of education system, and may have little effect on the pedagogical practices of teachers – for example, how a certain topic or skill is taught in the class, or the tradition of homework, which is a crucial determinant of academic success. This corresponds with the observation that policies, or at least their surrounding rhetoric, often focuses more on attracting attention to the pro-activeness of the policy makers rather than on the actual impact of policies.
- 3) **Isolated nature and lack of consideration of contextual factors.** Reforms are often accompanied by specific measures to ensure compliance (inspections, financial penalties and rewards, and others). These measures may result in unintended negative consequences that hinder the effectiveness of the reforms. Furthermore, it often happens that reforms replicate observed good practices without sufficiently taking into account the differences in local contexts and the effects of various specific factors outside the school, such as culture or social structures. Reforms also often fail to address the role of non-educational factors such as the home environment, which directly influence the students' academic abilities and their potential to improve (Bolden & Tymms, 2020).

Studies also show that countries which have improved their PISA scores are usually those that were among the worst-performing countries in previous PISA cycles, making an initial improvement easier to trigger. Studies also show that these countries have often advanced in other socio-economic areas as well; for example, by achieving higher income levels and/or shifting to a more democratic form of government (Rowley, McNeill, Dufur, Edmunds, & Jarvis, 2019).

2.2. Zooming in on seven countries

This section analyses PISA trends in the seven selected countries in comparison to the EU average, looking at mean performance across domains and a selection of factors that are associated with a certain level of performance (such as socio-economic and cultural status, student placement into the academic or vocational track, and grade repetition). The indicators are based on the PISA 2018 data, which represents the most recent cycle. More

detailed country-specific analysis of the interactions between variables is provided in Chapter 3 and in the detailed country reports in Annex 1. Following this overview of trends, we present the results of a multi-level regression analysis on the seven selected countries. This analysis helps to understand variations in the effects of the same variable across the seven countries (for instance, the native status of students does not affect their performance equally in every country).

2.2.1. Overview of trends in certain variables among the selected countries

This section reviews the individual, school and system-level variables that may influence the academic performance of students the most. It then offers a picture of the selected sample of countries in terms of mean performance in all three domains, trends in academic segregation⁹, as well as trends in the variables known to be major predictors of the students' performance. It also places the picture for each country within the perspective of the PISA results for the EU as a whole.

The literature demonstrates that students' academic success may be affected by a huge variety of factors at family, school and system level. However, a limited number of variables can be included in a statistical model. If there are many independent variables, their effect cannot be clearly seen because they may be highly affected by each other (multicollinearity). Consequently, in this study a limited number of variables have been proposed that may influence students' academic achievement. The indicators selected vary slightly between countries. However, the variables were chosen by taking into consideration which factors are seen as the best predictors of academic success and can best explain the observed variances in academic performance; which factors may be most relevant for the analysed reforms; and which factors are seen by existing research as being important to academic performance. The variables used for cross-country comparisons are presented in the table below.

TABLE 6. MAIN VARIABLES

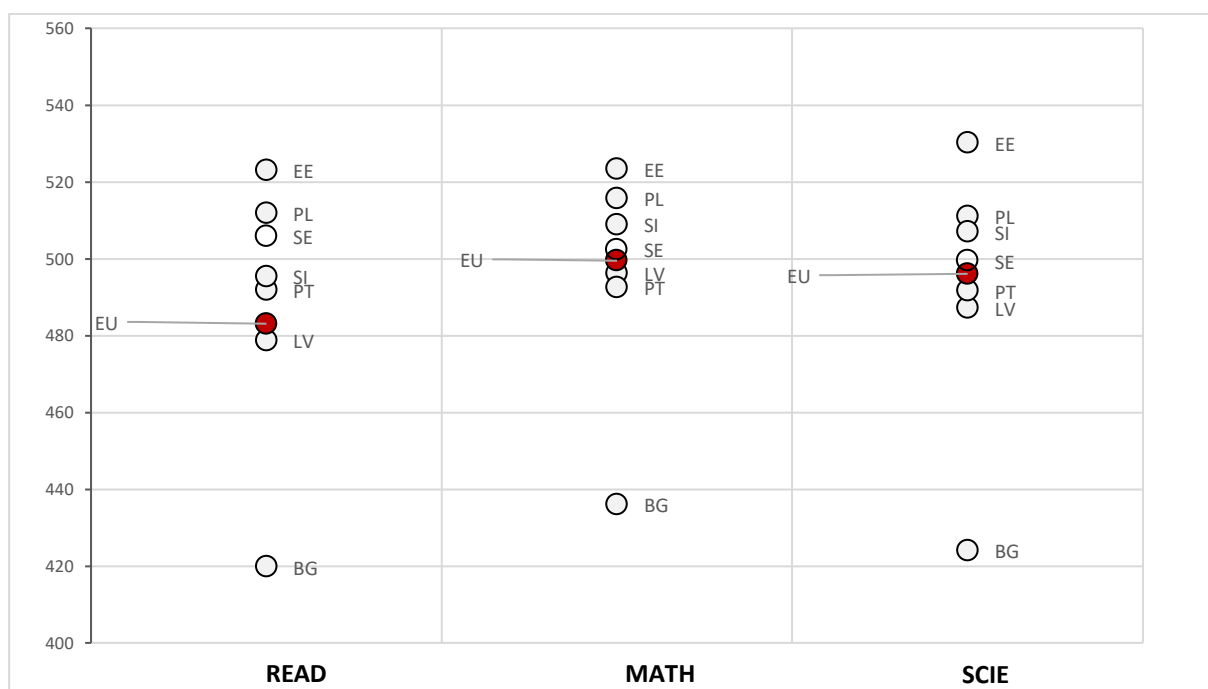
Code of variable	Name of variable	Short explanation
Performance variables (later used as dependent variables)		
READ	Performance in reading	Average performance of 15-year-old students in reading, as measured by PISA.
MATH	Performance in mathematics	Average performance of 15-year-old students in mathematics, as measured by PISA.
SCIE	Performance in science	Average performance of 15-year-old students in science, as measured by PISA.
Individual or school characteristics (later used as independent variables)		
ESCS	Student economic, social and cultural status	ESCS is calculated on the basis of several questions from the students' survey (including the highest parental education and home possessions), and reflects the socio-economic background of students, with positive values indicating a higher background.
NONNATIVE	Students' non-native status	Shows whether or not a student was born in the country of assessment (presented as the share of students not born in assessment country).

⁹ Since all three domains show the same trends in academic segregation, the team has chosen to use maths as an example. Mathematics achievement is, at student level, the primary factor leading to grade repetition, to separate tracks, and therefore to segregation.

REPEAT	Students' status with regard to grade repetition	Shows whether a student has repeated a grade at any point in their education (presented as the share of students who repeated a grade).
VOCAT	Vocational or academic track chosen	Shows whether students are attending a general, pre-vocational or vocational education track (in education systems where students are already streamed into different paths at the age of 15) (presented as the share of students in vocational education).
ISCEDo	Participation in ECEC	Shows whether a student attended ISCED o for at least one year (presented as the share of students who attended ECEC).
School segregation	Academic school segregation in mathematics	Shows whether students with similar characteristics (similar level of academic performance in mathematics) tend to be clustered in the same schools

The figure below presents an overview of the mean PISA performance of the selected countries in all three domains against the EU average.

FIGURE 1. MEAN PERFORMANCE IN ALL THREE DOMAINS IN SELECTED COUNTRIES IN 2018



Source: authors' analysis based on OECD database, PISA 2018.

Note: The mean performance for 2018 shows the average of the performance of all students in a country or the EU. The axis on the left indicates a score in the PISA assessment

Figure 1 shows that **four out of the seven countries (Estonia, Poland, Slovenia, and Sweden) performed better than the EU average in all three domains**. Portugal was above the EU average in reading, but below it in mathematics and science. This means that the education systems in these countries provide opportunities for most students to gain the necessary basic skills in reading, mathematics, and science. Such a situation may be a result of well-designed education systems in these countries, and the effect of some of the reforms presented in Chapter 3, such as the 1999 education reform in Poland or Estonia's strong focus on national assessments since 1996. The two remaining countries

(Bulgaria and Latvia) were below the EU average in all three domains. This shows that these countries may still face important challenges in their education systems, despite the changes so far implemented.

The literature shows that several variables relating to students' backgrounds may influence academic achievement. **The socio-economic status of the student's family is often cited as the most significant factor explaining students' success** (Deckers, Falk, Kosse, Pinger, & Schildberg-Hörisch, 2017). Even though its effect may differ when interacting with other variables, including school factors, ethnic background or area of residence (Sirin, 2005), socio-economic inequality, particularly in the socio-economic background of a student's family, is often shown as a critical factor in academic achievement (Schulz, 2005). Consequently, Economic Social and Cultural Status (ESCS), an index of socio-economic status presented in PISA dataset, is included as an influential variable in the statistical analysis. According to existing studies, gender may (for various reasons, including pre-existing gender stereotypes) explain differences in academic performance, forming a **gender gap** (Spinath, Eckert, & Steinmayr, 2014). This justifies the inclusion of gender as a factor in the statistical analysis. Aspects relating to cultural and language diversity also play a role in student performance. For instance, some students with **migrant backgrounds** may face a language barrier, which can significantly affect their academic performance (OECD, 2019, a, p. 70), making it important to consider this in the statistical model. The analysis of variables relating to these individual characteristics is also crucial to better understanding the conditions under which reforms are implemented, which are further discussed in the country chapters in Chapter 3. Some of the reforms presented focus on the equity and inclusiveness of the education system, and attempt to tackle the effect these background variables have in determining the academic performance of students.

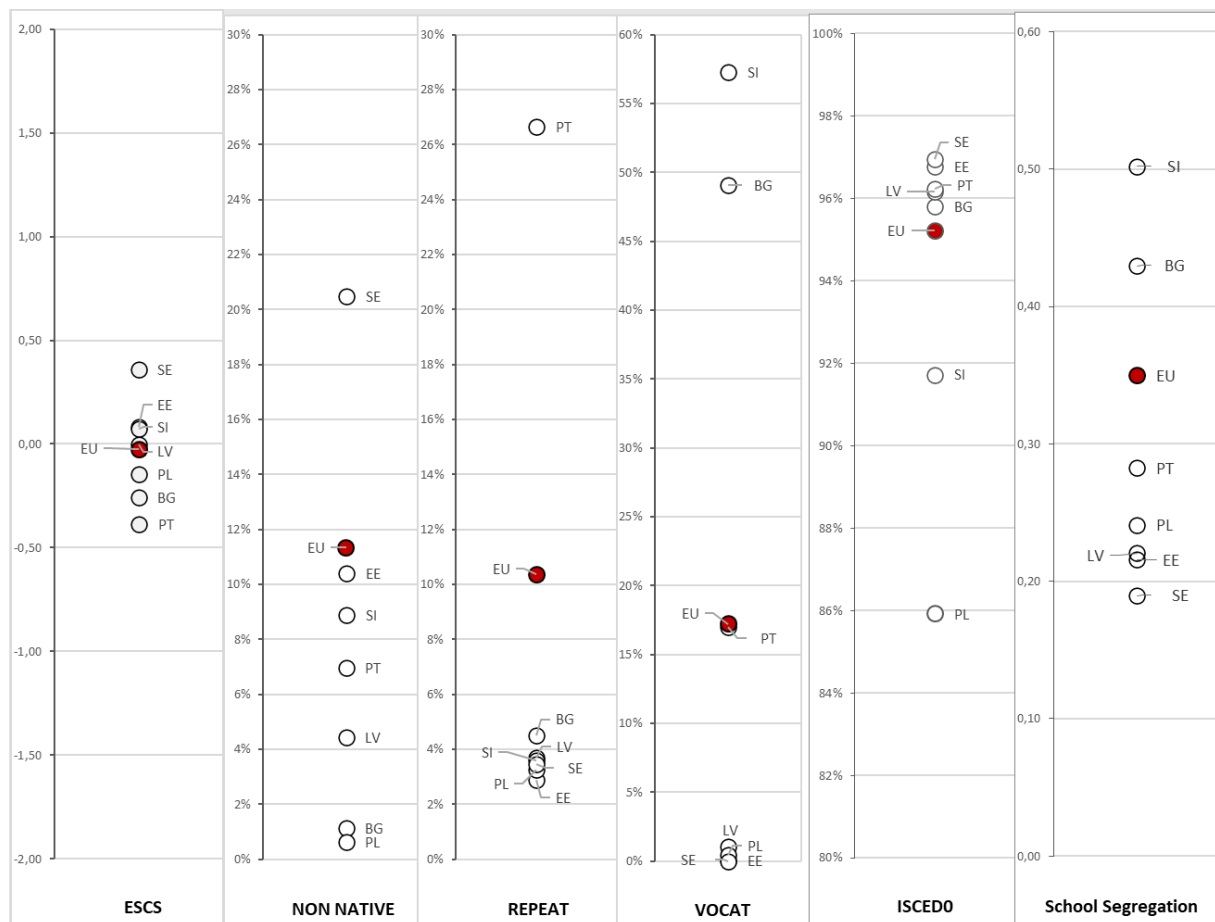
The academic path taken by students was also shown to be as important to academic achievement as background factors (Hanushek & Wößmann, 2006). More specifically, **placing students into different tracks has been demonstrated to affect students' academic success**. Depending on which track (academic or vocational) students choose, or are placed to, their opportunities to learn may differ, especially with respect to the knowledge and skills that are assessed by PISA. Existing research on tracking and streaming indicates that grouping students into different classes or offering them different instructional programmes may negatively affect equity in education, especially when combined with socio-economic disadvantage (Eurydice, 2020, c). **Grade repetition** tends to be associated with lower levels of academic achievement (Brophy, 2006). According to the PISA 2018 results, countries with higher rates of grade repetition generally showed lower mean performance in PISA. (OECD, 2020, a). Consequently, a variable showing grade repetition is also included in the statistical analyses in this study. However, it is important to bear in mind that low achievement patterns among students who have repeated a grade are often associated with poverty and the low socio-economic level of a school (Brophy, 2006), which further points to the significance of socio-economic status in determining students' success. Other measures such as **extensive early childhood education and care** have been noted to have a positive impact on equity in education. Research shows that high-quality early childhood services contribute to children's positive socio-emotional development and later social outcomes, such as a reduction in negative social behaviour. Furthermore, the benefits of early participation in good-quality ECEC lead to stronger academic skills (Ansari, Pianta, Whittaker, & Ruzek, 2019). It is crucial to better analyse the variables relating to the academic paths of students as some of the reforms focus on, for example, reducing grade repetition or increasing access to ECEC. It is important to understand the potential effect these variables have, as well as how many students are affected by, for example, grade repetition or a lack of access to ECEC, in order to better recognise the need for such reforms and their potential scope and effect.

Lastly, students' academic performance is also affected by the school environment. Existing studies show that the socio-economic status of students' peers (in other words, the **school's socio-economic composition**) may have a significant effect on students' academic achievement (Suna, Tanberkan, Gür, Perc, & Özer, 2020). Consequently, school socio-economic composition is included in the statistical analyses presented. Moreover, **school segregation**, including socio-economic, ethnic, or academic segregation (see Section 1.3.4) negatively affects students, as it reinforces ethnic and socio-economic inequalities (Drake, 2017). Existing studies also show that various factors related to **school climate** affect academic students' performance (Kotte, Lietz, & Lopez, 2005). Factors that affect students positively include a cooperative learning environment, a supportive peer culture (Barber, Eccles, & Stone, 2001), adequate provision of support from teachers, and a bullying-free climate (Phillips, 2007). A school's disciplinary climate is another important component of school environment. While some of the causes of a poor disciplinary setting can be determined by the individual factors of students (their behaviour), a school's disciplinary environment is also closely linked to institutional aspects such as the overall preparedness of teachers, student-teacher ratio, good-quality school leaders, and so on (OECD, 2020, b, p. 14). Hence, the statistical analyses presented in this study include several variables from the PISA dataset that relate to school climate.

Figure 2 presents an overview of the indicators that are seen as the best predictors of academic performance, or are relevant to the reforms analysed in the selected countries. These variables are later used in regression models for the seven countries both comparatively and individually, which are further complemented by additional relevant variables (such as gender, disciplinary school climate, or instruction time spent on mathematics)¹⁰.

¹⁰ At country level, these variables do not vary significantly between countries. The greatest variation is observed between schools or between students. Consequently, they are not presented here, but are analysed thoroughly in the chapters on individual countries.

FIGURE 2. TRENDS IN THE SELECTED COUNTRIES IN RELATION TO SELECTED VARIABLES



Source: authors' analysis based on OECD database, PISA 2018.

Note: please consider each variable separately when reading this figure, as the scales differ from one variable to another. The ESCS graph shows the average economic social and cultural status in a country. The graph for the NON NATIVE variable presents non-native students as a share of the student population. The graph for the REPEAT variable shows the share of students who repeated a grade. The graph for the VOCAT variable shows the share of students in the vocational education track out of all assessed students. The graph for the ISCEDo variable shows the share of students who attended at least one year of ECEC before compulsory primary education. The graph on school segregation shows how segregated a school system is (0 being not segregated at all, and 1 being completely segregated); if the value is closer to 1, it means that the students with similar characteristics tend to be clustered into the same schools. The school segregation (in mathematics) presented in this figure may slightly differ from the OECD computation because the student weight is used at both student and school level, while the OECD used distinct weights at the two levels.

The socio-economic status of students in the seven countries analysed differs markedly from country to country. The student populations also differ in terms of their homogeneity: while in some countries, most students are native, in others the number of students born in a different country is fairly high. In some EU countries, a high level of immigration is associated with a lower average socio-economic status across the population. Among the selected countries, Portugal has a low ESCS (the lowest of the selected countries) and a fairly high share of non-native students (7%) (though still below the EU average – 11.2%). Sweden has both the highest rate of non-native students and the highest mean level of ESCS. Conversely, Bulgaria and Poland have both low mean ESCS and low immigration rates. Moreover, the populations of immigrant students may be heterogeneous across countries, composed of both students who have mostly been educated in the host country, as well as those who have only recently joined the educational system of the host country. It is important to keep all of these facts in mind when considering the contexts in which the education reforms in different countries have taken place.

In six of the seven selected countries, the share of **students who had to repeat a grade** in 2018 was low (between 2 and 5%), and significantly below the EU average. Portugal was the exception, with a repetition rate above 25%. As noted above, grade repetition, which is often associated with poverty and the low socio-economic status of a school, is linked with lower levels of academic achievement (Brophy, 2006). This shows that Portugal's overall performance in PISA may have been hindered by the country's inability to ensure the successful progression of students. It also shows that while in other countries, measures to tackle grade repetition may not result in significant improvements in students' overall academic performance (due to the already small number of students repeating a grade), such measures are necessary in Portugal and could be very effective. It is not surprising, then, that measures to tackle grade repetition are one of the recent (and relatively successful) programmes in the Portuguese education system, which is also analysed in Section 3.5 [on Portugal](#). Such programmes in Portugal target a large number of students (as the number of students repeating a grade is high), so an improvement in their academic performance is likely to affect the country's overall academic achievements.

In terms of vocational education, four of the countries analysed (Estonia, Latvia, Poland, and Sweden) had very low shares of 15-year-old students enrolled in the vocational track in 2018. In all of these countries, students are usually streamed into different education tracks (academic and vocational) in a later school year than the age at which they participate in PISA. Consequently, this variable does not provide any useful information. This is also a reason why reforms tackling VET education were not considered in the analysis of these countries. However, while the effect of such reforms in these countries cannot be observed from the PISA data, this does not mean that they did not contribute to improvements in education quality in these countries. At the same time, Portugal's rate was statistically equal to the EU average (17.2%), and the two remaining countries (Bulgaria and Slovenia) had higher rates of students in VET, above the EU average. This is due to the fact that students in these countries are streamed into different educational tracks (academic and vocational) before they reach the age of PISA assessment (15 years). Consequently, the effect of reforms focusing on VET in these countries could be observed in PISA. Moreover, because Slovenia has an exceptionally high share of students attending the VET track (as seen in Figure 2), measures aimed at ensuring quality and equity in VET education in Slovenia are likely to be exceptionally important and necessary. Some of the measures recently introduced are presented in Section 3.6 on Slovenia.

With regard to **access to Early Childhood Education and Care (ECEC)**, in five out of the seven selected countries (Bulgaria, Estonia, Latvia, Portugal and Sweden), the share of 15-year-olds who report having attended ECEC for at least one year before beginning obligatory primary education was statistically equal to or slightly above the EU average. Only in two countries (Poland and Slovenia) was this rate below the EU average. Nevertheless, when speaking of ECEC attendance as measured by PISA, it is necessary to remember that the rates correspond to the share of 15-year-olds students who in 2018 declared that they had attended ECEC when they were younger (i.e. in 2009). Consequently, the PISA data on ECEC refer to the situation in the past, may be affected by self-reporting bias, and therefore may differ from the national data that measures ECEC attendance by looking at the number of children who attend ECEC at a given point in time as a share of all children in that specific age group. While these data should be treated with caution, they indicate that Bulgaria, Estonia, Latvia, Portugal, and Sweden have a strong focus on ECEC and education from an early age, which can result in the better academic performance of students in the future, as indicated by existing evidence. However, the data also show that while students in Poland and Slovenia perform relatively well on average, these countries could still benefit from further increasing participation in ECEC.

Higher values for academic segregation point to higher levels of segregation in the school system. Across the EU, average academic segregation is 0.35 (meaning that 35% of the differences in mathematics¹¹ performance among EU students in 2018 can be explained by the schools that students attend). The school systems in five out of the seven countries selected for this study (Estonia, Latvia, Poland, Portugal and Sweden) were less segregated than the EU average (i.e. their school segregation values in 2018 were below the EU average of 0.35, indicating that they are more equitable education systems. The lowest rates are observed in Sweden and Estonia. This indicates that these education systems are somewhat equitable, and that attendance at a specific school has little effect on the academic performance of Swedish and Estonian students. However, as will be discussed in Section 3.7, equity indicators in Sweden have been worsening, and segregation of schools according to the SES and ethnic backgrounds of their students remains a potential challenge for the country's future. Conversely, in Bulgaria and Slovenia, academic segregation is high. With a value of 0.50 in 2018 (meaning that 50% of the differences in mathematics performance among Slovenian students can be explained by the school they attend), the Slovenian education system was the most segregated among the seven countries selected, and the third most segregated system across the entire EU. This means that academic segregation may be one of the key challenges for Slovenia's education system, and that interventions to tackle school segregation by ensuring equal access to quality education for all are crucial. One such reform, at least to some extent, has been a change in the VET curriculum in Slovenia aimed at improving the quality of vocational education to make it more comparable with the quality of academic education (for more information, see Section 3.6.3.2). Academic segregation, along with other indices of segregation, will be discussed in greater depth in each of the country-specific sections (see Chapter 3).

2.2.2. Factors influencing students' performance in the selected countries

To measure the effect of selected factors at individual and school level on the success of students in PISA, a multi-level regression was conducted. These variables may not differ significantly at country level between the selected countries, but differ from student to student on an individual level, and are important predictors of students' academic performance. Consequently, even though the trends in these variables (such as gender) at country level are not presented through the descriptive statistics above, they are included in the multi-level regression analysis, which aims to determine what specific individual and school level factors affect the academic performance of students in different countries. The most important variables included in the multi-level regression model are presented in the table below.

TABLE 7. VARIABLES INCLUDED IN THE MULTI-LEVEL REGRESSION MODEL

Code of variable	Name of variable	Short explanation
GIRL	Student gender	Shows whether a student is a girl (variable value is 1) or a boy (variable value is 0).

¹¹ Only school segregation in mathematics is presented, in order to avoid redundancy due to too much similar information. It was decided to focus on mathematics because academic performance in mathematics appears to be the most important domain in terms of grade repetition and the choice of educational tracks, which then lead to segregation.

ESCS	Student economic, social and cultural status	ESCS is calculated on the basis of several questions from the student survey (including the highest parental education and home possessions), and reflects the students' socio-economic backgrounds, with positive values indicating a more advantaged background.
NATIVE	Student's native status	Shows whether a student is born in the country of assessment (variable value is 1) or not (variable value is 0).
REPEAT	Student's status with regard to grade repetition	Shows whether a student has repeated a grade at any point in their education (value of 1) or not (value of 0).
VOCAT	Vocational or academic track	Shows whether students are following an academic track (variable value is 0), or pre-vocational or vocational education track (variable value is 1).
PLUS ₄ MATH	Number of mathematics lessons per week	Shows whether a student has more than four lessons of mathematics per week (value of 1) or not (value of 0).
DISCLIMA	Students' perceived disciplinary climate in school	Shows whether the school's disciplinary climate is perceived positively or negatively; disciplinary climate is assessed via five different items and is measured using IRT scale.
PERCOOP	Perception of cooperation among students	Shows whether students think they cooperate with each other or not; measured using IRT scale.
SCH_ESCS	School's mean ESCS	Arithmetic average of ESCS value of all students at the school.
SCH_DISCLIMA	School's mean disciplinary climate	Arithmetic average of disciplinary climate variable for all students in the school.
SCH_PERCOOP	School's mean perceived cooperation	Arithmetic average of the variable showing perceived student cooperation for all students in the school.

The summary results of multi-level regressions for each country are presented in the table below. The numbers in the table refer to the effect¹² on students' performance in mathematics of each of the main variables of interest. The penultimate line of the table presents the percentage of between-school variance¹³ explained by the regression model, while the last line shows the intraclass coefficient, which is the variance between schools divided by the total variance (between and within schools). This table presents a short overview of the most important factors affecting student performance in different countries. In-depth analysis and individual multi-level regression models focusing on each country are presented in the sections on each country.

TABLE 8. RESULTS FROM THE MULTI-LEVEL REGRESSION ON THE SEVEN SELECTED COUNTRIES

	Bulgaria	Estonia	Latvia	Poland	Portugal	Slovenia	Sweden
GIRL	-14,3*	-11,6*	-13,3*	-10,2*	-23,7*	-24,1*	-7,6
ESCS	10,8*	16,0*	15,7*	22,7*	10,3*	3,7	20,9*

¹² 'Effect' refers to the regression coefficient of each variable on the dependant variable (here, performance in Mathematics). It means that changing the category in one variable (e.g. being a boy or a girl, attending vocational or academic track, being from a more advantaged socio-economic background) comes with a difference in performance indicated by the regression coefficient. If this coefficient is negative, it means that an increase in an independent variable will result in a decrease in the dependent variable. For example, in Bulgaria, the coefficient for GIRL is -14.3, which means that if the variable is equal to 1 (student is a girl), a student's performance in mathematics will be, on average, 14.3 points lower than if the variable is equal to 0 (student is a boy).

¹³ School variance refers to the share of the variance in student performance that lies between schools (not at student level). In most countries, (and particularly in segregated countries), variance between schools is greater than variance within schools, between students.

NATIVE	-1,5	15,9*	6,0	12,6	23,7*	26,0*	36,7*
REPEAT	-35,3*	-47,5*	-64,0*	-86,6*	-107,5*	-63,6*	-46,4*
VOCAT	-10,2	n.a.	n.a.	n.a.	-42,9*	-26,4*	n.a.
PLUS ₄ MATH	3,3	14,9*	22,1*	3,5	21,6*	-9,6	n.a.
DISCLIMA	3,5	6,7*	7,2*	4,1*	4,3	6,7*	6,0*
PERCOOP	3,9	3,2	3,8	3,8	2,2	2,9	0,0
SCH_ESCS	46,8*	27,9*	36,3*	42,3*	15,0*	66,6*	25,2*
SCH_DISCLIMA	22,4*	5,7	-7,0	4,6	5,1	13,6*	20,8*
SCH_PERCOOP	26,5*	26,4*	11,2	3,5	0,6	17,1*	14,1*
% of explained BS variance	15.1%	69.0%	62.1%	66.3%	81.0%	66.5%	70.9%
Intraclass coefficient (rho)	16.8%	7.1%	9.4%	6.8%	4.8%	9.7%	5.9%

* The effect is statistically significant (at the significance level 0.05). For an explanation of the variables, please see Annex 2 – Methodological approach, Section 2.1.3. Variables used for statistical analysis.

Note: continuous variables have been standardised for all seven countries to allow comparison of the strength of the effects between countries. However, this means that the values of the fixed effects cannot be compared between independent variables.

Different percentages of between-school variance can be explained by the regression model in each country. While the input of the variables' into the model explains more than 80% of between-school variance for Portugal, only 15% are explained in Bulgaria. This means that, in Bulgaria, the largest part of the performance differences between the schools is explained by variables other than those selected in this model. While the importance of the factors included in the model are highlighted in the available academic literature presented above, in Bulgaria, not all of them factors are important. Explanations vary as to why certain variables do not affect academic performance. For example, the population in Bulgaria is fairly homogenous, meaning the number of students with migrant backgrounds is small, resulting in the migrant background variable being irrelevant for predicting students' academic performance. As presented in Section 3.1 on Bulgaria, the individual and school-level variables that are most important to a students' academic performance include their gender, socio-economic background, the socio-economic status of their schools, and the school climate (disciplinary school climate, sense of belonging, level of bullying). Conversely, for the six remaining countries, these variables are good predictors of between-school variance in performance in mathematics. The country-specific portions of this report (Chapter 3 and Annex 1) further explore the specific variables country by country, as well as analysing additional variables that may be relevant in a particular country context.

Several important observations can be made in relation to the results of the multi-level regression analysis. In terms of gender, in all countries except Sweden, **boys perform significantly better in mathematics than girls, all other variables being equal**. The strongest effects are observed in Portugal and Slovenia, where boys' mean performance in mathematics is about 24 points higher than girls' mean performance (a quarter of a standard deviation). This indicates that the teaching methods used in Portugal and Slovenia may favour boys over girls, or that other challenges to equity exist in these education systems. This finding means that measures to ensure a more individualised approach to education in these countries could significantly contribute to improvements in the education system. These findings also highlight that future reforms to the education systems need to consider the fact that, while specific pedagogical tools might work for a certain group of students, they may not be as effective for others.

Students' ESCS has a positive significant effect on the academic performance of students in all countries except Slovenia. The value of this effect can be interpreted as the mean increase in the performance in mathematics that would result from an increase of one point on the ESCS scale. In Estonia, for example, if a student's socio-economic

condition improves by 1 on the ESCS scale, their PISA score in mathematics should increase by 16 points, all else being equal. The socio-economic status of the school also has a positive effect on academic performance in all seven countries, subject to the student's ESCS. On average, students of identical socio-economic status are more likely to perform better if they attend a school with a more socio-economically privileged population than those who attend a school with a more socio-economically disadvantaged population. Unsurprisingly, the effect is larger in the most segregated systems (Slovenia, Bulgaria) than in those with lower between-school variances (e.g. Latvia or Sweden). As the effect on the academic performance of students of individual or school-level socio-economic status tends to be significant and fairly large, it is clear that measures aimed at mitigating these existing inequalities could improve educational achievement not only for students from more disadvantaged backgrounds, but also on average at country level. These measures could include the re-organisation of the school network to improve the quality of education offered across schools, or the provision of additional support to disadvantaged families, among other measures. These findings also show that new measures should take into account existing socio-economic inequalities to ensure more equal educational opportunities.

In Estonia, Slovenia, Portugal and Sweden, native students are more likely to perform better than those born in a country other than the country of assessment, all else being equal. This indicates that migrant students tend to be at a disadvantage, and that reforms should prioritise equity and inclusion. The non-significant effects in Poland, Bulgaria and Latvia are explained by the small share of non-native students in these countries. This means that while past or current changes do not necessarily have to account for inequalities between native and migrant students, the situation should still be carefully monitored to ensure that if the number of migrant students in the country changes and this affects their academic performance, future changes to the education system should take this into account.

It can also be seen that grade repetition has a significant negative effect on the academic performance of students in all seven countries. While this factor should still be considered by policy-makers, it is important to note that, as mentioned above, the share of students repeating a grade in all countries except Portugal is relatively low. The rate in Portugal is the highest in the EU, and its negative effect on academic performance is the greatest among the seven selected countries. As can be seen from the results of the multi-level regression model, if a student has repeated a grade during their academic career, their mathematics performance in PISA will be 107.5 points lower than that of students who did not repeat a grade. This may indicate that in Portugal, grade repetition is especially detrimental to academic success and affects a large share of students. Consequently, reforms tackling grade repetition may have a large positive effect not only on those students who directly benefit from such reforms, but also on Portugal's academic performance in general. Similar reforms in other countries are likely to have smaller effect. However, this does not mean that they are ineffective for the students they target. Country-level analysis (see Chapter 3) considers these gaps in relation to the frequency of grade repetition, as in some countries, grade repetition is quite rare.

Attending a vocational track has a significant negative effect on student PISA performance in Portugal and Slovenia. In Slovenia, for example, students on a VET track will score 26.4 points less in mathematics assessments in PISA than students following an academic track. This means the country needs educational reforms that focus on improving the quality of VET education. Some such reforms have already taken place, and are presented in Section 3.6. Despite the reforms already in place, the effect on academic performance of the track a student follows remains significant. This may indicate that further changes are needed. This does not, however, diminish the importance of the reforms already implemented, or their effectiveness. **Conversely, in Bulgaria, the effect**

of which track a student follows is not significant. This means that under the control of different variables of the model, pursuing a vocational track does not influence students' mean performance in mathematics in Bulgaria. In the other analysed countries (Estonia, Latvia, Poland and Sweden), students are streamed into different tracks at a later age; thus, 15-year-old students in these countries are still in comprehensive education and enter different tracks only after they participate in PISA.

The decision was taken to include having more than four lessons of mathematics per week as an independent variable in the multi-level regression equation, due to existing evidence from the literature that greater instruction time contributes to higher achievement. Existing studies show that the time spent for certain subjects is directly connected to an "opportunity to learn", and thus, having more time to study as a result of a higher number of classes positively contributes to students' academic performance (Schmidt, et al., 2001). Having more mathematics lessons may also be connected to following an academic track or a more "elitist" and more academically focused programme. In mathematics, the time spent on the subject each week is especially closely related to higher academic performance. **Having more than four periods of mathematics per week has a significant positive effect on student performance in maths in Estonia, Latvia and Portugal.** In these countries, subject to other variables in the model, 15-year-old students who have more lessons of mathematics perform better in mathematics than those who do not. This indicates that education reforms in these countries should consider how lesson time can be better used to ensure higher-quality learning, as has been achieved by curricular reform in Estonia (for more information, see Section 3.2.3.2), or by ensuring that the amount of time spent on mathematics does not differ significantly between schools. Conversely, this variable does not have a significant effect in Bulgaria, Poland or Slovenia.

The disciplinary climate also influences the students' mean performance in mathematics. **In every country except Portugal, the disciplinary climate variable at individual or school levels (or both) affects students' academic performance.** In all of the countries analysed, a favourable disciplinary climate in the school a student attends has a positive effect on student academic performance in mathematics. This should be taken into account in the implementation of reforms that directly or indirectly affect school climate. For example, the changes introduced in Portugal in 2018 to ensure the greater inclusion of students into decision-making processes in school management is likely to positively affect the disciplinary climate in schools, and subsequently contribute to higher achievement. A focus on assessments, as introduced in Estonia, Sweden, Bulgaria and other countries, on the other hand, may indirectly negatively affect the disciplinary climate in schools, if the assessment is accompanied by a culture of punishment. Some of these reforms (those whose effects can be traced in PISA data) will be presented in further detail in the country overviews in Chapter 3. The overall indication is that the (indirect) effects that various reforms may have on the disciplinary climate in schools should be considered when planning such reforms.

Perceived cooperation at an individual level had no significant effect on students' performance in mathematics. However, the perceived cooperation between students at a school level affected academic performance of students in Bulgaria, Estonia, Slovenia, and Sweden. This means that in these countries, students tend to perform better in mathematics if schools promote a collaborative culture. This indicates that cooperation among students and among school staff may be important to the performance of students in these countries, and that education reforms in these countries that focus on teaching and management practices should consider the potential effects on cooperation in schools.

This overview of the effects on students' performance in mathematics of various individual and school-level factors provides a comparative picture of the context in which education reforms in the analysed countries take place. The analysis also highlights what reforms and changes may be needed in which countries, as well as shedding more light on the rationale behind those reforms already implemented, which are presented in the country-specific sections in Chapter 3.

3. Country PISA stories

This chapter provides a detailed picture of the pathways taken by the seven selected countries towards improvements in PISA performance over time across different subject domains, taking into account equity and inclusion indicators. Each section begins by presenting important aspects of the country's educational context. This is followed by a detailed look at the country's PISA trends over time, based on descriptive statistics. This section also aims to identify a number of policy reforms that may possibly have had a positive impact on students' academic performance or on equity in the country. For this, the research team considered the specific time frame during which a positive change has been observed, and verified whether the effects associated with the reform can be found consistently in the PISA data (across several cycles). This serves as a confirmation that the reform has actually been implemented, and that it has had an effect (e.g., the introduction of a compulsory pre-school year should lead to an increase in the percentage of students who have attended ECEC in subsequent PISA cycles). The analysis then focuses on the potential impact of the selected reforms using complex statistical models (such as DiD and PSM methods), where the conditions for the application of such methods are met. This is further contextualised via consultations with relevant stakeholders in each country¹⁴, providing insights into what can explain the proven or perceived success of the reforms (i.e., the key enabling factors).

3.1. Bulgaria

Educational context and key policy issues

Over the last two decades, the academic achievements of Bulgarian students have remained significantly lower than those of students in other EU countries (OECD, 2019). Consequently, Bulgarian policy makers have focused on improving the quality of the country's education system through various measures. These measures include the introduction of matriculation exams in 2005; standardised national assessments in 2007; financial decentralisation since 2007; and a greater focus on quality assurance in the education system since 2016, to name a few. However, many challenges remain. At the end of their compulsory education, almost half of students in Bulgaria lack basic skills in reading, mathematics and science (OECD, 2019). Moreover, Bulgarian authorities face challenges in mitigating the risk of future teacher shortages, as the teacher population is ageing. In the school year 2020/2021, 50% of teachers were over 50 years old, and only slightly more than 6% of teachers were younger than 30 (Republic of Bulgaria National Statistical Institute, 2021, b). Teachers' salaries in Bulgaria are also among the lowest in the EU. For the school year 2019/2020, the starting salary for schoolteachers in Bulgaria was EUR 6,657 per year (Eurydice, 2021, s). This may discourage young people from joining the teaching profession. However, while salaries may still be too low to attract young talents, it is important to note that Bulgarian authorities have put a great deal of

¹⁴ The research team wants to thank the national stakeholders for their participation in consultations and contribution to this study. The Bulgarian expert wants to acknowledge the participation of the Bulgarian stakeholders – Evgeniya Kostadinova, Director of the Pre-school and School Education Contents Directorate at the Ministry of Education and Science; Neda Kristanova, the head (director) of the Centre for Assessment of Pre-school and School Education; Natalia Vassileva, chief expert at the Centre for Assessment of Pre-school and School Education, national coordinator for Bulgaria in PISA; Svetla Petrova, PhD, Institute for Research in Education, National Coordinator for Bulgaria in PISA from 2006 till 2017. The Portuguese expert would like to acknowledge the participation of the Portuguese stakeholders in the data collection phase – António Teodoro (CeIED, Universidade Lusófona de Humanidades e Tecnologias) David Justino (FCSH, NOVA University of Lisbon) Domingos Fernandes (ISCTE, University Institute of Lisbon) Maria de Lurdes Rodrigues (ISCTE, University Institute of Lisbon) Nuno Crato (ISEG, University of Lisbon; Iniciativa Educação) Rui Trindade (FPCEUP, University of Porto). Respecting their privacy, the research team is not naming the stakeholders from other countries.

effort into improving the situation. The starting salary for teachers almost doubled between 2017 and 2021, and the average wage of teachers is 11% higher than the national average (European Commission, 2021, a). Strengthening professional development systems is also an area in which Bulgarian authorities have focused in recent years, but many challenges remain. Despite recent efforts to improve teacher training, this still focuses to a large degree on theory, and often disregards innovative pedagogical practices. The continuous professional development on offer is insufficient and inconsistent (European Commission, 2020). Unless greater investment and effort are directed towards attracting young people into the teaching profession, the result in the future may be a shortage of teachers and a further worsening of education quality¹⁵.

The inclusiveness and accessibility of education has also been a significant challenge for Bulgaria over the last two decades. While various measures and policies have been introduced to improve inclusion and access (such as a compulsory pre-school programme, the prevention of drop-out and re-integration of early school leavers, a strategy for the inclusion of ethnic minorities and other measures), their effectiveness appears limited. Socio-economic background remains an important factor explaining students' academic achievements, with majority students faring much better than those belonging to ethnic minorities (World Bank, 2019). Moreover, as mentioned in Section 2.2.1, average socio-economic status in Bulgaria is relatively low (the lowest in the sample), which may indicate a lower standard of living in the country. This means that many students may come from disadvantaged socio-economic backgrounds and require support. Consequently, unless the measures introduced are implemented on a large scale, their effect is likely to be limited.

The situation is further exacerbated by the relatively low level of funding directed towards education (3.5 % of GDP, compared with the EU average of 4.6 % in 2018) (European Commission, 2020). This share has been increasing, however. In 2019 it increased by 14% to reach 3.9 % of GDP (European Commission, 2021, a). Meanwhile, there has been a **lack of continuity in education policy** due to cyclical patterns of educational reforms linked to government changes after elections every four years (Totseva, 2014).

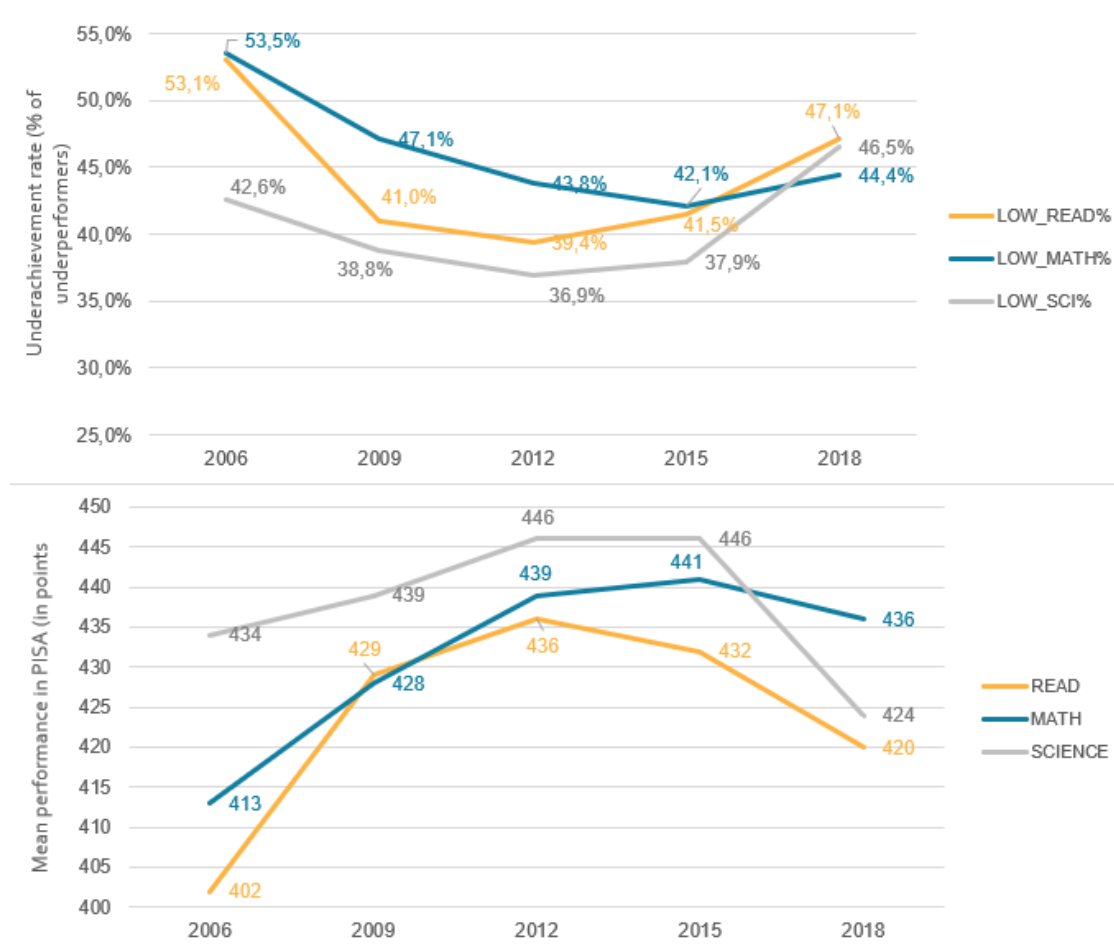
Key trends in students' performance

According to the PISA 2018 results, **almost half of 15-year-olds in Bulgaria lack basic skills in reading, mathematics or science** (European Commission, 2020). One in five pupils in Bulgaria are underachievers in all three domains (reading, mathematics, and science) (European Commission, 2019).

Even though Bulgaria performs worse than most EU countries, some positive changes can be observed over time. **Mean performance in all three domains increased between 2006 and either 2012 or 2015 (depending on the domain)**; however, this decreased again in 2018 (although it has remained higher than in 2006 for both maths and reading). The mean underachievement rate has followed an inverse trend: rates in all three domains decreased between 2006 and 2012/2015, and increased again in 2018 (see below).

¹⁵ Information gathered during consultations with relevant national stakeholders.

FIGURE 3. MEAN PISA PERFORMANCE AND UNDERACHIEVEMENT RATES IN BULGARIA 2000-2018



Source: PISA data.

Note: the graph presents the trends in mean student achievement in Bulgaria between 2000 and 2018, as well as variations in the mean rate of low-achieving students. No data are available for 2003, as Bulgaria did not take part in this PISA cycle.

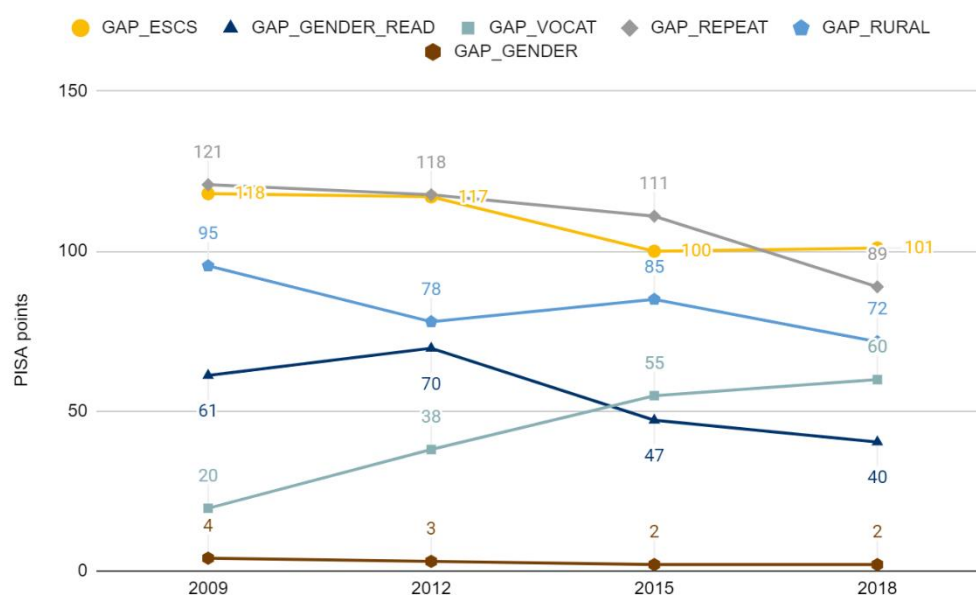
As in many other EU countries, student performance in Bulgaria continues to vary significantly according to the characteristics of students' backgrounds; however, **improvements have occurred across several inclusion indicators over time.**

The performance gap in mathematics between students from different socio-economic backgrounds (those in the highest and lowest quartiles for ESCS) decreased significantly between 2012 and 2015, and remained stable from 2015 to 2018. The narrowing of the gap in maths (between 118 in 2009 and 101 in 2018) is the result a small decrease in the results achieved by advantaged students (from 492 to 488, non-significant) and an increase in the scores of disadvantaged students (374 to 387, significant). However, the gap remains large and significant. The gender gap in reading also significantly decreased between 2012 and 2018. However, a decrease in the gender gap in mean reading performance is likely to be related to the change in PISA from paper-based to computer-based assessment. This trend is observed in the majority of the countries participating in PISA assessments, as boys tend to perform better on computer-based tests (OECD, 2016, b). Differences in performance between students living in urban and rural areas¹⁶ also diminished between 2009 and 2018, but remained high. The performance gap between students who had to repeat a grade and those who did not also shows a decreasing

¹⁶ City or urban areas are defined as having 100,000 residents or more, while a rural area or village is defined as having fewer than 3,000 residents

tendency between 2009 and 2018, though it has remained high and significant. In contrast, the performance gap between students in vocational and general schools increased significantly between 2009 and 2018 (see Figure 4). Further analysis indicates that this increase in performance gap mainly results from an improvement in the three domains among those students attending general education, while in vocational education, improvement was only observed in 2009, followed by a slow decline.

FIGURE 4. MATHEMATICS PERFORMANCE GAPS BETWEEN STUDENTS IN BULGARIA 2009-2018



Source: PISA data.

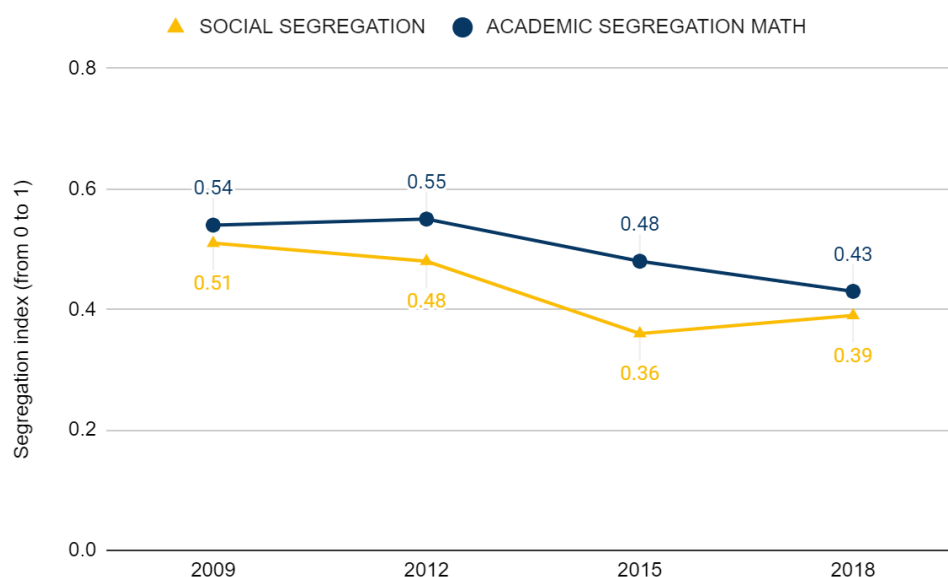
Note: the graph presents the trends in performance gaps in Bulgaria between certain categories of students (boys vs. girls; students in rural environments vs. students living in cities...) between 2009 and 2018. All gaps are presented as absolute values, so that the graph is easier to understand. However, all these gaps are actually negative (meaning a difference in favour of the most advantaged category of the comparison). While all the gaps relate to performance in mathematics (the most interesting domain for analysis), the gap between boys and girls in reading (GAP_GENDER_READ) is also presented, as the gender gap is usually larger in reading than in mathematics or science.

Positive trends can also be seen in addressing school segregation during the observed time period (2009-2018). Social segregation¹⁷ has decreased since 2009, with the largest fall between 2012 and 2015. Academic segregation¹⁸ in all three domains remained stable from 2009 to 2012 and decreased between 2012 and 2018, meaning that school factors had less influence on students' mean performance in 2018 than in 2012 (see Figure 5).

¹⁷ Variable SOCIALSEGR. For more information, see Annex 2 – Methodological approach, Section 2.1.3. Variables used for statistical analysis.

¹⁸ Variable ACADEMICSEGR. For more information see Annex 2 – Methodological approach, Section 2.1.3. Variables used for statistical analysis.

FIGURE 5. VARIATION IN SOCIAL AND ACADEMIC SEGREGATION IN BULGARIA 2009-2018



Source: PISA data.

Note: segregation index can have a value between 0 and 1. 0 means no segregation (none of the variance in performance between schools is explained by the school attended); 1 means complete segregation (the school attended can explain 100% of variance between schools).

While the performance gaps and school segregation rates have decreased, **educational outcomes remain more inequitable in Bulgaria than internationally**, pointing to the inability of the Bulgarian education system to ensure inclusion and correct existing social inequalities. The value that schooling brings to students whose mother tongue is Bulgarian is much higher than that provided to students whose mother tongue is, for example, Turkish or Romani (World Bank, 2019). This is an important challenge, given that around one in seven residents of Bulgaria do not consider themselves ethnic Bulgarians, and are likely to speak another language at home. According to the latest population census in 2011, 84.8% of Bulgarian residents self-identified as Bulgarians; 8.8% identified as Turkish; and 4.9% identified as Romani. The share of children who are not in the formal education system is much larger among ethnic minorities than for among who identify as Bulgarian. According to the national population census of 2011, 5.6% of Bulgarian children aged 7 to 15 years were not in school in 2011, compared with 23.2% of children of the same age who identifying as ethnically Roma, and 11.9% of children identifying as ethnically Turkish (Republic of Bulgaria National Statistical Institute, 2011). The analysis of inequalities between different ethnic groups observed from the student data gathered in formal education settings does not consider those children who are out of school, and therefore does not provide a full picture of educational equity in the country. Consequently, the inequalities observed may be only a conservative estimation of the reality. This should be kept in mind when considering the findings of this study.

Analysis of the effects of various individual and school level factors that may affect students' achievement conducted through the multi-level regression model¹⁹ using PISA 2018 data confirms these challenges with regard to inclusion. Socio-economically advantaged students and boys perform better than disadvantaged students and girls (see the figure below).

¹⁹ The model tested the effect on students' performance of individual background variables (gender and ESC); academic path variables (attending VET track); and school climate variables at both individual and school levels. Only the variables presented showed a significant effect. For more information, see Annex 1. Country Profiles, Bulgaria.

FIGURE 6. FINDINGS OF THE MULTI-LEVEL REGRESSION ANALYSIS OF PISA 2018 DATA FOR BULGARIA

Students in Bulgaria perform better in PISA (mathematics) if:



Source: multi-level regression analysis conducted for the study based on the PISA 2018 data. As mathematics is the most interesting domain in Bulgaria (given the positive trends in performance), all of the gaps presented are calculated for performance in mathematics.

Note: it is also important to bear in mind that, as discussed, a large proportion of students from ethnic minorities (23.2 % of ethnic Roma and 11.9 % of ethnic Turks, according to 2011 data) are not even in school, and are thus not represented in the PISA data and the regression analysis. Consequently, it is likely that ethnicity also plays an important role in determining the academic achievements of students, but because a large share of students from ethnic minorities do not participate in the PISA assessment, this is not visible from the analysis.

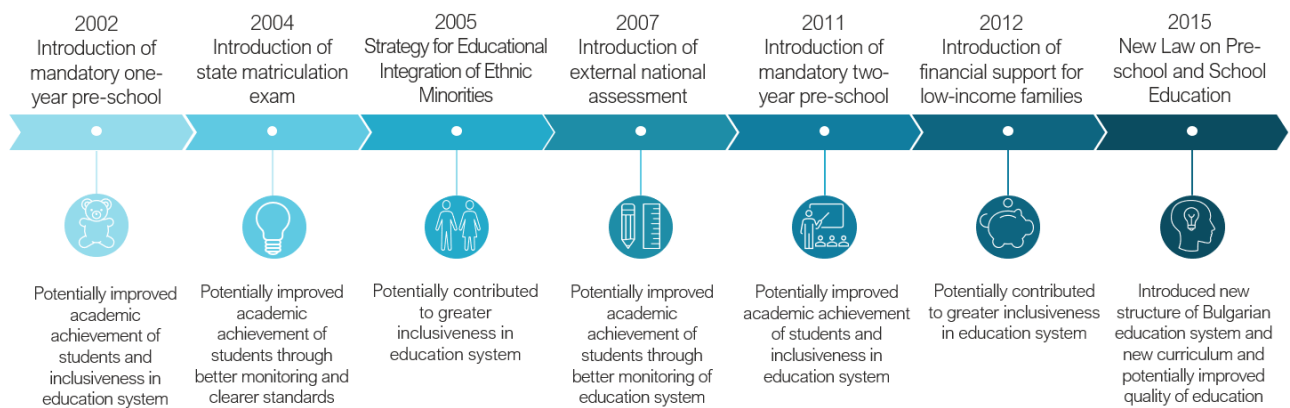
Key policies associated with the improvements observed

Despite the remaining challenges discussed above, Bulgaria has managed to somewhat improve its academic performance, as measured by PISA, over the years. In a nutshell, the most important positive changes observed are:

- An increase in students' mean performance between 2006 and 2012 (reading) or 2015 (math and science);
- A decrease in the gap between the lowest- and the highest-achieving students (with an improvement in the performance of low-achievers) until 2015 or 2018 (as the gap remained more or less stable between 2015 and 2018), in all three domains;
- A decrease in the ESCS gap between 2012 and 2018;
- A decrease in social segregation in schools between 2006 and 2015.

The issue at hand is to understand which specific reforms and developments in education system may have contributed to these improvements. While changes in education system do not happen in isolation, and a combination of different factors influence their outcomes, some reforms can still be identified as having a more pronounced positive effect on the quality and equity of education and, consequently, on students' academic achievement. Potentially influential education reforms in Bulgaria are presented in Figure 7.

FIGURE 7. REFORMS POTENTIALLY LINKED TO IMPROVEMENTS IN ACADEMIC ACHIEVEMENT IN BULGARIA



The reforms mentioned above address different aspects of the education system – early childhood education and care, assessment and monitoring, curricular and structural changes, inclusion and targeted support to vulnerable students. While all of these may have contributed to the observed improvements in the quality and equity of the education system in Bulgaria, the specific effects of certain reforms cannot be analysed in a rigorous way due to the cross-sectional design of assessment surveys and the lack of variables in existing datasets that can show the effects of the reform. Consequently, this country chapter focuses on two priority areas – ECEC, and assessment policy. These priority areas have been chosen due to the fact that the effect of reforms in these areas can, at least to some extent, be observed in the PISA data and in the existing academic literature, and a consultation with a stakeholder supports the findings with regard to the effect of reforms in these areas²⁰. According to the existing literature, quality early childhood interventions in education are likely to contribute to better educational outcomes for children in later years, especially those from disadvantaged backgrounds (Cunha, Heckman, Lochner, & Masterov, 2006). Meanwhile, the assessment system allows the monitoring of the quality of the education system, also contributing to better educational outcomes²¹.

3.1.3.1. Early childhood education and care (ECEC)

Key facts about ECEC

ECEC in Bulgaria is available for children from 10 months until they start primary school at the age of 7. During the last 20 years, Bulgarian authorities have focused on ensuring greater access to ECEC for all children. One of the policy measures implemented to ensure this is the introduction of one-year compulsory pre-school education (2002), the effect of which can be observed in PISA. A more detailed look at this reform is presented below.

²⁰ For more information, see Annex 1. Country Profiles, Bulgaria.

²¹ Information collected during an interview with a representative from the Ministry of Education.

BOX 1. OVERVIEW OF THE INTRODUCTION OF ONE-YEAR COMPULSORY PRE-SCHOOL EDUCATION (2002)

In the early 2000s, Bulgaria focused on improving its provision of ECEC. Decree No. 4 for Early Childhood Education, issued in 2000 by the Ministry of Education and Science, established national educational standards for early childhood education as well as preparation for primary school. These standards defined what knowledge, skills and attitudes children are expected to attain during early childhood education (Engels-Kritidis, 2012). In addition, since the early 2000s Bulgaria has focused on increasing access to ECEC for all children by introducing compulsory preparatory years of pre-school education.

In 2002, one year of compulsory preschool education was introduced before children start school. This change came into force in the school year 2003/2004. The policy-makers hoped that this change would enhance the importance of pre-school education and contribute to children's development (Engels-Kritidis, 2012). Moreover, the data from large-scale international assessments, such as PIRLS, showed that the children who attend ECEC achieve higher scores in assessments. Consequently, Bulgarian policy makers saw the introduction of compulsory pre-school as a way to improve the academic achievements of students and the country's performance in large-scale international assessments²².

Data show that as a result of this change, the participation of children from 4 years until the start of compulsory primary education increased from 73.2% in 2001 to 82.5% in 2005 (Eurostat, n.d., i). However, existing monitoring reports demonstrate that while the overall participation rate has increased, access has not been ensured equally for all the groups of children. This has resulted in greater exclusion for the most marginalised children, such as children from the Roma community (World Bank, 2009). This may explain why participation in ECEC has remained rather low (in 2019, 79.9% of children from 3 years old to the age of mandatory education were enrolled in ECEC (Eurostat, n.d., i)) even after mandatory preschool education was introduced. This marginalisation further exacerbated the situation of Roma community, as a lot of Roma children do not speak Bulgarian well enough to cope with learning in Bulgarian schools (Council of Ministers of the Republic of Bulgaria, 2010).

At the moment, ECEC is compulsory for children aged 5 years or older (two-year compulsory pre-school education was introduced in 2010). According to the law adopted in 2020, from 2023/2024, ECEC will be obligatory for all children aged 4 or older (Eurydice, 2021, a). Compulsory ECEC in municipal and state kindergartens and primary schools is generally free of charge, and parents are only asked to pay for additional meals and activities. Private kindergartens can charge a fee not larger than the maximum amount set by law (Eurydice, 2021, a).

Despite the fact that the government mandates municipalities to ensure free ECEC for all children of the age at which it is obligatory, the municipalities struggle to do so due to a lack of resources (World Bank, 2013). Access to ECEC is also hindered by limited places in ECEC institutions in certain areas and districts, especially in large cities (European Commission, 2021, a). Parents often find it challenging to enrol their children into pre-school due to the financial burden it may entail (Yosifor, et al., 2018). Several measures have been put in place to address these challenges. In 2014, several new kindergarten and pre-school groups were opened. Primary schools were also allowed to organise pre-primary groups for children of compulsory ECEC age (Oberhuemer & Schreyer, 2017). However, challenges remain in providing access to ECEC for marginalised children, and in ensuring the quality of ECEC (World Bank, 2019). Moreover, as indicated by the national stakeholders, **mandatory ECEC is not fully enforced**. More specifically, if parents wish their children to start school at the age of 6, they are asked to submit a document of completed preschool education; however, if parents enrol their child into school at the age of 7, such a document is not required²³. It is unsurprising, then, that **the percentage of**

²² Information gathered during consultations with relevant national stakeholders.

²³ Information gathered during consultations with relevant national stakeholders.

children in ECEC remains relatively low. In 2019, despite a gradual improvement in the overall share, only 82.7 % of all children from the age of 4 to the starting age of school education were enrolled in formal ECEC, compared with the EU average of 95.1% (Eurostat, n.d., i). According to the national statistics for Bulgaria, enrolment in ECEC is also not increasing, despite the measures implemented. In the school year 2015-2016, 81 % of children from 3 to 6 years were enrolled in formal ECEC institutions; and in school year 2020/2021, this figure had fallen to 78.1 % (Republic of Bulgaria National Statistical Institute, 2021, c).

Despite the existing challenges, the provision of ECEC in Bulgaria has been improving over the last two decades, with more and more children attending ECEC. The evidence produced by this study indicates that the **ECEC reform has indeed contributed to achieving better educational outcomes for low achievers, and reducing social segregation.**

Observed effects of the reform

As PISA assessment takes place among 15-year-olds, the effect of the introduction of compulsory one-year pre-school education can only be observed after nine years, when the first children likely to have been affected by the introduction of compulsory pre-school participate in PISA (that is, 2012 and onwards). A linear regression analysis conducted on the basis of the PISA 2012 data confirms that **children who attended ECEC did indeed show better academic outcomes.** The regression shows a strong and significant positive effect of ECEC attendance on students' performance (both in mathematics and reading), even when a set of control variables (gender, ESCS, immigration status and others) are included in the regression equation.

A more sophisticated statistical analysis was performed to evaluate the impact of Bulgaria's ECEC reform. The underlying idea of this analysis was to apply the principle of experimental study design on PISA data. Experimental designs allow the differential evolution of two groups to be observed, one of them receiving a specific 'treatment' (such as a new method in reading, or a specific reform), and the other is taught under 'business as usual' conditions. If the groups are similar at the beginning, a difference between the two groups after the introduction of an innovation may be attributed to the innovation.

To examine the impact of the ECEC reform on students in Bulgaria, comparable groups needed to be found, some of which benefitted from the reform, while others did not. PISA 2009 serves as a 'control' group reservoir (i.e. students who have not benefitted from the reform), while PISA 2018 serves as an 'experimental' group reservoir (i.e. students who have benefitted from the reform). It was decided to include the data from 2009 because the students participating in PISA at that time were not obliged to participate in ECEC. Students who participated in PISA in 2018, on the other hand, were already growing up in a system in which one year of ECEC is obligatory. The 2018 cohort was chosen as it is most likely that by this time, most students had been properly exposed to the change. Earlier PISA cohorts may have included a student body that had only partly been exposed to the change, or who were among the first years whose entire cohort had been exposed to the change, and thus some challenges may have been faced that could affect the observed effect. Moreover, in some earlier PISA cycles, such as in 2012, a lot of data are missing due to the rotated design used for the background questionnaire, which makes the data hard to compare with those from other years.

The first step in carrying out this process is to match students from both data sets, in order to assemble two groups of comparable students. Propensity score matching (PSM) was used to create these virtual pairs between PISA 2009 and 2018 students. To find pairs of similar students, a preparatory step was taken to select the variables that best predicted PISA reading performance. The analysis showed that around 33 % of the variance in

reading performance can be explained by eight variables – gender, language spoken at home, three variables relating to socio-cultural background, following either an academic or VET educational track, repeating a grade, and a motivational variable indicating students' enjoyment of reading. Once these variables had been identified, students with the same values for these variables in the 2009 and 2018 databases were selected.

The second step was to test the difference between these groups of comparable students. A difference-in-difference regression model was constructed to understand how mean reading performance was affected by increased attendance at ECEC, due to the introduction of obligatory ECEC. In other words, the research team considered pairs of students who identical in terms of the variables predicting reading performance (gender, language spoken at home, socio-economic status, etc.), with the only difference being that one did not attend ECEC, and the other did²⁴. The question was to check whether the first student demonstrated greater proficiency in reading than the second one.

The difference-in-difference (DiD) regression model shows that **the introduction of compulsory year of pre-school education had a positive effect on students who attended ECEC as a direct result of the reform**. Students who benefited from the introduction of the reform achieved better reading scores than their statistical 'twins'²⁵. The regression model shows that ECEC had increased reading performance by 7.9 points. Even though this effect may be seen as relatively small, the fact that it remains visible after a decade – since it is measured among 15-year-old-students – shows its importance and significance. This is in line with the findings of existing studies, which show that ECEC interventions result in better education outcomes in both primary and secondary education (Cunha, Heckman, Lochner, & Masterov, 2006), and that students who receive quality pre-school education achieve better academic results later in life (Bakken, Brown, & Downing, 2017)

In addition, the statistical analysis shows that **the reform has, to some extent, succeeded in targeting socio-economically disadvantaged students**. More specifically, the analysis shows that the students who began attending ECEC as a result of the reform were those that had lower values for socio-economic variables (home possessions or wealth). Even though existing reports still claim that despite a general increase in participation in ECEC, access to ECEC among the most marginalised children is not yet universal or guaranteed (World Bank, 2009), our analysis shows that the children who have benefitted from the reform are indeed those who were targeted by it (though, as explained below, the reform did not manage to reach all vulnerable children due to a number of barriers).

Main success factors for, and challenges to, the implementation of the reform

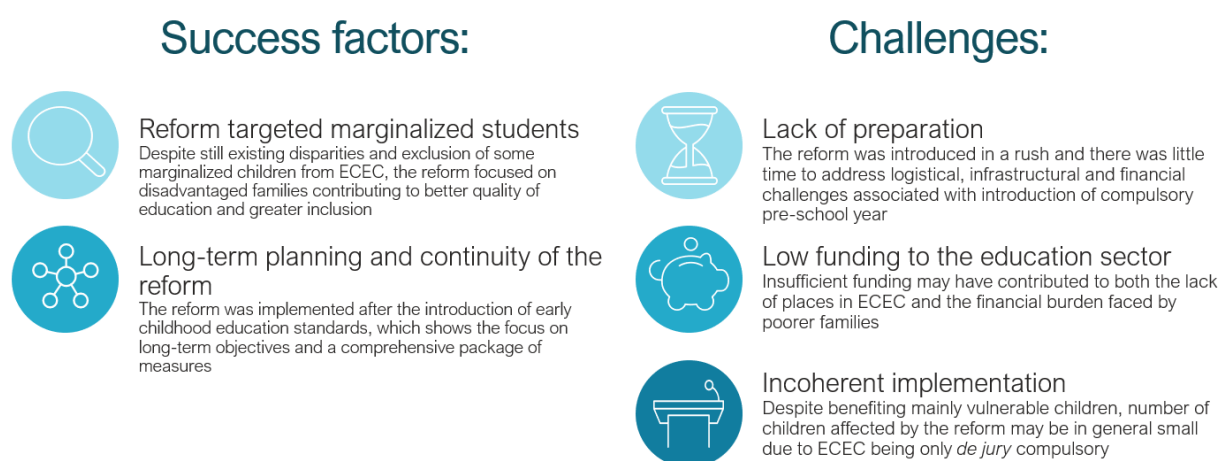
Even though the observed positive effect of the introduction of one-year compulsory pre-school education on academic performance of students at 15-year-old is rather small, it

²⁴ It is nevertheless important to acknowledge the limitations of applying PSM and DiD methods when working with cross-sectional data. For instance, in many countries, including Bulgaria, the percentage of parents with tertiary education increased dramatically between 2009 and 2018; the learning environment in pupils' homes and schools changed significantly; and parents' attitudes towards education changed. In such a situation, performing a valid statistical 'twinning' or 'matching' of students is almost impossible. While such matching is possible on the selection of variables that best predict success, the lack of influence of other factors (not included in the statistical model) should not be completely disregarded.

²⁵ In this study, statistical 'twins' refer to pairs of students from different years (in this case, students from the 2009 dataset and the 2018 dataset) that were determined to be most similar by propensity score matching, given the selected variables (in this case, the selected variables were gender, language spoken at home, three variables relating to socio-cultural background, following an academic or VET educational track, repeating a grade, and a motivational variable indicating students' enjoyment of reading).

still indicates that the reform was relatively successful. Scarce existing evaluations and consultations with stakeholders suggest that several factors have contributed to this success. At the same time, several challenges were faced during the implementation of the reform, which could have hindered the potential greater effect of the reform (see Figure 8 below).

FIGURE 8. SUCCESS FACTORS AND CHALLENGES AFFECTING THE EFFECTIVENESS OF THE INTRODUCTION OF MANDATORY PRE-SCHOOL EDUCATION (2002)



First, statistical analysis (using PSM and DiD²⁶) shows that **the reform did, to some extent, reach students from disadvantaged backgrounds**, who benefit from participation in ECEC the most. As inclusion into the education system remains an important challenge in Bulgaria, this is an especially important effect of the reform, even though disparities in ECEC participation still exist (Bulgaria Ministry of Education and Science, 2015).

It is important to note that compulsory one-year pre-school education was introduced shortly after the establishment of Bulgaria's national educational standards for early childhood education and school readiness. The introduction of national standards may have contributed to the increased quality of pre-school education consistently across different regions and providers. **This points to an attempt by education actors to plan the package of accompanying measures with a long-term vision in mind, which is an important factor for the reform's success** (see, for example: European Commission, 2018). Such long-term planning is also evident from subsequent improvements in the field of ECEC in Bulgaria. The introduction of compulsory pre-school for 6-year-olds in 2002 was followed by the introduction of compulsory pre-school for 5-year-olds in 2010, and compulsory pre-school for 4-year-olds in 2020. In the context of the cyclical nature of education policy in Bulgaria, such continuity is an important positive development.

However, **systemic challenges pertinent to the Bulgarian education system have limited the potentially larger positive effect of the reform**, as can be seen from existing studies and the national stakeholders consulted.

Despite the comprehensive package of measures being prepared with a longer-term vision in mind, when introducing compulsory pre-school in 2002, and further

²⁶ For more information, see Annex 1. Country Profiles, Bulgaria.

extending it in 2010, education stakeholders failed to consider infrastructure shortages in the short term. Authorities were given little time to address the logistical, infrastructural and financial challenges faced in order to ensure enough places were available in ECEC institutions to accommodate all children. While the implementation of two-year obligatory pre-school education (2010) was more gradual than that of one-year pre-school education, existing studies show that the availability of ECEC was still not ensured (Yosifor, et al., 2018). According to national statistics, **even in 2020, there were about 1.5 children of pre-school age for every available place (full- or half-day) in ECEC** (Republic of Bulgaria National Statistical Institute, 2021, a).

Despite the compulsory nature of the year of pre-school, low municipal education budgets did not allow access to ECEC to be ensured for children from poorer families (e.g. through targeted financial support or ECEC fee waivers) (Bulgaria Ministry of Education and Science, 2015). For example, **lack of affordability and the indirect/hidden costs of ECEC** are often listed as the most important barriers to access for vulnerable children (RECI+, 2020). The government mandated that municipalities should provide free pre-school education to children of compulsory pre-school education age (World Bank, 2013). However, existing studies show that in reality, free-of-charge pre-school education included only half-day pre-school education without meals. If parents wanted their children to attend full-day pre-school education and receive meals, they had to pay fees. No financial support or exemptions from fees were available for poorer families (Volen & de Laat, 2021). Consequently, poorer families could rarely afford to allow their children to attend pre-school education for the whole day, and may not have perceived the benefits of attending ECEC only for half a day, especially if no meals were provided. It is also important to note that the Bulgarian government tried to incentivise poorer families to send their children to kindergartens by punishing non-attendance at ECEC by withdrawing child benefits after a small number of unjustified absences. However, this measure was not effective in 'nudging' families towards greater attendance, as it did not address the issue of the cost to parents of ECEC participation. Moreover, as similar measures did not exist in relation to better-off families, this may have contributed to perpetuating existing social inequalities (RECI+, 2020).

Public spending on education in Bulgaria in 2018 was equal to 3.5 % of GDP, compared with the EU average of 4.6 % (European Commission, 2020, a). Spending specifically on ECEC in Bulgaria in 2016 was equal to 0.7 % of the country's GDP, compared with an average of 1.5 % across the EU (RECI+, 2020). Existing reports state that a lack of funding may have prevented municipalities from ensuring sufficient spaces in ECEC institutions to accommodate all children of obligatory pre-school age (World Bank, 2013). The majority of municipalities cannot afford not to charge fees for ECEC or to provide targeted financial support for vulnerable families. In 2017, fewer than 5% of all municipalities in Bulgaria abolished fees for children in mandatory ECEC groups (RECI+, 2020).

For the reasons outlined above, **access to ECEC for vulnerable children was not fully ensured**, even though this was the intended effect of the reform on paper. Serious discrepancies exist in access to ECEC between areas minority populations (Roma or Turkish) predominate, and other areas. For example, in the year 2020/2021, the number of available places in ECEC institutions per 100 children attending ECEC across Bulgaria as a whole was equal to 108 places per 100 children. However, the number of places actually available varied across regions and districts, from 215 down to 87 (Republic of Bulgaria National Statistical Institute, 2021, a). ECEC attendance is also significantly lower in rural areas with low population density, as this results in financial and logistical challenges to ensuring ECEC (Bogdanov, 2018). This demonstrates that while the reform managed to reach some disadvantaged students (as shown by the improved participation rate and the statistical analysis conducted in this study), it has not yet succeeded in ensuring access for all, due to the limitations discussed above. This makes the pre-school programme for 5-

and 6-year-olds *de jure* compulsory and free of charge, but not necessarily *de facto* (Volen & de Laat, 2021).

3.1.3.2. National standardised assessment practices

Key facts about Bulgaria's national assessment system

In Bulgaria, to complete upper-secondary education, students have to successfully pass matriculation exams – ‘high-stakes’ exams, (meaning that the results of these assessments play an important role in defining the students’ academic futures. These exams are in Bulgarian language and literature, and in one additional subject of the student’s choice. Exams in mathematics or science are not obligatory.

Students finishing grades 4, 7 and 10 (corresponding to the ends of different educational stages in Bulgaria) are obliged to undergo standardised national assessments. Standardised national assessments are regulated by Ordinance No 11/01.09.2016 for the evaluation of the learning outcomes of students. The main goal of these exams is diagnostic. However, the results of the assessments at the end of grade 7 are also used to determine admission to profile-oriented secondary schools²⁷.

The introduction of the high-stakes exams (matriculation exams) and standardised system of national assessments have been seen as very important for Bulgaria’s education system (see the box below), **with the greatest potential effect on academic performance**, as discussed below.

BOX 2. OVERVIEW OF THE INTRODUCTION OF MATRICULATION EXAMS (2003) AND STANDARDISED NATIONAL ASSESSMENTS (2007)

In the early 2000s, students in Bulgaria could complete secondary education without taking a high-stakes final exam (matriculation exam). In most cases, students took matriculation exams only if they wished to receive higher marks than they had already achieved. However, because Bulgaria aimed to join the European Union, education system requirements had to become more coherent and unified. As final exams upon the completion of secondary education were becoming obligatory in more and more countries in Europe and around the globe, Bulgaria too decided to implement mandatory exams at the end of secondary education.

Originally, the matriculation exam was introduced by the Education Act (1998), and was intended to be implemented for the first time in 2003. However, this change was met with resistance both from students and their parents. Consequently, it was decided to organise consultations with parents, students and teachers, which resulted in of the implementation of the matriculation exam being postponed (Totseva, 2014). The first matriculation exams (*matura*) were eventually introduced in 2004/2005. At the end of secondary education, every student had to take an obligatory matriculation exam in Bulgarian language and literature, as well as in one more subject of their choice. If students so wished, they could also take an additional exam in a subject of their choosing.

The results of matriculation exams are not publicly available, but students can access their own individual results. However, general statistics, such as average results at country and regional level for each subject, are announced to the public. Moreover, the 10 schools with the highest results and the 10 schools with the lowest results are also announced to the public²⁸.

²⁷ Profile-oriented schools in Bulgaria are specialised schools that have a predominant focus on a specific subject or group of subjects, such as mathematics or languages. These schools have a specific admission procedure and are selective. Students must usually demonstrate a certain level of academic achievement in order to be admitted to such schools.

²⁸ Information collected during the interview with a representative of the Centre for the Assessment of Pre-school and School Education.

In addition, standardised national assessments were introduced in Bulgaria in 2007. These assessments were census based (covering all students in the tested cohorts), and were administered annually for students in grades 4 and 7. However, the recent Preschool and School Education Act (2015) introduced two stages of upper-secondary education. Hence, as the first stage of upper-secondary education covers grades 7-10, a new census-based standardised national assessment in grade 10 was also introduced.

The results of the standardised national assessments in grade 7 are also used for admission to upper-secondary schools. The results of the assessments in other grades are used for diagnostic purposes²⁹.

Bulgarian students also participate in large-scale international assessments, has and have taken part in PISA since 2000. The country also took part in PIRLS and in some TIMSS surveys. Studies based on the results of these surveys indicate the importance of wide-range regular assessment processes for evidence-informed education governance. In order to conduct such assessments, a specialised centre was created under the auspices of the Ministry of Education and Science. One of the major roles of this centre is also to develop national assessments.

Observed effects of the reform

The introduction of matriculation exams and standardised national assessments in Bulgaria can be traced in the PISA datasets over time. The percentage of students attending school that implemented standardised assessment practices increased from 67% in 2000 to 97% in 2015. There are no statistical means to assess a causal effect of the reform on students' achievements, due to a lack of variables in the PISA data that could be used to test the effect of the reform, and the inability to control for the potential effects of other changes in the education system. Even, **available scientific literature** (Bergbauer, Hanushek, & Woessmann, 2018) **indicates that the introduction of standardised national assessment practices may have contributed to improvements in students' achievements in Bulgaria.**

Bergbauer et al. (2018) assessed the effect that testing has on students' academic performance, as measured by PISA. The authors found that standardised assessment, which enable the comparison of test outcomes across schools and students, result in higher academic achievement among students. At the same time, the study revealed that internal testing in schools, the results of which cannot be compared across schools and classrooms, has little effect, or even a negative effect, on students' achievements. The authors also pointed out that reward systems can further increase the positive effect of standardised assessments on students' achievements, and that testing and accountability mechanisms tend to be more important in those countries where student performance is lower (Bergbauer, Hanushek, & Woessmann, 2018).

Since the aggregated results of national assessments and matriculation exams are publicly available in Bulgaria, it is reasonable to assume that the introduction of these assessments has had a positive effect on the academic performance of students. Given that Bulgaria is a relatively low-performing country, such improvements are likely to be more pronounced, since the introduction of these assessments has introduced a measure of accountability for schools. Indeed, **the national stakeholders interviewed believed that external assessments motivate teachers to ensure higher-quality teaching, which has contributed to better achievement levels among students**³⁰. In addition, the fact that the aggregated results of the worst and best schools are available to the public means that the lowest-performing schools are motivated to improve, and the best schools are

²⁹ Information collected during the interview with a representative of the Centre for the Assessment of Pre-school and School Education.

³⁰ Information collected during an interview with a representative from the Ministry of Education.

motivated to keep up their high results. This may foster competition between schools, which has been shown to result in the increased academic performance of all schools. However, while standardised national assessments are now conducted routinely, which has substantially improved the evidence base for education policy-making, the interviews with national stakeholders revealed that the assessment data are not adequately used for education monitoring and improvement. This may be explained by a lack of pre-conditions relating to the reliability and relevance of the information provided, as well as the financial and technical capacities of education policymakers.

Success factors for and main challenges to the implementation of the reform

Given that the introduction of the matriculation exams and standardised national assessments in Bulgaria has been followed by an increase in mean PISA scores in all three subjects, it is likely that there is a correlation between the reforms and improved academic achievements. Several factors may have contributed to the potential success of the reforms. However, the effect of the reform cannot be measured using statistical tools, so it is difficult to say for sure whether the increase in PISA scores has resulted from the reform. The size of this effect, if positive, cannot be determined. A number of challenges faced during the implementation process may also have limited the effectiveness of the reform.

FIGURE 9. SUCCESS FACTORS AND CHALLENGES AFFECTING THE EFFECTIVENESS OF THE INTRODUCTION OF MATRICULATION EXAMS (2003) AND STANDARDISED NATIONAL ASSESSMENTS (2007)



Several aspects of the reform can be viewed positively, as documented in the literature analysing the success of similar reforms in other countries. First, **the introduction of standardised national assessments increased the accountability of schools and teachers** (Bergbauer, Hanushek, & Woessmann, 2018). The national stakeholders interviewed also believed that standardised national assessments motivated teachers to improve their pedagogical practices³¹. However, this does not appear to have resulted in greater innovation in teaching, but has instead reinforced a culture of 'teaching for the test'. According to PISA (2018), the absolute majority of teachers in Bulgaria use more teacher-directed instruction (e.g. lecturing to classes) (OECD, 2019). Such practices are generally associated with lower performance (Kane, Taylor, Tyler, & Wooten, 2011).

³¹ Information collected during an interview with national stakeholders.

If applied adequately, a **system of assessment facilitates the monitoring of an education system's quality**. According to the stakeholders interviewed, the introduction of standardised national assessments is therefore a prerequisite for improving the quality of education. However, policy makers need to build the capacity to use assessment data for educational improvements. Because the Ministry of Education is responsible for both developing and analysing assessments, there are instances in which only successes are being reported, or assessments have been simplified in order to obtain more positive results³².

While the effect of this reform on students is, at least to some extent, potentially positive, the introduction of standardised national assessments and matriculation exams has been **somewhat challenging, due to negative public perceptions about such exams**. This challenge was addressed by involving the public and relevant stakeholders in the **consultation process that accompanied decision-making**. A discussion with students, teachers and parents was organised to address their concerns. As a result, the introduction of the exams was delayed by one year, but public buy-in was better ensured.

Other challenges hindering the effectiveness of standardised national assessments stem from the design of these assessments. More specifically, **the legal framework provides too many intertwining objectives of the external assessments, and does not clearly explain the rationale behind the assessment system**³³. **While the same assessment can be used for multiple purposes, its design does not necessarily allow this**. For example, the standardised national assessments of students in grade 7 are primarily used for diagnostic purposes, but at the same time are used to admit students into upper-secondary schools. However, assessments aimed at serving these two different purposes are often designed in different ways³⁴.

Lack of continuity in education policy, due to cyclical patterns of educational reforms linked to government changes after elections every four years, may have also hindered the success of the assessment reform. Before the new Education Act (2015), every new education minister prepared a draft of a new Law on Education, each of which provided a new discourse on education. However, none of these drafts were discussed in the National Assembly. This situation only changed in 2012, when public debates at various levels were organised to discuss the potential new law (Totseva, 2014). While this lack of continuity is not directly related to the assessment system, it is important to the way in which standardised national assessments are implemented. The aim of standardised national assessments is to monitor how well the education system achieves its objectives. The assessments have therefore been designed to reflect those specific objectives. Consequently, if the direction of education policy changes too often, the national assessment system may not be able to adapt to its changing needs.

Education stakeholders also report that **there is no developed culture of testing in Bulgaria**, and that the assessments and their tools are not yet well designed³⁵. Having a well-developed testing culture means that the public, students, teachers and policy makers

³² Information collected during an interview with national stakeholders.

³³ Information collected during an interview with national stakeholders.

³⁴ The exams used for diagnostic purposes contain more items (questions, tasks or other elements) that are of medium difficulty, as such items are most suitable for determining the level of a student's knowledge. However, the results of these exams cannot normally be used to identify those students who perform exceptionally well, which is required for the purposes of admission to different schools. At the same time, tests that are used for admission (for sorting purposes) contain more difficult items (questions and problems) to identify the best students. However, such tests often do not properly represent the knowledge of 'average' students who are unable to answer the harder items. Consequently, the use of the same assessments for both of these purposes indicates that the results will not be suitable for at least one of them.

³⁵ Information collected during the interview with a representative of the Centre for Assessment of Pre-school and School Education.

are all aware of the importance of the assessment system in improving the education system, and that they respect the existing system. Promoting accountability for learning outcomes and results is the key policy direction for secondary education. Despite teachers being the key determinant of the quality of education, TALIS (2018) indicates that teachers in Bulgaria are subject to a lack of investment and support (OECD, 2019).

Lastly, as with other measures, the effectiveness of the assessment reform may be affected by **low spending on education** (3.5 % of GDP in 2018, compared with the EU average of 4.6 %) (European Commission, 2020, a). More specifically, lack of funding in the education sector may be the reason why one assessment in grade 7 has two contradictory purposes, as it is cheaper to prepare and implement one assessment instead of two.

Lessons for future education reforms in Bulgaria

It is difficult to single out specific outcomes of various education reforms, as such reforms are never implemented in isolation and many factors influence the education system at the same time. The analysis of Bulgaria's PISA journey presented in this report zooms in on two reforms – the introduction of compulsory pre-school, and the introduction of a national assessment system, as the effects of these reforms can be traced in the PISA data.

While the implementation process for each of these reforms reveals specific challenges pertinent to these education areas – ECEC and national assessments – a number of systemic issues exist within the Bulgarian education system that shape the outcomes of the two reforms, and which should be considered by policy-makers in the future. The important lessons to highlight are:

- **Careful planning with a broader longer-term perspective is crucial.** As mentioned above, a lack of elaborate planning and continuity in education policy discourse over time may have hindered the effectiveness of both reforms. The cyclical nature of reforms in Bulgaria, and changes in education discourse with every new Minister (Totseva, 2014), hinder the establishment of a long-term vision and a solid foundation for planning reforms. Going forward, it is crucial to ensure a more stable environment for education policy-making. It is reasonable to believe that the introduction of the Education Law in 2015, which had been discussed and planned since 2012, will provide a more stable direction for education policy, as well as a clearer framework that will facilitate the better planning of new educational reforms. However, as the changes introduced by the Education Law are being introduced gradually, it is still too early to see its effect.
- **Each new reform should be accompanied by a comprehensive set of measures, and should consider the context in which it is being implemented.** The rushed introduction of compulsory pre-school hindered the ability of the policy-makers to address the logistical, infrastructural and financial challenges that stemmed from the increased number of children in ECEC. Lack of consultation with and buy-in from education practitioners before the introduction of the new standardised national assessment system may have hindered policy-makers' ability to adequately address the concerns of the public with regard to the assessments. Structural issues in Bulgaria, such as low spending on education and the low quality of teacher training, also need to be addressed by a set of measures accompanying the reforms (European Commission, 2020). If enough time is planned for the 'inception' stage before new changes are implemented, policy-makers can consult the relevant stakeholders and education experts and plan how to address these challenges, which would otherwise hinder the effectiveness of the reforms. This has been already done in relation to the introduction of mandatory pre-school education for 4-year-olds, as well as the gradual implementation of the Law on Education (introduced in 2015). In the future, it will become visible whether

or not planning for an inception phase for these two reforms has resulted in better educational outcomes.

- **It is important to consider the resources available for the implementation of any education reform.** Low municipal budgets have prevented municipalities from ensuring a sufficient number of places in ECEC institutions for all children; nor have they been able to provide financial support for disadvantaged families to cover ECEC fees. Routine standardised national assessments are also costly, but they are imperative for generating a sufficient base of evidence for educational policy-making. While it may be hard to address the lack of resources, a more efficient allocation of the limited resources and the setting of priorities might allow the same results to be achieved with fewer resources.

3.2. Estonia

Educational context and key policy issues

Over the years, Estonia has performed very well in PISA, which may suggest that the country offers high-quality education to its children. In 2018, the average performance of Estonian students in all three domains was the highest in the EU (OECD, 2019, a). Estonia is also one of the top performers out of all countries participating in PISA (OECD, 2019, a). In 2019, the Estonian government spent 15.5 % of its budget on education (compared with an EU average of 9.9 %). This represents 6 % of Estonia's GDP (compared with an EU average of 4.7%). It is also important to note that spending on education in Estonia has increased. **This indicates that inclusive, high-quality education has been an important focus for education policy makers over the years** (European Commission, 2021, b).

According to existing studies, **the most important factors contributing to high-quality education in Estonia include strong pre-school traditions, well-educated teachers, positive attitudes towards education in society, and a generally well-developed educational landscape** (Vukovic, 2018). Estonian policy-makers also focus continuously on the modernisation of the country's education system, and keep learning and improving education policy despite already high results (European Commission, 2019). A strong focus on digitalisation in Estonia has also significantly contributed to improvements in education quality. The country has implemented various initiatives aimed at facilitating the digitalisation of the education system and improving the digital skills of students and teachers (Hariduse Infotehnoloogia Sihtasutus, n.d.). While the COVID-19 pandemic has highlighted a lack of readiness in education systems across most EU Member States to shift towards digital and distance learning, Estonia managed this transition relatively smoothly and with minimal negative effects, due to high level of digitalisation of its education system (Vihma, 2020). However, **education quality is threatened by a potential future shortage of teachers.** Despite the government's efforts to encourage more young people to choose teaching as a profession, in 2018 49.4% of teachers (from primary to upper-secondary levels) were older than 50 (European Commission, 2020, b).

The right to equal opportunities in education for was clearly set out in the Republic of Estonia Education Act in 1992, indicating that **equity has been an integral part of the Estonian education system for the last 30 years.** Indeed, the impact of socio-economic background on the performance of Estonian students is among the lowest in the EU. To ensure equal educational opportunities, every school in Estonia has a coordinator who is responsible for the provision of services for students with special educational needs, and additional personalised support is available for students who are at risk of dropping out (European Commission, 2019). However, gaps between native and minority students persist – **students in Estonian-speaking schools consistently outperform students**

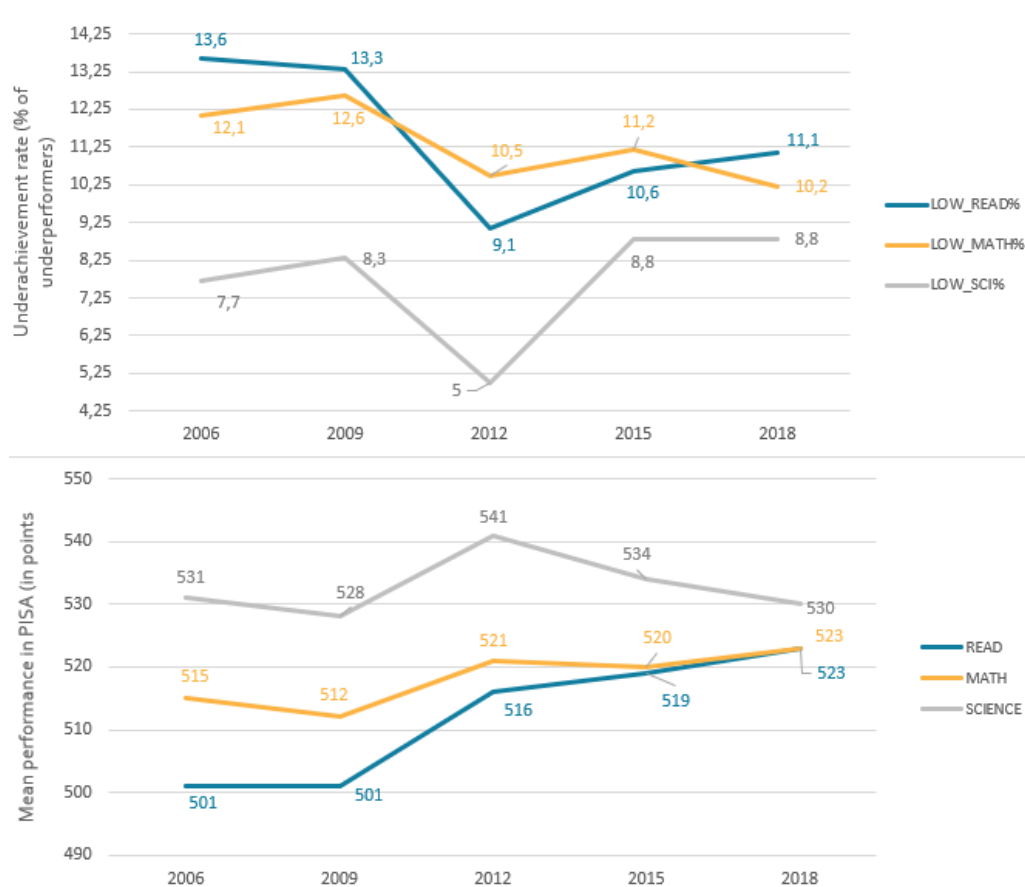
in Russian-speaking schools. Given that Russian speakers also often have poorer Estonian language skills, this may limit their access to higher education and the labour market, as well as perpetuating existing inequalities. Moreover, **unfavourable school climates and instances of bullying threaten the inclusiveness of the education system and diminish students' safety and sense of belonging in schools.** Despite the recently developed anti-bullying education programmes in Estonia (Republic of Estonia Ministry of Education and Research, 2019), a quarter of Estonian students report being bullied (compared with an EU average of 22.1%). The average performance of these children in PISA is 15 points lower than that of students who are not bullied (European Commission, 2020, b). **Early school leaving Estonia is lower than the EU average** (7.5% in 2020, compared with 9.9% across the EU) (Eurostat, n.d., b). However, **early school leaving may still limit the inclusiveness of Estonia's education system.** Due to the shrinking labour force in Estonia, early school leaving creates a risk of future labour shortages, particularly of highly qualified specialists (European Commission, 2020, b).

Key trends in students' performance

In 2018, Estonian students scored an average of 523 points in reading and mathematics, and 530 points in science – the highest scores in the EU (OECD, 2019, b). (OECD, 2019, b). **Most 15-year-old Estonian students are well equipped with basic skills in reading, mathematics and science** (European Commission, 2020, b). This means that the education system in Estonia provides opportunities for most students to gain basic skills in reading, mathematics and science.

High mean performance in PISA is not a new trend for Estonia. As can be seen in Figure 10, students' average performance in all three domains has remained high over the years. And while mean performance in science remained fairly stable between 2006 and 2018, mean performance in reading and mathematics increased. These increases were statistically significant. The mean rates of underachievement remained low between 2006 and 2018. During the time period analysed, the underachievement rate increased slightly in science, and decreased slightly in reading and mathematics (see Figure 10). However, none of these changes were statistically significant.

FIGURE 10. MEAN PISA PERFORMANCE AND UNDERACHIEVEMENT RATES IN ESTONIA 2000-2018



Source: PISA data.

Note: the graph presents trends in mean student achievement in Estonia between 2000 and 2018, as well as variations in the mean rate of low-achieving students.

As mentioned, the impact of a student's background on their academic performance in Estonia is among the lowest in the EU (European Commission, 2019), which points to the inclusive nature of Estonian education system. However, **performance gaps still exist between different groups of students** (see Figure 11).

While the reading performance of both boys and girls increased during the time period analysed (2009-2018), the gender gap diminished between 2012 and 2015 as boys' performance in reading increased. This indicates improvements in both the efficiency and the equity of the education system.

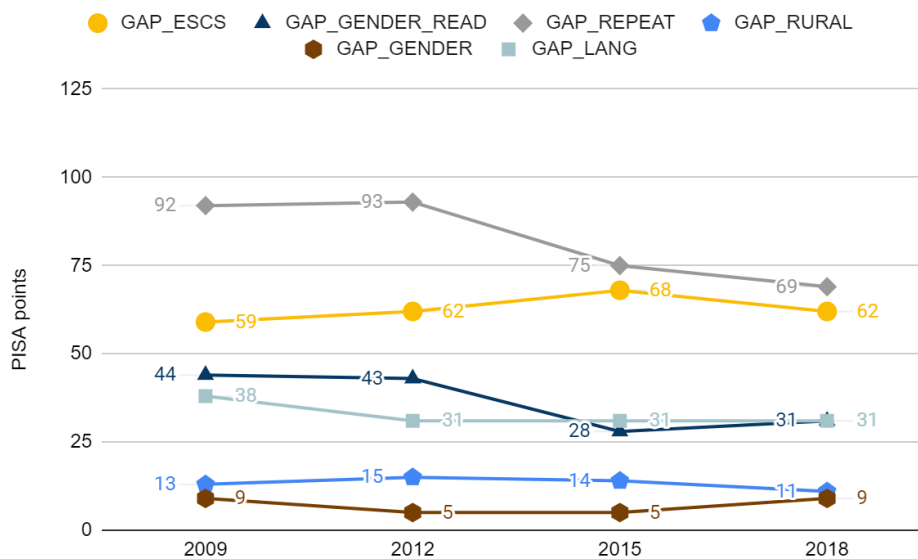
The performance gap between students who had to repeat a grade and those who did not remained significant between 2009 and 2018. However, this gap was 24 points narrower in 2018 than it was in 2009. Over the same time span, the share of students who had to repeat a grade decreased (in 2018, it was 2.9 % compared with an EU average of 10.4%), which may partly explain the narrowing performance gap.

The performance gap based on the language spoken at home (between students speaking Estonian and those speaking other languages) decreased by seven points between 2009 and 2012, then remained stable between 2012 and 2018 (at around 30 points). This gap is concerning, given that Estonia's population includes a large Russian minority (25.2 % of the population), and a smaller Ukrainian (1.8 %), Belarusian (1%) and Finnish (0.6 %) minorities (Statistical Office of Estonia, Central Statistical Bureau of Latvia, Statistics of

Lithuania). These inequalities seem to become more apparent only in the later stages of education. Existing reports show that Russian-speaking children in Estonia tend to score even better than Estonian-speaking children in early-learning measures (OECD, 2020, h).

The performance gap between students living in urban and rural areas³⁶ has remained stable throughout the years, and is significantly lower than in most EU Member States (between 11 and 15 points, compared with an EU average of 35 points). However, this gap in performance should still be seen as an important concern for Estonia, as the country is one of the top three EU Member States (together with Poland and Denmark) with the largest share of students living in rural areas (in 2018, 23.2% of students in Estonia declared that they lived in rural area, compared with an EU average of 9.3%).

FIGURE 11. MATHEMATICS PERFORMANCE GAPS BETWEEN STUDENTS IN ESTONIA 2009-2018



Source: PISA data.

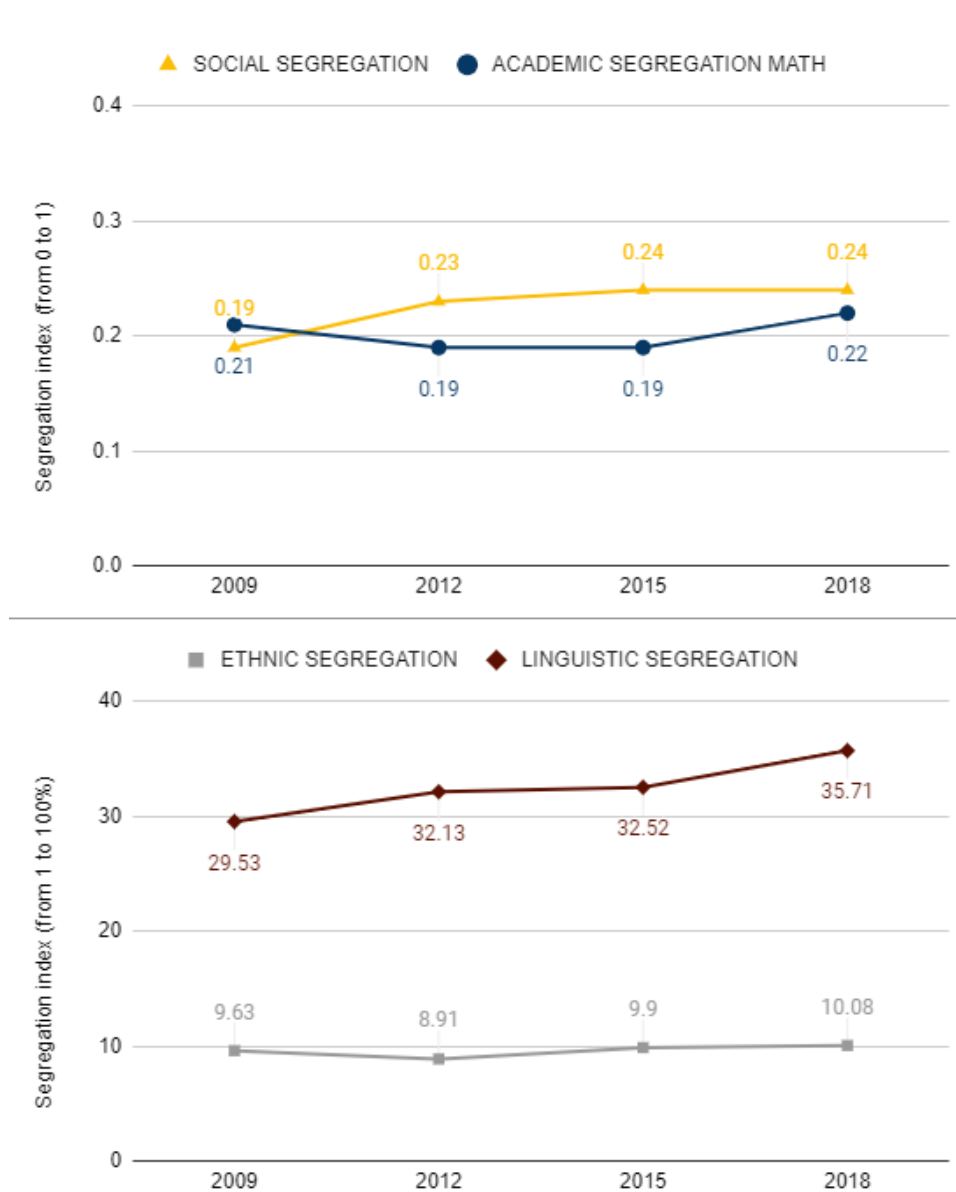
Note: the graph presents trends in the performance gaps in Estonia between certain categories of students (boys vs. girls; students in rural environments vs. students living in cities...) for the 2009-2018 time period. All gaps are presented as absolute values, so that the graph is easier to understand. However, all gaps are actually negative (meaning a difference in favour of the most advantaged category in the comparison). While all of the gaps refer to performance in mathematics (the most interesting domain for analysis), the gap between boys and girls (GAP_GENDER) is also presented, as the gender gap is usually larger in reading than in mathematics or science. The gap between students following an academic vs. a vocational track is not represented, due to the very low rate (less than 1%) of students in VET.

Despite Estonia's commitment to inclusiveness in its education system, school segregation persisted between 2009 and 2018. During the timeframe under analysis, academic and ethnic segregation³⁷ remained statistically stable, while social and linguistic segregation increased slightly (see Figure 12).

³⁶ A city or urban area is defined as having 100,000 residents or more, while a rural area or a village is defined as having fewer than 3,000 residents

³⁷ Variables SOCIALSEGR, ACADEMICSEGR and ETHNICSEGR. For more information, see Annex 2 – Methodological approach section 2.1.3. Variables used for statistical analysis.

FIGURE 12. VARIATION IN SOCIAL AND ACADEMIC SEGREGATION IN ESTONIA 2009-2018



Source: PISA data.

Note: the segregation index can have a value between 0 and 1. 0 means no segregation (none of the variance in performance between schools is explained by the school attended) and 1 means complete segregation (the school attended can explain 100% of variance between schools)

Despite Estonia’s education system being relatively inclusive and equitable, **socio-economic background indicators still influence students’ achievements to some extent.** This can be seen from the analysis of the effects of various individual and school-level factors that may affect students’ achievement, conducted via the multi-level regression model³⁸ using the PISA 2018 dataset. Boys from socio-economically advantaged backgrounds, who speak Estonian, have never repeated a grade, and who attend a school with a favourable environment, are more likely to achieve higher scores in mathematics in PISA than other students (see Figure below).

³⁸ The model tested the effect on students’ performance of various individual background variables (gender and ESC), academic path variables (repeating a grade and having more than 4 periods of mathematics per week), and school climate variables at both individual and school level. The variables presented are the only ones that showed a significant effect. For more information, see Annex 1. Country Profiles, Estonia.

FIGURE 13. FINDINGS OF THE MULTI-LEVEL REGRESSION ANALYSIS OF PISA 20018 DATA FOR ESTONIA

Students in Estonia perform better in PISA (mathematics) if:



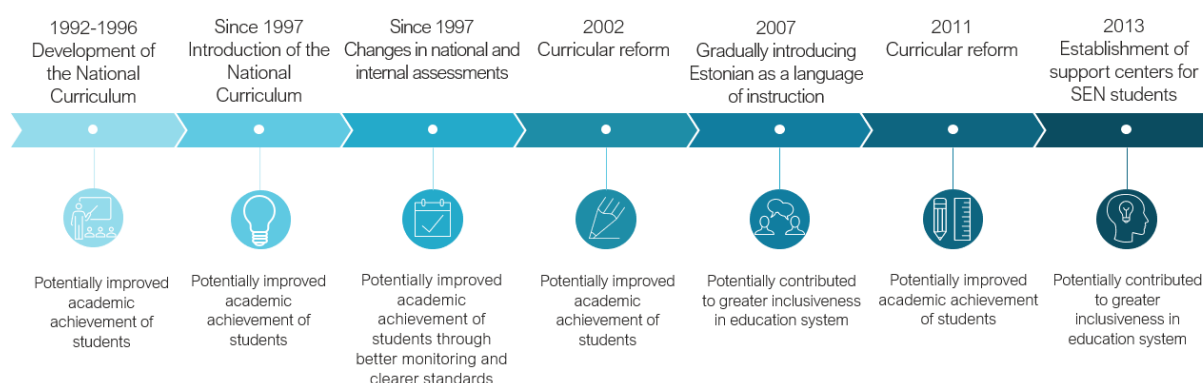
Source: multi-level regression analysis conducted for the study, based on the PISA 2018 data. As mathematics is the most interesting domain in Estonia (given its positive performance trends), all of the gaps presented are calculated with reference to performance in mathematics.

Key policies associated with the observed improvements

The academic achievements of Estonian students have been exceptionally high over the last two decades, despite some remaining challenges such as the threat of a future shortage of teachers or the lower educational outcomes of Russian minority students compared with native Estonians. Even though it is usually more difficult for the countries to significantly improve their academic performance when it is already high, over the last 20 years, several important positive changes can be observed in educational outcomes in Estonia (as measured by PISA):

- High and increasing mean performance in mathematics and reading between 2009 and 2018;
- A decreasing gender gap in mean reading performance between 2012 and 2015;
- A decreasing gap in performance based on the language spoken at home between 2009 and 2018.

The decrease in the gender gap in mean reading performance is likely to be related to the change in PISA assessment from paper-based to computer-based. This trend is observed in the majority of countries participating in PISA assessments, as boys tend to perform better on computer-based tests. (OECD, 2016, b). Other improvements, however, are potentially linked to various reforms and developments that have taken place in Estonia over the last two decades. Potentially influential education reforms in Estonia are presented in the figure below.

FIGURE 14. REFORMS POTENTIALLY LINKED TO IMPROVEMENTS IN ACADEMIC ACHIEVEMENT IN ESTONIA


The reforms above address various aspects of the education system in Estonia. While all of these reforms may have contributed to the observed improvements in the quality and equity of the education system in Estonia, the specific effect of some of them cannot be analysed in a rigorous way due to a lack of variables in the PISA dataset that can show the effect of the reform. Consequently, this country chapter focuses on three priority areas – assessment policy, curriculum development, and inclusive education. These priority areas were chosen due to the fact that the effect of the reforms in these areas can, at least to some extent, be observed via PISA and the existing academic literature. These findings are further supported by consultations with stakeholders conducted for the present study³⁹.

3.2.3.1. National standardised assessment and school evaluation practices

Key facts about Estonia's assessment system

In Estonia, students in basic education participate in standardised national assessments in 3rd grade in mathematics and Estonian or Russian (depending on the main language in school); in 4th grade, in nature studies; in 6th grade, in Estonian, mathematics and Russian (for students in Russian-medium schools); and in 7th grade, in nature studies (Eurydice, 2019, a). A random sample of 10% of schools is chosen to undertake these assessments for system-level monitoring; however, many schools participate in the assessments even when they are not chosen, in order to better monitor their students' progress⁴⁰. According to the Basic Schools and Upper Secondary School Act, the standardised national assessment system should provide relevant stakeholders, including students and teachers, with objective and comparable feedback on education outcomes and progress towards the achievement of the education system's objectives (Riigi Teataja, 2010).

High-stakes assessment (meaning that the results of the assessments play an important role in deciding students' academic futures) takes place at the end of basic education. Students in grade 9 are assessed in three subjects – Estonian, mathematics and one more subject of the student's choice. Students also have to complete a piece of creative work. If students pass these tests and their latest grades are at least "satisfactory", they are awarded a basic school graduation certificate. After grade 9, students are streamed into academic and vocational education tracks (Eurydice, 2019, a). Box 3 provides more details on the evolution of this system in Estonia.

³⁹ For more information, see Annex 1. Country Profiles, Estonia.

⁴⁰ Information gathered during consultations with national stakeholders.

BOX 3. CHANGES IN STANDARDISED NATIONAL ASSESSMENT PRACTICES IN ESTONIA

A standardised national assessment system was established in Estonia in 1997. Scottish experts were consulted as to how this should be implemented. In relation to foreign language proficiency examinations, the Common European Framework of Reference was followed. The Framework was also included into the Estonian national curriculum in 2002. Several relevant stakeholders, including teachers, schools, and universities, were involved in the development of exams. The exams were piloted before being introduced to all students. Practising teachers were involved in the piloting of the assessments⁴¹.

Since the introduction of the national assessment system, the development and implementation of assessments has been coordinated by the National Examinations and Qualifications Centre, under the Ministry of Education and Research. The National Examinations and Qualifications Centre was merged with Foundation INNOVE in 2012, and became a part of the Education and Youth Authority of Estonia in 2020. Consequently, the coordination of the exams is now the responsibility of the Education and Youth Authority of Estonia⁴².

Conditions regarding national assessments and school completion in grade 9 have not changed significantly since 1997. The content of the assessments has been updated to remain in line with changes in the curriculum. When the curriculum was revised, the assessments were adapted to reflect these new requirements, but the system itself (for example, the use of the results from the assessments or their importance for completing lower-secondary education) did not change. However, there has been recent public discussion about re-thinking the function of the assessments, making assessments in grade 9 'low-stakes'.

It is also important to note that various improvements are constantly implemented. The Lifelong Learning Strategy 2020 introduced several innovations into national assessment practices. The main aim of these changes was to ensure that every student, teacher and school is supported and has the conditions necessary for them to excel. The Strategy focused on enhancing the use of digital technologies for teaching and learning, and promoted the use of digital technologies not only in standardised national assessments, but also throughout continuous teaching and learning processes⁴³. The state has set a goal of making all standardised national assessments computer-based. So far, the standard tests for students in grades 3 and 6 are computer-based. In the future, it is planned to change the format of the final exams at the end of grades 9 and 12 to being computer-based as well. Fully computer-based assessments should help to further improve the digital skills and competences of Estonian students and better prepare them for an increasingly digitalised world. Moreover, a focus on non-traditional subjects, such as life skills or digital competences, as well as students' well-being, was recently added to ensure that more information on the education system is gathered to enable more informed decision making⁴⁴. For example, the idea of a measure to assess the well-being of students was introduced in 2015. Pilot studies were administered in 2016 and 2018. Since 2018, a survey assessing the well-being of students is administered annually to students in grades 4, 8 and 11. Such assessments are seen as very useful, providing necessary data for school improvement (Doumet, 2021). Moreover, since 2011, the inclusion of a piece of creative work or research project was introduced as one of the preconditions for completing lower-secondary education, further emphasising the competence-oriented approach of Estonian education.

Internal self-evaluation of schools has been compulsory since 2006. This measure was introduced to ensure that the quality assurance system aligns with the autonomy provided to schools and the principle of minimal control or inspection by central government. Schools are required to draw up a self-development plan, which provides a benchmark for the school's plans and development goals over a period of three years (Tire, 2021). During this three-year period, schools are required to conduct self-evaluation to assess progress and the achievement of these goals. This process involves various stakeholders in the school community – the board of trustees, teachers' council, student council, and external experts focusing on education (such as academics). While the Ministry of Education and Research

⁴¹ Information gathered during consultations with national stakeholders.

⁴² Information gathered during consultations with national stakeholders.

⁴³ https://www.hm.ee/sites/default/files/uldhariduse_valishindamise_ulesanded.pdf

⁴⁴ Information gathered during consultations with national stakeholders.

provides tools and support for self-evaluation, schools can choose for themselves how to conduct internal self-assessment and which relevant stakeholders to include in the process.

The data from standardised national assessments are available to the public via the electronic Estonian Education Database (EHIS, Eesti Hariduse Infosüsteem). This database was launched in 2004, and is compulsory for all schools to use and update. It contains data on all educational levels and provides detailed and comprehensive information about education establishments, students, teachers and curricula, and is a key source of data on education for the public. However, while some of the data are available to the general public, some are only available to a restricted group of users. The Ministry of Education and Research has made aggregated educational indicators available for the public via the web interface 'Education Eye' (Haridussilm). These data are mainly used by parents, students, schools and municipalities. They are also used for monitoring purposes, as schools' aggregated results from national assessments can be found there.

Estonia also participates in large-scale international assessments. The country has taken part in PISA since 2006, and has participated in TIMSS in 2003. Participation in international large-scale assessments allows better analysis of the national education system and the opportunity to compare the quality of education in Estonia with that in other countries.

Observed effects of the reform

Estonia's consistently high performance in PISA indicates the high quality of the country's education system, and it is very likely that the gradual development of standardised national assessment and school internal assessment systems has contributed significantly to this. No statistical means can be used to establish a causal effect of the introduction of these assessments on students' achievement using PISA data, due to the large number of other variables that may have contributed to students' achievement. **However, existing evidence points to a connection between the strong assessment system in Estonia and the high academic performance of Estonian students.**

Bergbauer, Hanushek and Woessmann (2018) found that that standardised national assessments which compare outcomes between schools and students result in higher academic achievement. This effect is smaller if the outcomes of standardised assessments are reported without comparison (Bergbauer, Hanushek, & Woessmann, 2018). Given this observation, it is clear that Estonia's standardised national assessments, introduced in 1997, have potentially contributed to the country's high PISA results, as the data from national assessments conducted in Estonia are shared with parents, schools and relevant stakeholders, and information about different schools can be collected and compared. The introduction of a standardised national assessment system in 1997 is also recognised as one of the factors contributing to Estonia's high results by existing studies (Tire, 2021). The stakeholders interviewed further confirmed that standardised national assessments are an important tool for schools to gain feedback on their performance. This helps them to improve their teaching practices. Stakeholders also note that the performance of students has improved in those subjects for which standardised tests and project-based assessments were introduced⁴⁵.

While some academic papers argue that internal school assessments based on self-evaluation may not have a strong positive effect on students' academic achievement (Bergbauer, Hanushek, & Woessmann, 2018), evidence from Estonia shows otherwise. Interviews with relevant stakeholders and a review of available reports demonstrate that internal evaluation is seen as a useful instrument to provide a systemic and comprehensive

⁴⁵ Information gathered during consultations with national stakeholders.

understanding of schools' strengths and weaknesses and to improve education quality in schools. However, the existing report on school self-evaluation points to the need to ensure sufficient human and administrative resources for such internal evaluations to bring about the desired value. To do so, schools can enlist the support of trained counsellors (OÜ Eesti Uuringukeskus, 2011).

Main success factors for, and challenges to, the implementation of the reform

The introduction of standardised national assessments and internal school self-evaluation procedures has potentially had a significant positive effect on the overall quality of the education system, as well as on the academic achievements of students. Several important factors may have contributed to the positive effect of these national assessments and internal school self-evaluations. However, while the assessment system has been well designed and implemented, a number of challenges were faced in the process of implementation. The most important success factors and challenges are presented in the figure below.

FIGURE 15. SUCCESS FACTORS AND CHALLENGES AFFECTING THE EFFECTIVENESS OF THE ASSESSMENT SYSTEM IN ESTONIA



The evolution of the assessment system in Estonia was well planned, and employed a multi-stakeholder approach. As mentioned by the stakeholders interviewed, the **inclusion of the relevant stakeholders in the decision-making process ensured that the assessment system is in line with the needs of the education system**⁴⁶. Defining strategies for evaluation and assessment is an important step towards improving student outcomes and developing a better and more equitable school system. Furthermore, transparent evaluation mechanisms like those in Estonia can help systems to better respond to changing needs in contexts of disruption.

It is important to note that the standardised national assessments have been introduced rather early in comparison to other countries analysed in this study. This means that **Estonia has had a sufficiently long period of time to develop a positive culture of testing**, in which national assessments are respected by the authorities, teachers and students, and their importance and value is acknowledged. Evidence of this comes from the fact that even though only 10% of schools are randomly selected to participate in sample-based standardised national assessments for diagnostic purposes at system level,

⁴⁶ Information gathered during consultations with national stakeholders.

many schools choose to participate in them voluntarily outside of the compulsory sample⁴⁷. **A high degree of school autonomy** over quality assurance is also seen as a supporting factor, which has also helped to overcome initial hesitation over the introduction of standardised tests. The fact the schools can seek support for their self-assessment process from trained counsellors provides an additional trigger for building the capacity of schools to become active agents in the improvement of the education system.

The aggregated results of schools in standardised national assessments are also accessible publicly, which serves as an effective accountability mechanism and motivates the school community to improve⁴⁸. The Estonian Ministry of Education and Research publishes an annual review that brings together data from internal and external evaluations and covers from education pre-primary to tertiary, thereby providing an extensive educational database for decision-making at national and school level.

3.2.3.2. Development of the national curriculum

The education system in Estonia is largely decentralised, with responsibility for various aspects of the education system being clearly defined and divided between the state, local authorities and education institutions. Responsibility for the curriculum is shared between the national authorities and the schools. The national authorities set the national curriculum, and schools then develop their own curricula, based on the national framework.

The national curriculum in Estonia provides clear objectives not only regarding the teaching of traditional subjects, but also in relation to the development of various cross-curricular skills and competences. The national curriculum also provides some guidance on assessment.

The national curriculum is fairly broad, and is defined on the basis not of 'per school grade' but of 'per education level'. Such a design gives schools greater autonomy to organise their learning and teaching, depending on the needs of the students and school context⁴⁹. Schools are also able to choose the content of elective courses⁵⁰, and to decide which textbooks they use for their classes (Eurydice, 2019, d).

The development of the national curriculum in Estonia can be seen as a continuous process. Since the country's independence, curricular reforms have focused on the vision of a well-rounded education that provides students not only with important theoretical knowledge, but also the skills and competences that are crucial for their full participation in society⁵¹ (see the box below for more details).

BOX 4. NATIONAL CURRICULUM REFORMS IN ESTONIA SINCE 1992

The definition of a 'National Curriculum' was introduced in Estonia in 1992, when the Estonian State adopted the Republic of Estonia Education Act (Riigi Teataja, 1992). The Education Act provided the legal basis for the formation, functioning and development of the education system, and outlined its principles and the right to equal opportunities for all. In 1993, the Basic Schools

⁴⁷ Information gathered during consultations with national stakeholders.

⁴⁸ Information gathered during consultations with national stakeholders.

⁴⁹ Information gathered during consultations with national stakeholders.

⁵⁰ Elective courses are those subjects that are not included in the national curriculum, but which may be taught in school if the school decides they are needed. Some elective courses are also presented in the national curriculum as examples, e.g. courses in career studies, entrepreneurship, religion and ICT for Basic schools.

⁵¹ Information gathered during consultations with national stakeholders.

and Upper Secondary Schools Act established the 'educational standard', which outlined the national standards and requirements for school curriculum.

Policy-makers and education experts aimed to build a national school system based around new concepts and new qualities, focusing on the general and specialist competences that would be necessary for the modern world (Sarv & Rõuk, 2020). The policy-makers consulted the Finnish National Board of Education when developing the national curriculum, as the Finnish curriculum was seen as a good example that Estonia could follow, and might expect similar results due to similarities between the countries (Krull & Trasberg, 2006). Several working groups, including specialists in specific subjects, representatives of schools and higher education institutions, were formed to ensure that the various needs of Estonian society were taken into account. Understanding the perspective of students was seen as one of the most important goals of discussions on the curriculum⁵².

Estonia's first national curriculum after the country regained its independence was established in 1996. This introduced the same curriculum for all general education schools. The new curriculum included general provisions and subject syllabuses, and focused on the stages of education rather than individual grades. Since then, grades 1 to 3 (ages 7 to 9) have been considered the first stage of basic education; grades 4 to 6 (ages 10-12), the second stage of basic education; and grades 7 to 9 (ages 13-15), the third stage of basic education. The state organised standardised national assessments only at the end of each basic education stage. Schools were given the flexibility to decide on the number of hours of each subject taught. However, they could not exceed the maximum weekly study load⁵³.

The national curriculum of 1996 also introduced the notion of competences and cross-curricular skills into its learning objectives. The key competences introduced included communication competence, value competence and the competence to act. Cross-curricular skills included environmental awareness and IT skills. The introduction of the curriculum coincided with the rapid digitalisation of the education system. The introduction of IT skills as a cross-curricular subject indicated the importance of digital literacy as a crucial focus of the education system and innovation⁵⁴.

Implementation of the new curriculum was hindered by a lack of resources. In 1991, Estonia regained its independence and began its transition from a socialist regime under totalitarian occupation to a democratic capitalist system. As the country needed to reimagine and reform all its systems from the core, this required a lot of resources, which needed to be distributed among various different fields, one of which was education. Consequently, some of the goals planned could not be achieved straight away⁵⁵. Moreover, while the general part of the curriculum of 1996 focused on modern education philosophy, subject syllabuses were still heavily subject-oriented, following more traditional teaching approaches, and enforcing the Soviet model of a top-down approach to education (OECD, 2001). This top-down approach remained part of educational decision-making, despite later improvements in the curriculum. Tensions between curriculum makers and teachers remained, and the involvement of teachers in curriculum development remained rather formal (Erss, et al., 2014).

A second version of the national curriculum was introduced in 2002. The new curriculum defined competences as the ability to function effectively in a particular activity or field, based on knowledge, skills, and values. These were divided into general competences and subject-based competences, presented as learning outcomes; and cross-subject competences. In this curriculum, the learning outcomes for general competences were divided according to study levels rather than specific school years (Jaani, 2004). While the provision of clear definitions for different competences might have helped in planning the school curriculum, critics of the reform believed that too many competences were introduced, and the curriculum was criticised for envisaging an unreasonably heavy workload for students⁵⁶.

The 2002 national curriculum also defined how many lessons in each subject should be included at each stage of education. It was hoped that this change would provide more guidance for teachers in their daily work. However, the decision to regulate the number of lessons per subject was criticised by the public and by relevant stakeholders. This regulation was seen as too precise to follow, and teachers of some subjects felt that due to this reform the number of lessons in

⁵² Information gathered during consultations with national stakeholders.

⁵³ Information gathered during consultations with national stakeholders.

⁵⁴ Information gathered during consultations with national stakeholders.

⁵⁵ Information gathered during consultations with national stakeholders.

⁵⁶ Information gathered during consultations with national stakeholders.

their subject had been unreasonably reduced. Existing studies also show that Estonian teachers felt that their opinions and expertise did not matter, and that the new reform contradicted the thinking behind the 1996 curriculum reform, which presented teachers as education policy-makers (Erss, et al., 2014). However, the national stakeholders consulted did not consider this curriculum change as limiting the autonomy of schools and teachers, because the curriculum also foresaw an opportunity for schools to allocate a certain number of lessons to subjects of their own choosing⁵⁷.

Introduction of the present version of the national curriculum began in 2011. This is divided into the curriculum for basic schools and for upper-secondary schools. The decision to divide the national curriculum to correspond with the different levels of education stemmed from a decreasing number of students, especially in some municipal upper-secondary schools. Starting with the curriculum reform, the state began to optimise the upper-secondary school network, creating state gymnasiums. The two curricula defined the values of basic education, teaching and learning goals, teaching methods and the learning environment, study organisation, evaluation mechanisms, and school curriculum organisation.

In the 2011 curricula, key competences are based on the recommendations of the European Commission on Key Competences for Lifelong Learning. Eight general competences were introduced into the Estonian curriculum: culture and values, social and citizenship, self-determination, learning, communication, mathematics, science and technology, and entrepreneurship. Digital competence was also added later.

With the curriculum update in 2011, schools gained additional opportunities to make autonomous decisions. They were allowed to change the list of subjects defined in the national curriculum (with the consent of the school's board of trustees), and to decide how subjects would be taught, as long as students mastered the learning outcomes stated in the national curriculum. For example, language could be merged with another subject and, consequently, lesson distribution among subjects could be changed. However, the learning outcomes should be achieved in both subjects⁵⁸.

Observed effects of the reform

The effectiveness of curriculum reforms cannot be assessed easily using statistical analysis methods. Such reforms tend to be introduced gradually, which makes it almost impossible to observe and quantify the effects of the reforms. Moreover, they are often introduced together with other reforms, which makes it impossible to distinguish the effects of the various reforms from each other. However, the existing studies and closer analysis of the curriculum changes may help to determine the plausible effectiveness of the curriculum reforms presented.

Existing studies of Estonia's performance in PISA list the curriculum reform of 1996 as one of the influential reforms that has potentially contributed to the high level of high academic achievement among Estonian students. The main factors contributing to the success of this curricular reform, according to existing studies, is its focus on competences and the greater academic autonomy of schools (Tire, 2021). These findings are supported by other studies that analyse the general factors that can contribute to better educational outcomes.

Quality education is determined not only by academic achievement, but also by sufficient attention being paid to the development of socio-emotional, behavioural and cognitive competences which, in turn, help students achieve higher academic success (Cohen, 2006). Consequently, it can be argued that an increased focus on competences and cross-curricular skills has improved the quality of education in Estonia and helped students master the skills measured by PISA.

A study by Hanushek, Link and Woessmann (2013), which analyses PISA data from 2000-2009 in 42 countries, shows that increased school autonomy tends to have a positive effect

⁵⁷ Information gathered during consultations with national stakeholders.

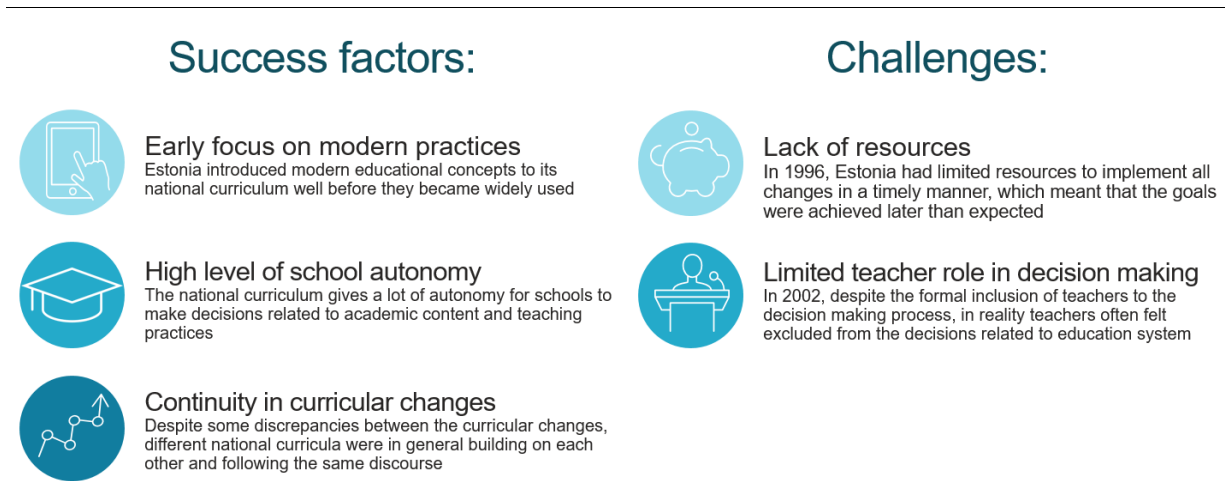
⁵⁸ Information gathered during consultations with national stakeholders.

on students and their academic achievement. The study finds that these effects are the most pronounced when the increased autonomy affects decision-making in relation to academic content. As Estonia's new curriculum focused specifically on increasing school autonomy over teaching content, the findings of the aforementioned study support the claim that curriculum reform in Estonia has contributed to the improvement in the academic achievement of students. The stakeholders consulted also believed that moving away from the highly centralised system in Soviet times by giving greater autonomy to municipalities and schools through the gradual and continuous process of curriculum reform has contributed to Estonia's success, as measured by PISA⁵⁹.

Success factors for and main challenges to the implementation of the reform

Findings from the existing studies, together with consultations with the national stakeholders, has helped to identify several factors that may have contributed to the potential success of Estonia's curriculum reforms, as well as the challenges that were faced during the implementation process (see the figure below).

FIGURE 16. SUCCESS FACTORS AND CHALLENGES THAT AFFECTED THE CURRICULAR CHANGES IN ESTONIA SINCE 1996



Several factors contributed to the effectiveness of Estonia's curriculum reform. First, it is crucial to mention that **Estonia took an innovative approach towards curriculum development (an early focus on skills and competences), and used its post-Soviet transition process as a chance to re-think education policy.** Other countries have realised the importance of competence and skill development in education only more recently. Until the reform, teachers were given a fairly detailed description of what they should teach in each subject. After the reform, more attention was given to what students should know and be able to do (an output-oriented curriculum). Teachers were exposed to contemporary ideas such as the competence-based curriculum, general and cross-curricular competences, and subject strand competences. Initially, this created some confusion and resistance among teachers, but more than 20 years later it is recognised that a very innovative and positive change was implemented (Tire, 2021). Learning from the Finnish comprehensive school system was also an important enabler.

Such innovative curricular reform was also possible due to the fact that the **implementation process was accompanied by a high level of trust in teachers, who were given a high level of autonomy over educational content.** The curriculum

⁵⁹ Information gathered during consultations with national stakeholders.

reform of 1996 presented teachers as education policy makers, which increased their motivation to properly implement the new curriculum and to put greater efforts into their teaching (Erss, Kalmus, & Autio, 2016). Indeed, the high academic achievements of Estonian students indicate that the real autonomy provided to teachers had a positive effect on the quality of education. This is in line with the findings of existing studies on the effect that increased school or teacher autonomy may have on the academic achievements of students (Hanushek, Link, & Woessmann, 2013), and the information provided by national stakeholders.

Despite some discrepancies between different curriculum changes, **the curriculum reforms followed the same discourse and were in line with the more general goals and longer-term vision for the Estonian education system.** The curriculum reforms aimed to build upon one another, which can be seen, for example, through the gradual introduction of competences into education system. The stakeholders consulted also noted that curriculum reforms were seen as a continuous development process embedded in the more general developments in Estonian society such as the process of digitalisation⁶⁰.

This process was not without challenges. After regaining its independence, **Estonia had limited resources, which may have hindered the implementation of the 1996 curriculum change.** According to the national stakeholders consulted, implementation of the new curriculum was complex, as all teaching and learning materials had to be developed and distributed from scratch. Teachers also had to be retrained to enable them to follow the new curriculum in their everyday teaching. Due to a lack of resources, these processes took longer than expected, which delayed the intended effects of the curriculum reform⁶¹.

It is also important to acknowledge that the curriculum introduced in 2002 included stricter regulations on the teaching of specific subjects, and prescribed the time that should be spent on each subject. This contradicted the discourse of the curriculum introduced in 1996, which gave more freedom to teachers and provided little regulation over teaching practices. Existing studies show that this **contradiction between the discourses followed by the different reforms resulted in teachers feeling left out of the education decision-making process** (Erss, Kalmus, & Autio, 2016).

3.2.3.3. Focus on equity and inclusion

Estonia's education system is based on egalitarian principles. Under Estonian law, general education should adhere to the principle of inclusivity and be equally accessible to all people, regardless of their social-economic or ethnic background and special educational needs. As can be seen from the analysis of PISA data above, in Estonia, compared with other EU countries, background variables have a weaker role in determining the academic performance of students. The quality of education provided in different schools also tends to be fairly comparable, which indicates a high level of inclusiveness.

Several types of support measure are available in Estonian schools. Students get free school meals, textbooks, and have access to various extra-curricular activities, among other measures. According to the Basic Schools and Upper Secondary Schools Act, schools should implement measures that support a student's development according to his or her needs and, if necessary, adjust the student's study plan according to their individual needs (Eurydice, 2019, b).

⁶⁰ Information gathered during consultations with national stakeholders.

⁶¹ Information gathered during consultations with national stakeholders.

In relation to students with special educational needs (SEN), all of the necessary conditions are in place to enable such students to participate in mainstream education. Schools have an employee or a support group that is responsible for identifying the special needs of students, specifying and applying for the required support measures, and monitoring their effectiveness. Schools and parents can seek additional guidance and support from regional guidance centres if the supportive measures applied by schools do not have the expected results (Republic of Estonia Ministry of Education and Research, n.d.)

In some instances, however, despite the existing support measures and system-level policies that favour equity, segregation still persists. As described above, linguistic segregation is fairly high, and Russian-speaking students tend to consistently underperform compared with Estonian-speaking students (European Commission, 2020, b). According to existing analyses, the continuing language-based segregation of schools developed during Soviet occupation and remained after Estonia regained its independence (Pöder, Lauri, & Rahnu, 2017). (Eurostat, n.d., b)

Several reforms and policy changes have been introduced over the last two decades to address the remaining educational inequalities in Estonia. These include changes enforced by the Basic Schools and Upper Secondary Schools Act, the gradual introduction of Estonian as a language of instruction in minority schools to tackle the linguistic segregation of schools, and an increased focus on personalised support for students facing educational difficulties, to name a few. However, one of the most interesting recent reforms affecting the inclusiveness of education in Estonia is the creation of 'Rajaleidja' centres, which aim to ensure sufficient support for students facing educational difficulties (see the box below).

BOX 5. INTRODUCTION OF RAJALEIDJA CENTRES PROVIDING EDUCATIONAL SUPPORT TO STUDENTS WITH SEN

In 2014, the state established a nationwide specialist network called 'Rajaleidja' ('Pathfinder') centres, where students with learning, psychological or behavioural difficulties can receive help. In addition, Rajaleidja centres coordinate the development of educational support services through the elaboration of new methodologies and e-services, as well as coordinating the promotion of guidance services. When the centres were established, they also provided career counselling and career information (CEDEFOP, 2016). However, these services are no longer provided in Rajaleidja.

This initiative was funded through the European Social Fund and co-funded by the Ministry of Education and Research. The goal of this national intervention is to support students in need, to reduce and prevent early school leaving and reduce the numbers of dropouts from lower-secondary education (CEDEFOP, 2016). The centres were opened in all counties (15 centres in total), and were managed centrally by the INNOVE Foundation until 2020 when it was integrated to the newly created Education and Youth Authority.

Counselling and support services for special educational needs are provided to children between 1.5 and 18 years, as well as their parents, teachers, and other relevant stakeholders. These include local governments and local specialists working with children with special educational needs or those experiencing learning difficulties or behaviour problems. The Rajaleidja centres aim to support local municipalities and specialists working in educational institutions. If the state-provided service for students does not yield the expected results, these centres can appoint a counselling committee to propose a learning curriculum for the students and provide the additional psychological and medical research needed to find alternative learning support measures (CEDEFOP, 2016).

The opening of these new support centres was motivated by the varying quality of services provided in different counties. As the idea of inclusive education was introduced in the legislation in 2010, it was realised that the support system in place was not suited to providing sufficient assistance to all children in all counties. With the opening of state-coordinated Rajaleidja centres and services for SEN students, the distribution of resources became more case-oriented. The

Rajaleidja centres are responsible for independently evaluating more complicated cases and determining further treatment, while local municipalities are entrusted with providing support⁶².

The level of inclusion of relevant stakeholders depends on a specific county. In some counties, municipalities and schools have been eager to cooperate with Rajaleidja, while in others, they did not want assistance. In Tallinn, for example, the centres found it difficult to cooperate with the municipality and schools, whose support system for students with SEN was already fairly developed and the local actors were reluctant to adopt a new approach. In smaller towns and villages, on the other hand, local actors were more willing to cooperate with the network on these matters⁶³.

The system of support for SEN students is constantly developing, to ensure the quality of its services. Additional efforts are being made to ensure the system is transparent. The support system tries to ensure that the decisions regarding support for SEN students are research-based and the approaches taken are in line with the principles of inclusive education⁶⁴.

Observed effects of the reform

Existing research that focuses on the career counselling services initially provided by Rajaleidja centres shows that these services were well regarded by both stakeholders and the target group (CEDEFOP, 2016). The work of Rajaleidja centres to support students with special educational needs is less well researched, and its effectiveness has not yet been rigorously assessed.

In theory, such interventions should result in improvements in the performance of low-achieving students, as measured by PISA. As Estonian PISA results demonstrate, between 2015 and 2018 the scores of low-achievers in all three domains remained fairly stable, with only a slight improvement (1 percentage point) observed in maths performance.

It is important to note that the percentage of SEN students participating in PISA is very low (LeRoy, Samuel, Deluca, & Evans, 2019). Consequently, it is possible that the effect of the introduction of Rajaleidja centres is not visible in PISA, as the target group of the centres is highly underrepresented in the sample. For example, the national stakeholders interviewed noted that the positive effects of the centres observed included greater support for the parents of students with SEN, and improved relationships between children with SEN and their parents after services were provided⁶⁵. These positive effects are still very important, even though it is not possible to detect them in the PISA data.

Success factors for and main challenges to the implementation of the reform

While there is lack of rigorous assessment of the effectiveness of Rajaleidja centres, the national stakeholders interviewed perceive their introduction as fairly successful. Several factors may have contributed to the perceived effectiveness of this intervention (as summarised in the figure below).

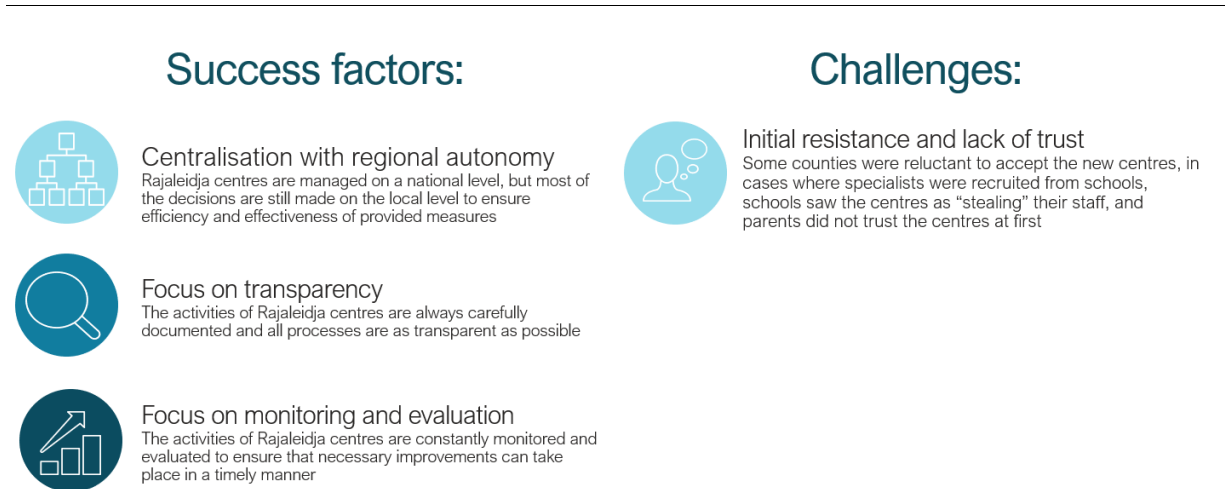
⁶² Information gathered during consultations with national stakeholders.

⁶³ Information gathered during consultations with national stakeholders.

⁶⁴ Information gathered during consultations with national stakeholders.

⁶⁵ Information gathered during consultations with national stakeholders.

FIGURE 17. MAIN SUCCESS FACTORS AND CHALLENGES INFLUENCING THE EFFECTIVENESS OF THE NEWLY INTRODUCED RAJALEIDJA CENTRES



Firstly, **the initiative employed a more centralised approach, which contributed to the more efficient use of resources, but still allowed regional autonomy.** There are 15 Rajaleidja centres (one per county, covering all regions of Estonia), replacing 26 guidance centres. The activity of the previous support measures was somewhat fragmented, their quality varied, and some counties lacked certain specialists. As the number of new centres is smaller, the resources can be used more efficiently to ensure higher-quality services are provided. Quality is also ensured by giving the centres a high degree of autonomy, despite their relatively high level of managerial centralisation. Each centre can develop and plan its work and activities depending on the specific needs of the beneficiaries in its region (CEDEFOP, 2016).

Transparency in the activities of the centres was prioritised. The Rajaleidja centres and their activities are well documented, with information being accessible to everyone concerned⁶⁶. This has also helped to address initial resistance and doubts about the intervention from the school community and families.

Furthermore, built-in monitoring and evaluation systems for Rajaleidja centres may have contributed to their perceived success. The effectiveness of the support measures is evaluated and monitored constantly to enable further improvements. As the national stakeholders mentioned in interviews, the services provided are constantly evolving and improving⁶⁷.

Lessons for future education reforms in Estonia

Estonia continues to outperform other countries in overall PISA performance. According to existing studies, several factors contribute to the high performance of Estonia. These include highly qualified teachers, a strong evidence base resulting from the comprehensive assessment and monitoring system, positive public attitudes towards education, and a generally well-developed educational landscape (Vukovic, 2018). Because the success of Estonia depends on various factors, it is difficult to single out individual reforms that have contributed to the country’s high performance in PISA. The present analysis of Estonian performance in PISA focuses on three different fields in which several reforms have taken place – namely, the introduction of the external assessment and internal school self-

⁶⁶ Information gathered during consultations with national stakeholders.

⁶⁷ Information gathered during consultations with national stakeholders.

evaluation system; changes in the national curriculum; and the introduction of the Rajaleidja centres, which aim to ensure high-quality support for students with SEN.

While process of implementing each of these reforms has faced specific challenges, a number of systemic characteristics of the Estonian education system have shaped the outcomes of the discussed reforms, as well as possible future reforms. The important lessons to highlight are:

- **Long-term vision for equity and quality of education:** each new intervention or reform is linked to the overall vision for educational development. Even though, in some cases, educational reforms in Estonia have not always followed the same direction, such as the curriculum change in 2002, which was seen as limiting teachers' participation in educational decision-making process (Erss, Kalmus, & Autio, 2016), in most cases, educational reforms over the past two decades have adhered to a consistent long-term vision. The most drastic changes in Estonia's education system took place just after the country regained its independence. Other changes and reforms were built upon the basis laid down in the 1990s⁶⁸.
- **Crucial role of local actors, schools, and teachers in the implementation of educational changes.** As mentioned, Estonia's education system is decentralised. The analysed reforms, specifically the introduction of the assessment and internal evaluation system and curricular changes, acknowledged the important role of schools and teachers in promoting educational innovation. Existing studies argue that education reforms often fail because they do not focus on changing pedagogy and daily teaching practices (Bolden & Tymms, 2020). However, in Estonia's case, schools and teachers are seen as the main designers and implementers of the reforms, which ensures their buy-in from the start. The 2002 curriculum reform showed that when the freedom of teachers is limited and the reforms are seen as top-down changes, teachers are less motivated to implement them (Erss, Kalmus, & Autio, 2016).
- **Priority given to an adequate balance between centralisation (through accountability mechanisms and centralised management) and local focus (through a high level of autonomy), as well as a focus on generating sufficient evidence for education decision-making.** This is accompanied by a well-established culture of evaluation.

3.3. Latvia

Educational context and key policy issues

Since Latvia regained its independence in 1990s, the country has aimed to improve the quality of its education system. It began by setting up a strong basis for the education system with clear goals and objectives, and later focused on ensuring high quality through, for example, the implementation of quality assurance measures. However, some challenges still remain in the efforts to ensure the quality and equity of education in the country.

The quality of education in Latvia is threatened by a lack of qualified teachers and the inefficient use of resources. More specifically, accessible, high-quality professional development programmes are rare and no formal system of support for teachers exists. The teaching profession is also not seen as attractive in Latvia, resulting in a low number of new teachers. (OECD, 2020, c). This poses the risk of a future teacher shortage. However, teacher shortages are already a serious problem for some municipalities and

⁶⁸ Information gathered during consultations with national stakeholders.

schools (European Commission, 2020, c). Moreover, quality assurance mechanisms are still not fully efficient, as education institutions often lack the capacity to use the data from evaluations and assessments to carry out systematic improvements. Resource allocation and the sharing of responsibility also hinders the quality of education. Local authorities have limited autonomy and capacity to raise income, which negatively affects their ability to address various context-specific challenges. (OECD, 2020, c). School networks in the country are also organised fairly inefficiently due to their large size, and maintenance requires a great deal of resources (European Commission, 2020, c).

Inclusiveness in education also remains a challenge for Latvia, even though analysis of PISA data shows that individual background variables tend to have a limited influence on students' academic achievement. The quality of the education available often depends on a student's geographical location (European Commission, 2020, c). The share of early school leavers also differs between rural and urban areas, as well as between men and women (9.5% and 4.7% respectively, in 2020). (Eurostat, n.d., b). Moreover, the education of students with SEN remains rather segregated (European Commission, 2020, c). For example, in the school year 2016/2017, only 39.1% of students with SEN in primary and secondary education were educated in inclusive educational settings (EASIE, 2018, p. 88). Ethnic segregation remains high, and is seen as an important challenge despite efforts to ensure the better integration of students from ethnic minorities through the introduction of Latvian language as a language of instruction in language minority schools (Kalniņš, 2004). Differences in the quality of education in Latvian and ethnic minority schools remain, and further reinforce inequalities in society. The PISA data show that around 30% of all students in Latvia speak a language other than Latvian (mainly Russian), which means that changes in ethnic minority education affect around one-third of all students. Finally, bullying is an important problem, affecting education equity and quality. In 2018, the proportion of students who reported being bullied in Latvia was the highest in the EU. As many as 35.5% of students reported being bullied at least a few times per month (European Commission, 2020, c). The existing evidence also shows that bullying has a slightly greater negative effect on Latvian students than it does on average across the EU. As the index of exposure to bullying increases by one unit, the reading performance of Latvian students decreases by 18 points according to the in PISA 2018 data. The corresponding decrease on average across the EU was equal to 11.6 points. The National Guidelines for the Development of Education 2021-2027 highlighted the need to reduce bullying in schools, but the measures to do are still yet to be implemented, and their effectiveness is likely to be seen only after a few years (European Commission, 2021, c).

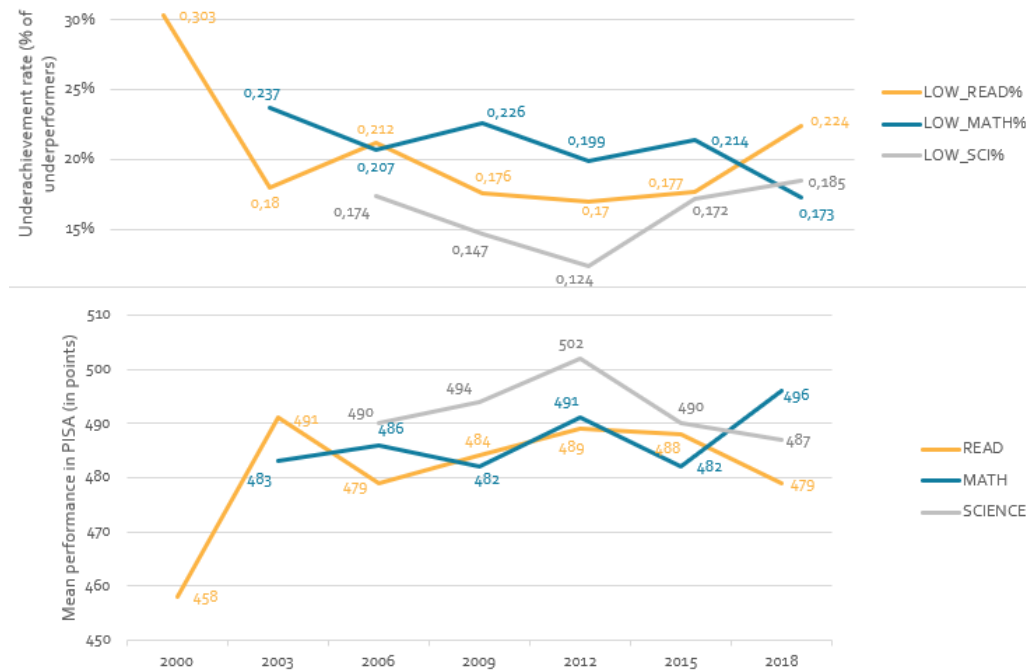
Key trends in students' performance

In 2018, the scores of Latvian students in mathematics, reading and science were similar to the EU average. However, the share of underachievers who underperform in all three domains was lower than the EU average (9.2%, compared with 12.6%) (European Commission, 2020, c), which may show that the changes implemented in the Latvian education system were not as effective as hoped.

Latvia's average performance in PISA has fluctuated over the years, and several improvements can be observed. Mean performance in mathematics was higher in 2018 than in 2009. Latvian PISA performance in reading was also higher in 2018 than 2000, despite a decrease in performance between 2015 and 2018. Mean performance in science increased between 2006 and 2012, but due to decrease since 2012, Latvia's performance in science in 2018 is now lower than in 2006. The underachievement rate in all three domains has followed a reverse trend. It is also important to note that underachievement rates in Latvia in 2018 did not meet the ET2020 goal of 15%. Underachievement in

mathematics stood at 17.3%, underachievement in science at 18.5%, and underachievement in reading at 22.4% (see Figure 18).

FIGURE 18. MEAN PISA PERFORMANCE AND UNDERACHIEVEMENT RATES IN LATVIA 2000-2018



Source: PISA data.

Note: the graph presents the trends in mean student achievement in Latvia between 2000 and 2018, as well as variations in the mean rate of low-achieving students.

As mentioned above, equity remains a challenge in certain educational settings. However, some improvements can be observed with regard to inclusive education, as seen in Figure 19.

Between 2009 and 2018, the gender gap in reading performance in Latvia decreased by 14 points, even though it remained statistically significant (favouring girls). However, this decrease occurred because of a drop in girls’ performance rather than an increase in boys’ performance, which points to a lack of equity despite this change. Moreover, a similar decrease in the gender gap in reading performance was observed across all countries participating in PISA, and was probably caused by a shift from paper-based tests to computer-based tests, which are seen to be more detrimental to girls (OECD, 2016, b).

The performance gap between students who had to repeat a grade and those who did not decreased between 2012 and 2018. However, due to a previous increase between 2009 and 2012, the gap in 2018 was still wider than it was in 2009. It is important to note that over the same time period, the share of students repeating a grade decreased from 11% to 3%. This indicates that, in general, support for underperforming students has probably improved.

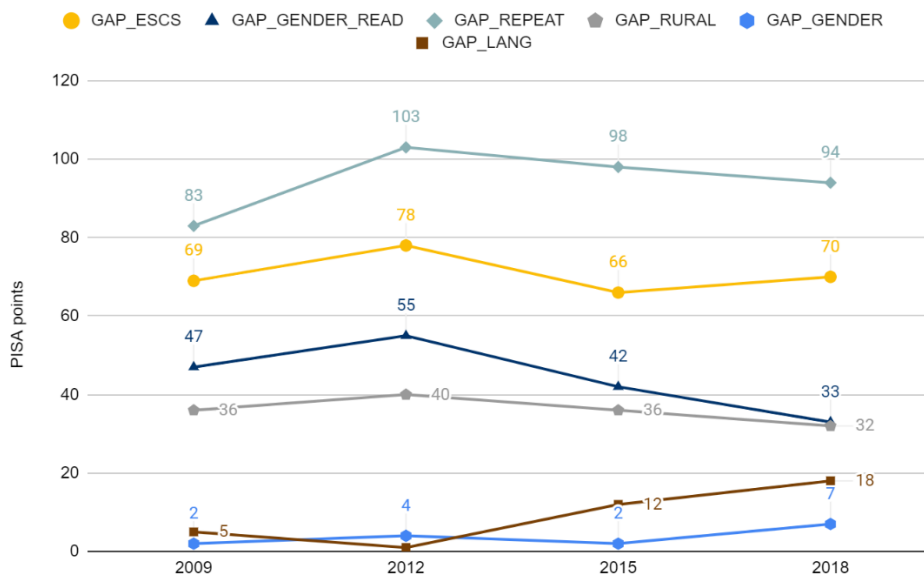
The performance gap between students living in rural and urban areas⁶⁹ decreased between 2012 and 2018, and while the gap in 2018 was smaller than in 2009, the difference is not

⁶⁹ Cities or urban areas are defined as having 100,000 residents or more, while a rural area or village is defined as having fewer than 3,000 residents.

significant. It is also important to note that the share of students who declared that they lived in rural area decreased significantly between 2009 and 2018 (from 32.5% to 19.6%).

The performance gap between low-achievers and high-achievers has also decreased between 2009 and 2018, indicating increasing access to quality education for all.

FIGURE 19. PERFORMANCE GAP BETWEEN STUDENTS IN MATHEMATICS IN LATVIA 2009-2018



Source: PISA data.

Note: the graph presents trends in performance gaps in Latvia between certain categories of students (boys vs. girls; students in rural environments vs. students living in cities...) for the 2009-2018 time period. All gaps are presented as absolute values, so that the graph is easier to understand. However, all of these gaps are actually negative (meaning a difference in favour of the most advantaged category of the comparison). While all the gaps relate to performance in mathematics (the most interesting domain for analysis), the gap between boys and girls (GAP_GENDER) is also presented, as the gender gap is usually larger in reading than in mathematics or science. The gap between students following an academic vs. vocational track is not represented, due to the very low rate (less than 1%) of students in VET.

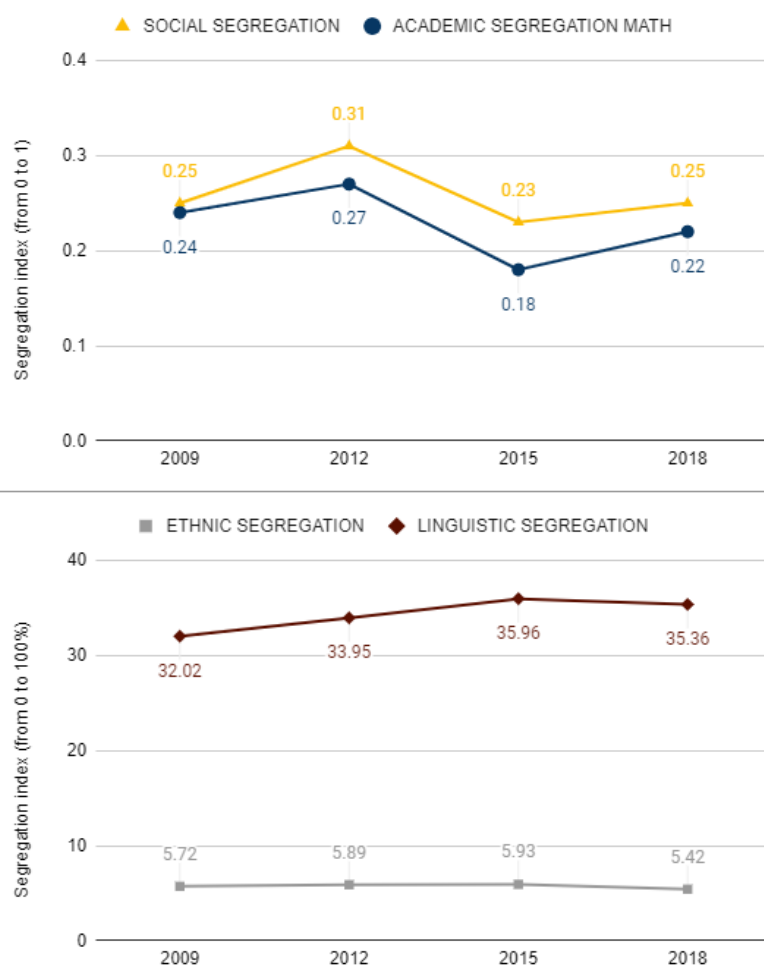
Some fluctuations can also be observed in segregation indicators in Latvia. Social and academic segregation⁷⁰ decreased between 2012 and 2015, but reached the same level as in 2009. Ethnic segregation⁷¹ remained low and stable between 2009 and 2018. However, this indicator mostly demonstrates that Latvian schools are heterogeneous with regard to the immigration status of their students, but does not consider those ethnic non-Latvians whose families have lived in the country for generations. To capture this group of students, a linguistic segregation⁷² variable was constructed. This variable shows that language-based school segregation is prominent (above 30%), and has increased between 2009 and 2018. This increase in language-based segregation remains high, despite Latvia's efforts to increase inclusion through the introduction of Latvian as a language of instruction in ethnic minority schools.

⁷⁰ Variable SOCIALSEGR and ACADEMICSEGR. For more information, see Annex 2 – Methodological approach section 2.1.3. Variables used for statistical analysis.

⁷¹ Variable ETHNICSEGR. For more information, see Annex 2 – Methodological approach section 2.1.3. Variables used for statistical analysis.

⁷² Variable LANGSEGR. For more information, see Annex 2 – Methodological approach section 2.1.3. Variables used for statistical analysis.

FIGURE 20. VARIATION IN SCHOOL SEGREGATION IN LATVIA 2009-2018



Source: PISA data.

Note: the segregation index can have a value between 0 and 1. 0 means no segregation (none of the variance in performance between schools can be explained by the school attended); 1 means complete segregation (the school attended can explain 100% of variance between schools).

The analysis of the effect of the various individual and school-level factors that may affect student achievement, conducted through the multi-level regression model⁷³ using PISA 2018 data, confirms the persistent challenges in Latvia with regard to inclusion. Boys from socio-economically advantaged backgrounds, who never have faced grade repetition and who attend schools with socially privileged backgrounds, are likely to perform better in mathematics than other students (see Figure below).

⁷³ The model tested the effect on students' performance of individual background variables (gender and ESC); variables relating to the academic path (grade repetition and having more than four periods of mathematics per week); and school climate variables at individual and school levels. The presented variables presented are those that had a significant effect. For more information, see Annex 2. Country Profiles, Latvia.

FIGURE 21. FINDINGS OF THE MULTI-LEVEL REGRESSION ANALYSIS OF PISA 2018 DATA FOR LATVIA

Students in Latvia perform better in PISA (mathematics) if:



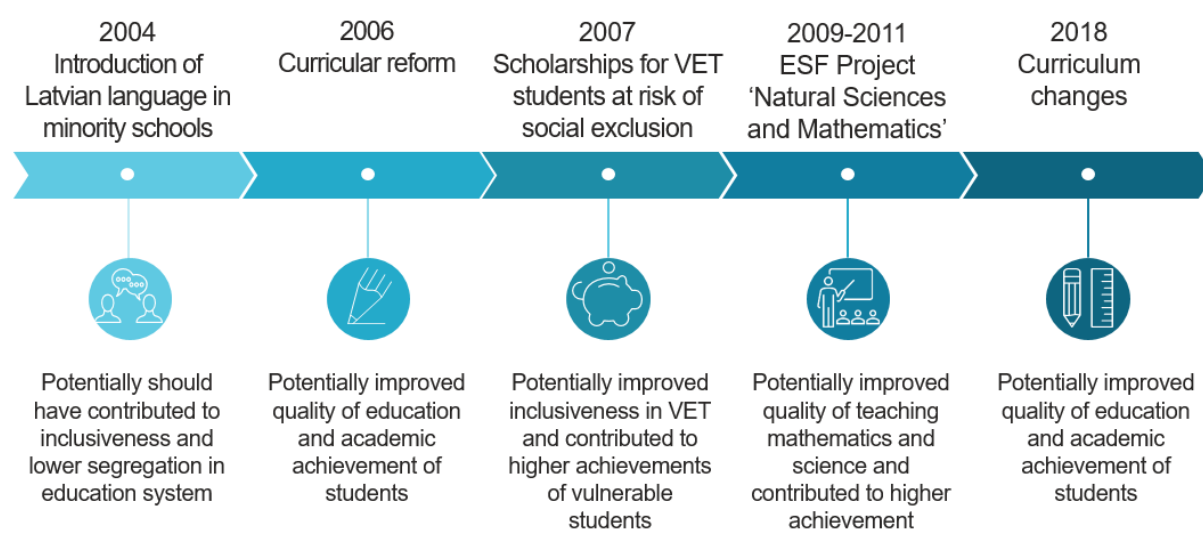
Source: multi-level regression analysis conducted for the study based on the PISA 2018 data. As mathematics is the most interesting domain in Latvia (given the positive performance trends), all the gaps presented are calculated for performance in mathematics.

Key policies associated with the improvements observed

Latvia's performance as measured by PISA has fluctuated over the years, but without any significant changes in the long run. However, some important improvements can still be discerned:

- An increase in students' mean performance in mathematics between 2009 and 2018;
- An increase in students' mean performance in reading between 2006 and 2015;
- A narrowing of the gap between low-achievers and high-achievers between 2000 and 2018, due to an increase in the performance of low-achievers.

Based on PISA data and existing studies, it is possible to identify some reforms that may have contributed to these improvements (see Figure 22).

FIGURE 22. REFORMS POTENTIALLY LINKED TO IMPROVEMENT IN ACADEMIC PERFORMANCE IN LATVIA


The reforms presented above tackle two main aspects of Latvia's education system – equity and curriculum development. However, the effectiveness of some of these reforms cannot be analysed due to a lack of variables in the PISA dataset that can trace the effect of these reforms (e.g. the introduction of scholarships for VET students) or because the reforms are too recent for any effect to be observed during the time period analysed (curriculum changes in 2018). Consequently, the introduction of Latvian as a language of instruction in minority schools, the 2006 curriculum reform and the accompanying ESF-funded intervention to boost the quality of teaching in science and mathematics are analysed as potentially important reforms.

3.3.3.1. Language policy

While inclusive education has been a challenge in Latvia over the past two decades, more focus has been placed on ensuring equity. Some system-level policies in Latvia favour equity, such as a longer period of compulsory education, delayed streaming into academic or vocational tracks, limited school choice, academic inclusiveness and little grade repetition (OECD, 2020, c).

Despite several favourable practices at system level, concerns over equity still exist with regard to students in rural schools and ethnic minority schools in Latvia. In relation to the education of students from ethnic minorities, Latvia has had a tradition of separate minority education since the early 20th century, which is still followed to this day (Eurydice, 2020, d). Even though the Latvian language has been partly introduced as a language of instruction in minority schools to ensure greater inclusion of students from ethnic minorities (see the box below), language-based school segregation still remains an important problem (Kalniņš, 2004) (OECD, 2020, c).

BOX 6. INTRODUCTION OF LATVIAN AS A LANGUAGE OF INSTRUCTION IN MINORITY SCHOOLS

Until the mid-1990s, Latvia had two separate education systems – one with Latvian as its language of instruction, and one using Russian. However, after the country regained its independence, it quickly became clear that such a system perpetuated existing social inequalities

and segregation. Consequently, shortly after regaining independence, Latvia began to focus on integrating minority schools into its general education system.

The integration of minority schools into the Latvian education system began with the gradual introduction of Latvian language into such schools. Since the school year 1995/1996, two subjects in minority schools from primary up to lower-secondary level (grades 1-9) have had to be taught using Latvian as the language of instruction.

In 1998, a new Education Law was adopted, which laid down clear foundations for the Latvian education system, such as a focus on unity and equality. The new law ensured that minority programmes included both content focusing on the cultural heritage of the ethnic minority and an adequate knowledge of the Latvian language, facilitating the integration of minority students into Latvian society. The new Education Law presented four models for minority education programmes, which determined how many subjects should be taught in Latvian and other languages, as well as how many subjects should be taught bilingually. Each minority school was able to choose which model to follow in developing its school curriculum. The selection of these models took place gradually until 2002. By the school year 2006/2007, all schools providing education specifically tailored to ethnic minorities had introduced their selected model of minority education for grades 1-9 (Hogan-Brun, 2006).

In 2004, a new reform was put in place, requiring at least 60% of teaching in all public upper-secondary schools, including minority schools that taught predominantly in a minority language (often Russian), should be carried out in the state language (Latvian). This change was implemented following the new State Language Law, introduced in 2000, which presented proficiency in Latvian as a prerequisite for the successful integration of individuals into public life and the labour market in Latvia.

Beginning in 2007, minority educational programmes received the materials for the 12th-grade state examination in Latvian, but students could still choose whether to take the exam in Latvian or a minority language. The planned changes in minority education were discussed with the relevant stakeholders. For example, the preparatory working group for the Education Law consisted of international experts, the directors of minority schools, and teachers and specialists from the Ministry of Education and Science. Decisions regarding changes to the education system, including minority education, were also based on the experiences of other European countries in providing bilingual education models.

The introduction of Latvian as a language of instruction was gradual and a time period was foreseen over which municipalities could prepare. Even though schools had to choose minority education models in 2002, and the change in the proportion of Latvian used as a language of instruction in minority schools was introduced in 2004, the schools were offered three more years to prepare for these changes. Those students who were in grades 11 and 12 when the changes to minority education were introduced in 2004, continued their studies according to the old regulations, which required only three subjects to be taught in Latvian. A complete transition to the new system came into force only in the school year 2007/2008 (Hogan-Brun, 2006).

As a large proportion of Latvian population are native Russian speakers, these changes in minority education were seen as very controversial. The dissatisfaction with the changes stemmed from the close relationship between language and identity in Latvia (Hogan-Brun, 2006).

From 2017 onwards, informed by the Language Situation in Latvia: 2010-2015 report (Kļava, 2018), Latvian has gradually become the principal language of instruction. From 2017, all centralised examinations must be administered in Latvian. An amendment to the Education Law (2018) made Latvian the principal language of instruction at upper-secondary level (from 2021/22) and ruled that at least 50% of the curriculum must be taught in Latvian in primary school, and 80% at secondary level. As of 2022/2023, all general subjects at upper-secondary education level will be taught in the state language. Minority students continue to have the opportunity to study their own language, literature, and culture through their mother tongue.

Observed effects of the reform

The reform primarily aimed to ensure equal access to quality education for all, and secondly to increase the participation of ethnic minority students in VET, in which Latvian is the principal language of instruction, and higher education, where programmes are in Latvian or other official languages of the EU.

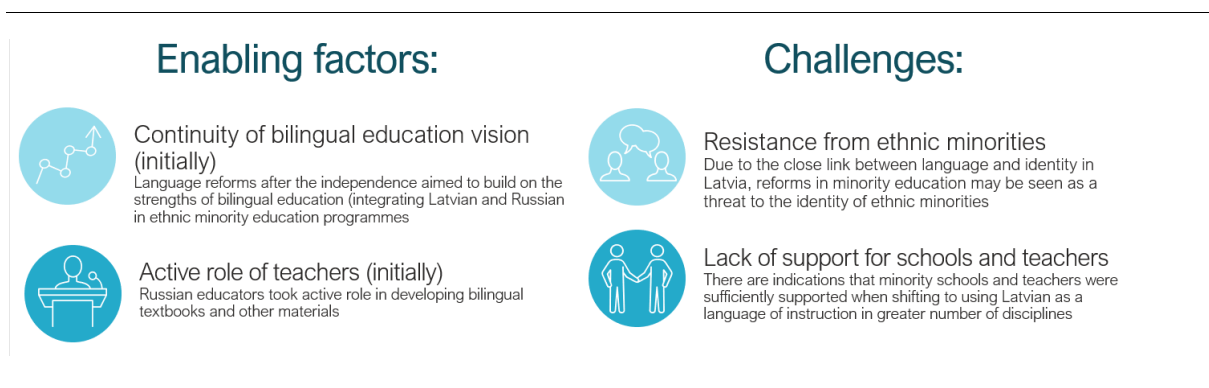
However, the reform has raised concerns regarding the capacity of minority schools to deliver change without compromising quality. Most teachers in minority schools are Russian speakers, and while they have had extensive training in Latvian, it is still challenging for them to implement the new curriculum solely in Latvian, as the national stakeholders point out. While the government plans to develop and provide teaching aids and methodological materials, and to improve the professional competencies of teachers, existing anecdotal evidence suggests that the teacher support provided so far has been insufficient.

Figure 19 shows that while the performance gap in the PISA data based on the language spoken at home was not significant in 2009 and 2012, this performance gap became significant in 2015 and 2018, and has been increasing. In 2018, students who spoke Latvian at home scored, on average, 20 points higher in the PISA assessment (in mathematics) than students speaking a language other than Latvian at home (e.g. Russian or other). Indeed, a study analysing the results of the centralised exams in Latvia's secondary schools between 2000 and 2011 found that, since the linguistic reform, the exam results of minority students have deteriorated significantly in comparison to the results of majority students. These negative effects of the reform were most pronounced just after its implementation (Ivlevs & King, 2014). Another study looking into the effects of Latvian language policy on students in Russian-medium schools between 2003 and 2012, however, observes some gradual improvements in performance among Russian-speaking students (Khavenson & Carnoy, 2016). According to the authors, the policy of imposing Latvian language requirements on Russian-medium schools in the 1990s and 2000s as part of a wider effort to legitimise the state had an 'unintended' impact on Russian students' achievement gains, due to the positive effects of bilingual education on learning (in terms of general competence development). However, as the current analysis shows, the gap between Latvian- and Russian-speaking students has been increasing significantly since 2012, which could be linked to the transition to Latvian being the sole language of instruction in secondary schools. This has effectively brought an end to minority language programmes in Latvia, but this change has not been accompanied by sufficient support for language minority schools to ensure the quality of teaching. This shows that while the reform was expected to improve equity in education system, it has resulted in greater inequality and worse education outcomes for certain groups of students.

Main success factors for, and challenges to, the implementation of the reform

Existing studies, and the lack of improvement in PISA data for students in minority schools, indicate that the changes in minority education in Latvia, which aimed to ensure greater inclusion within the education system, have not yielded the intended results in the long term.

FIGURE 23. MAIN ENABLING FACTORS FOR, AND CHALLENGES TO, THE IMPLEMENTATION OF BILINGUAL EDUCATION REFORM IN LATVIA (2004)



The education law of 1998 mandated the introduction of the Latvian language in a flexible fashion into primary schools (grades 1 to 9), according to various models at the discretion of the Russian-medium schools themselves. Despite (or perhaps because of) this flexibility, by the early 2000s, many Russian-speaking first- and second-graders were learning to read Latvian along with Russian (Khavenson & Carnoy, 2016). The 1998 education law, in addition to mandating Latvian as the sole language of instruction in universities, required Russian-medium secondary schools (grades 10 to 12) to teach courses in Latvian in a 60/40 proportion, beginning in 2004. While the Latvian requirement in primary schools met with little resistance due to the wide range of options available, the secondary school language requirement became a source of political conflict between the Russian minority community and the government, resulting in the delayed implementation of the rule (Ivlevs & King, 2014).

Some stakeholders emphasise that the flexibility given to Russian-medium schools in implementing the requirements also resulted in school communities taking a more active role of in adjusting teaching practices and developing new teaching materials built on bilingual education principles (Khavenson & Carnoy, 2016). This was accompanied by general education reforms (e.g. the development of new curricula, professional development focusing on the individualisation of teaching and teachers' autonomy) linked to transition of the country away from the Soviet education model.

However, as the consultations with stakeholders demonstrate, the language education reform was not accompanied by the supporting delivery system to ensure its effective implementation. Firstly, **available evidence suggests that the minority schools and their teachers did not receive enough support to implement the required changes.** While there was an inception phase during which the ethnic minority schools could have prepared to implement the changes, it is unclear whether all of them had the capacity to do so (e.g. sufficient proficiency in the Latvian language among the teaching staff). Sufficient availability of teaching materials was also questionable, which affects the delivery of quality education.

The linguistic reforms are likely to be seen as very controversial, due to the close relationship between language and identity in Latvian society. The reform in 2004 sparked a heated public and political debate, and even resulted in protests (Hogan-Brun, 2006). Even though the relevant stakeholders, such as international experts, the directors of minority schools and teachers, were involved in the working group for the Education Law, there is a lack of evidence that their involvement was seen as sufficient by the general public. This challenge stems from the history of Latvia and the close connection of language to the understanding of identity. While more information campaigns about similar reforms and the active public involvement of ethnic minority representatives in the decision-making process may improve public opinion slightly, such reforms will still be received negatively by at least part of ethnic minority communities. This is well illustrated by the example of public opinion regarding the recent changes in minority education introduced by amendments to the Education Law and the Law on General Education adopted in 2018. According to the new amendments, by the school year 2022/2023 all general education subjects except foreign languages in upper-secondary schools will be taught in Latvian. A new bilingual education model also ensures that at least 50% of education content in grades 1-6, and at least 80% in grades 7-9, is taught in Latvian. Public consultations were organised in preparation for this change. While the representatives of the Russian community complained that the consultations with the representatives of the ethnic minorities were insufficient, the number and variety of public meetings devoted to these reforms indicate that they should have provided enough opportunities for ethnic minorities to express their opinions and criticisms (European Commission for Democracy through Law (Venice Commission), 2020).

3.3.3.2. National curriculum

Reforms of the curriculum in Latvia have been carried out ever since the country regained its independence. In 1998, together with the Education Law, the National Education Standards for Compulsory Education (for grades 1-9) were introduced. The National Standards emphasised the application of knowledge rather than just its acquisition, and focused on interdisciplinary skills such as problem-solving. It clearly defined learning outcomes for students in grades 3, 6 and 9, outlined the main goals and objectives of compulsory education, and the fundamental procedures for student assessment. The goal of the National Standards was to provide clear instructions and expectations for the municipalities and schools, under which they could find the best way to teach their students (OECD Centre for Co-Operation with Non-Members, 2001). However, the implementation of the National Standards in 1998 was hindered by insufficient funding and human capacity, and they came into force almost a decade later (in 2006, when the new National Standards for Education were introduced) (see Box 7).

BOX 7. CURRICULAR CHANGES IN LATVIA IN 2006

The curriculum reform in 2006 built upon the National Standards introduced in 1998, and followed similar principles and general objectives to the 1998 National Standards. However, the implementation of the new curriculum was better thought out⁷⁴.

First of all, expert consultations were foreseen during the planning of the changes to the curriculum.

Moreover, educational experts working on the implementation of the new curriculum worked closely with school administrations, teachers, parents and even students themselves. It was hoped that the inclusion of a broad group of stakeholders would help the experts to better understand how the new curriculum was to be implemented, and what could be improved⁷⁵.

The curriculum reform was also accompanied by support measures to ensure its effective implementation. For instance, new textbooks were developed, initial teacher training programmes were adapted to the curriculum changes, and in-service training for teachers on the new curriculum was organised. Guidance and support was provided to schools. Educational experts who were involved in the development of the curriculum reform and the ESF project (presented below) consulted schools on how the curricular changes should be implemented. New textbooks and other educational materials (such as a suggested curriculum) were provided to schools. Accompanying the curriculum reform, initial teacher training included information on modern student-centred pedagogical approaches and the development of transversal skills and competences. In-service teachers were able to attend continuous professional development focusing on modern pedagogical approaches and the development of skills and competences⁷⁶.

The new curriculum defined general educational standards and the education outcomes expected, but also provided a high level of autonomy for schools and teachers. According to the new curriculum, teachers were able to develop their own teaching programmes as long as these respected the requirements outlined in the subject standards. The policy community also hoped that the curriculum reform would allow education to respond to the changing needs of Latvia's society and labour market⁷⁷.

Latvia's Ministry of Education carried out a few other initiatives to support the implementation of the curriculum reform, such as the 'Natural Sciences and Mathematics' project financed through the European Social Fund. During its first stage (2005-2008), this project focused on improving the teaching of natural sciences and mathematics for grades

⁷⁴ Information was gathered via interviews with relevant national stakeholders.

⁷⁵ Information was gathered via interviews with relevant national stakeholders.

⁷⁶ Information was gathered via interviews with relevant national stakeholders.

⁷⁷ Information was gathered via interviews with relevant national stakeholders.

10-12. New materials were developed and distributed to schools. Because this stage of the project took place before the implementation of the new curriculum, the knowledge and information gathered during this stage also contributed to the planning of the new curriculum for upper-secondary education⁷⁸. The second stage of the project (2009-2011) focused on increasing the quality of mathematics and science education for grades 7-9 (see Box 8 for more details).

BOX 8. ESF PROJECT 'NATURAL SCIENCES AND MATHEMATICS' FOR GRADES 7-9

Between 2009 and 2011, the European Social Fund project 'Natural Sciences and Mathematics' for grades 7-9 was implemented. The project tackled the teaching of mathematics and natural sciences at state, municipality and school levels. At the state level, the project implemented a unified methodological system for science and mathematics, focusing on the development of public understanding of the reforms, and aimed at continuously increasing the professionalism of experts in mathematics and natural science. At municipality level, the project ensured targeted support for schools, and strengthened communication between the schools and the Ministry of Education and Science. It also facilitated cooperation among schools in the same region, and focused on ensuring that the public was informed about the changes. At school level, the project focused on both school leaders and teachers. It aimed to ensure that the school leaders were able to develop a school improvement strategy, provide the necessary instructional and administrative leadership, and include local communities in school life. The project aimed to ensure that teachers were able to focus on learning outcomes in their daily work, effectively using various modern teaching practices and tools, collaborating with other teachers and engaging parents in the learning process (Dabaszinātnes un matemātika, 2011).

Within the framework of this project, the content of the mathematics and natural science curriculum for basic schools was improved. Moreover, printed and digital teaching materials for mathematics and natural sciences for grades 7-9 were developed and delivered to schools. During the project, a lot of attention was paid to improving the professional development of teachers⁷⁹. More specifically, professional development focused on modern pedagogical approaches and on enabling teachers to be more creative in their study methods. Together with these professional development programmes, opportunities were created to test newly learnt teaching strategies in classrooms. (Dabaszinātnes un matemātika, 2011).

As this phase of the project followed the curriculum reform, it was also seen as a supporting mechanism for the implementation of the new curriculum. In this way, it helped to address the challenges faced by teachers, such as the lack of materials needed to implement the new curriculum or additional support in translating the new curriculum into practice⁸⁰.

The ESF project also aimed to tackle the general lack of curriculum development and pedagogical innovation in the country. Latvian experts in curricular development from academia were involved in the project⁸¹.

The project team included various education experts and public officials, who cooperated with schools in piloting of the materials, and provided training and guidance to teachers. The project also aimed to bring schools together with universities, entrepreneurs and scientific institutions to develop and pilot new mathematics and science teaching standards⁸².

These pilots took place in 24 schools. Each school team consisted of the school principal or vice principal, as well as teachers in mathematics, physics, chemistry and biology. The school teams worked closely with the project team to pilot the new materials and teaching practices that the project team was developing, and provided feedback. This close collaboration with schools helped the project team to develop new materials for teaching natural science and mathematics, which were later (after piloting) distributed to other schools. The project team also developed training courses for teachers. The effectiveness of the measures introduced was evaluated (qualitatively) via consultations with teachers and students from the pilot schools. Such consultations also aimed

⁷⁸ Information was gathered via interviews with relevant national stakeholders.

⁷⁹ Information was gathered via interviews with relevant national stakeholders.

⁸⁰ Information was gathered via interviews with relevant national stakeholders.

⁸¹ Information was gathered via interviews with relevant national stakeholders.

⁸² Information was gathered via interviews with relevant national stakeholders.

to analyse the needs and challenges faced by teachers in the implementation of the new curriculum⁸³.

Today, Latvia's education system is considered to be fairly decentralised. Consequently, local authorities and schools have the freedom to make certain decisions about teaching and learning, including over the curriculum. While the national curriculum outlines the most important objectives of the education system, schools have some autonomy in developing and implementing their own educational programmes in line with the national curriculum. The national curriculum is also organised not by grade but by educational level, which provides greater freedom for schools and teachers to organise their work as they see fit (Eurydice, 2017).

Observed effects of the reform

It is impossible to test the effect of the curriculum reform in 2006 and the ESF project using statistical methods. Because these interventions were implemented in parallel, it is impossible to quantify the effect of one versus the other. Moreover, these two changes coincided with several other changes to the education system that may also have influenced academic performance. As these changes cannot be isolated from one another, it is impossible to determine the precise effects of each. However, the trends observed in PISA data and the characteristics of the reforms point to a potentially positive effect.

Latvia's mean PISA performance in mathematics and science increased significantly between 2009 and 2012. These improvements are also observed in other large-scale international assessment studies, such as TIMSS (Mourshed, Chijioke, & Barber, 2011). Moreover, the PISA data also shows that the share of low achievers in science decreased between 2006 and 2012, and the share of low achievers in mathematics decreasing between 2009 and 2012. The increasing school autonomy that accompanied the 2006 curriculum reform might possibly have reinforced its positive effect. A study analysing PISA data from 2000 to 2009 in 42 countries shows that increased school autonomy, particularly with regard to decision-making related to academic content, positively affects students and contributes to their greater academic achievements (Hanushek, Link, & Woessmann, 2013).

Specifically in relation to the ESF project, the national stakeholders consulted noted that the learning materials that were developed within the framework of the project have been widely used by schools and teachers since the project finished. This means that the project has had a long-lasting effect and benefited the teachers even after it was concluded⁸⁴.

Success factors for, and main challenges to, the implementation of the reform

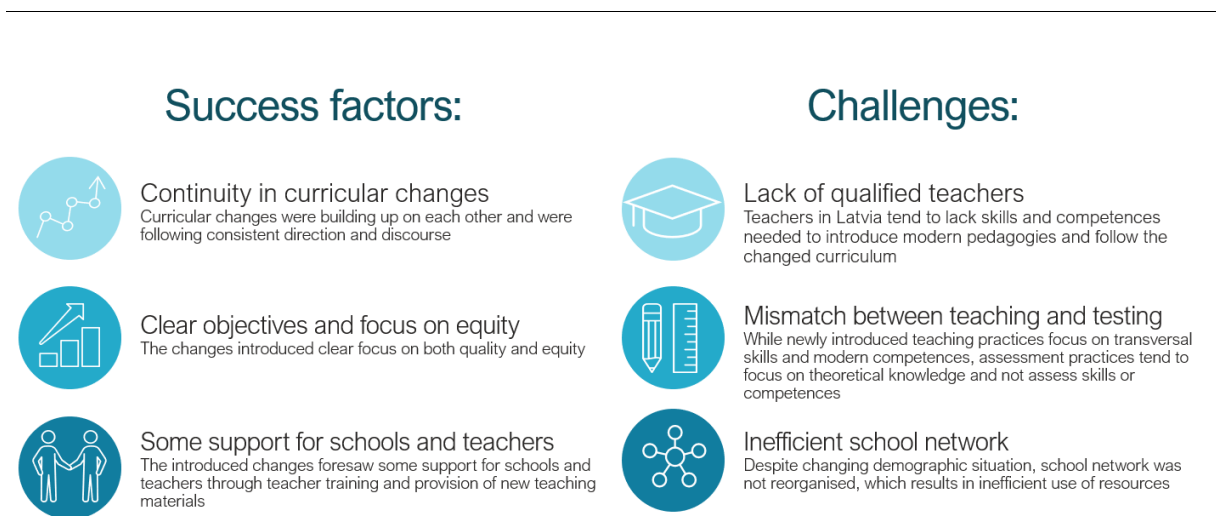
Curricular changes in Latvia, specifically the curriculum of in 2006 and the ESF project 'Natural Sciences and Mathematics' (2009-2011), which focused on grades 7-9, are believed to have significantly contributed to improving the quality of education in Latvia⁸⁵. Several important factors contributed to their perceived success (as depicted in the figure below).

⁸³ Information was gathered via interviews with relevant national stakeholders.

⁸⁴ Information was gathered via interviews with relevant national stakeholders.

⁸⁵ Information was gathered via interviews with relevant national stakeholders.

FIGURE 24. SUCCESS FACTORS AND CHALLENGES AFFECTING THE EFFECTIVENESS OF THE CURRICULUM CHANGE (2006) AND THE ESF PROJECT 'NATURAL SCIENCES AND MATHEMATICS' (2009-2011)



Firstly, **some long-term continuity can be observed in curricular development**. The 1998 education standards had already introduced modern education ideas, including a focus on transversal skills and key competences. The reform of the curriculum introduced in 2006 built upon this vision. The new curriculum also attempted to provide clear guidance for practitioners through specific standards in 20 subjects, which clearly indicated the main objectives and learning goals for each subject. The accompanying ESF project aimed to further support teachers in translating into practice the curricular goals for science and mathematics. Under the framework of the project, teachers were consulted to identify the main challenges they faced when following the new curricula, as well as their needs in ensuring the better implementation of the curricular changes to provide more tailored support. The emphasis on the vision of the new curricula on school completion and strengthening the examination system may also have contributed to the positive (i.e. decreasing) trend in the share of low achievers in Latvia.

The curricular reforms also foresaw some initial support to teachers (reinforced through the ESF-funded intervention). It was accompanied by the development of new textbooks, changes in initial teacher training, and the organisation of in-service teacher training. These measures facilitated the smooth implementation of the new curriculum. However, existing reviews demonstrate that teachers still lack adequate support, and professional development for educators is not impactful or accessible for all (OECD, 2020, c). This is further exacerbated by teacher shortages and unfavourable working conditions. Investing in teachers and their professional development is the focus of ongoing reforms in Latvia (Ibid).

While the ESF-funded intervention to improve the teaching of natural sciences and mathematics has provided some monitoring and evaluation of the implementation of the parallel curricular reform (through the piloting of maths and science teaching standards and accompanying teaching tools), the curricular policy itself **did not foresee built-in evaluation mechanisms and the modernisation of assessment that would allow curricular implementation and the quality of education to be monitored**. National assessments still primarily test theoretical knowledge rather than its application or

transversal skills. The development of new assessment frameworks is currently underway within the framework of Skola2030⁸⁶.

The implementation of the new curriculum is also hindered by **persistent inefficiency in the school network**, which stretches state resources by maintaining a large number of schools. Due to demographic change and migration, Latvia has many more schools than it requires, putting pressure on municipalities to streamline services. The government has been working to rationalise the school network, but progress is slow. Moreover, some teachers often work at several schools, which may hinder their motivation and ability to focus on one school community⁸⁷.

Lessons for future education reforms in Latvia

Educational outcomes in Latvia are relatively good. The proportion of low achievers in all three PISA domains is lower than the EU average, and most students possess basic skills in reading, mathematics and science literacy (European Commission, 2020, c). Analysis of developments in the area of minority education programmes and general curricula in Latvia reveals a number of key factors that shape the reform process in the country.

While each reform implementation process has revealed specific challenges, there are a number of systemic characteristics of the Latvian education system that shape the outcomes of the discussed reforms, as well as possible future reforms. The important lessons to highlight are:

- **It is important to ensure the continuity and consistency of educational developments to produce the expected long-term effect.** Curriculum changes in Latvia have followed the same direction since the country gained independence. As far back as 1998, the National Standards for Education introduced modern concepts into the education system. Even though the newly presented methods and concepts were not implemented in practice due to a lack of resources and expertise, more recent curricular reforms have building upon these ideas and pedagogical approaches.
- **Support for schools and teachers is crucial to the effectiveness of education reforms.** An adequate delivery system accompanying curricular reform is key. Language education policy has not yet brought the intended results, partly due to insufficient support being given to schools in managing the shift between Russian and Latvian as the main language of instruction. In contrast, the implementation of the ESF intervention went more smoothly, and is likely to have contributed to the decreasing share of low achievers in maths and science due to ongoing guidance, mentoring and collaboration within the school community. **Focusing on improving the quality of teacher training and ensuring the attractiveness of the teaching profession** would also improve teachers' effectiveness in the long term.
- **Extensive public consultations and participatory design are key when it comes to sensitive educational reforms.** The analysis of developments in ethnic minority education shows that the introduction of Latvian as the language of instruction in minority schools has been met with resistance from ethnic minorities. The controversy surrounding these reforms may stem from the close relationship between language and identity in Latvia (Hogan-Brun, 2006). This means that minority groups may see every change in minority education as a potential threat to their cultural identity or heritage. Ensuring public buy-in and involvement in the

⁸⁶ For more information on skola2030, please see: <https://www.skola2030.lv/lv>

⁸⁷ Information was gathered via interviews with relevant national stakeholders – education experts and representatives of the Ministry of Education.

decision-making process may be fruitful in managing resistance (European Commission for Democracy through Law (Venice Commission), 2020).

3.4. Poland

Educational context and key policy issues

According to their PISA 2018 results, **Polish students were among the top performers in the EU in reading, mathematics and science** (European Commission, 2020, d), showing that the reforms implemented to improve the education system in Poland over the last two decades (i.e. from 1999 until 2016) have, at least to some extent, been effective. The early school-leaving rate is also low enough not to be a priority problem for policy-makers (Tomaszewska-Pe, Marchlik, & Wrona, 2015). In 2020, the early school-leaving rate in Poland was just 5.4%, compared with the EU average of 9.9% (Eurostat, n.d., b). **This shows that quality has been an important focus of the Polish education system over the last two decades.**

The reform of the school system that took place in 1999 can be seen as one of the most important educational policy reforms in recent decades. This reform is perceived as the foundation of the Polish education system, and the starting point for its modernisation. While its innovation was a change in the structure of the education system, other measures that were part of the reform package focused on the professional development of teachers, as well as curricular development and the examination system (Wojniak & Majorek, 2018). The new curricula introduced a greater emphasis on practical skills and interdisciplinarity. The reform, together with the Teachers' Charter introduced in 2002, also strengthened professional development and changed the system of teacher remuneration (Zachorska, 1999). The reform package also focused on inclusion and access to tertiary education by ensuring more equal opportunities (Wojniak & Majorek, 2018).

Despite the progress made in the Polish education system over the last two decades, some challenges remain. First, education experts believe that **the recent change to the education system structure in 2016** (revoking the changes introduced in 1999), **which changed the structure of compulsory education from a nine-year back to an eight-year system, will increase academic inequality and negatively affect the academic performance of students** (Wojniak & Majorek, 2018). The teaching profession remains fairly unattractive, and while the authorities have recently proposed measures to tackle this, these have been criticised by stakeholders. The potential positive effects of the measures on the education system are questionable, as experts and the teaching community were not involved in the preparation of the proposed measures. These are criticised as lacking pro-quality solutions, focusing predominantly on saving resources by lowering hourly wages for teachers, propose an evaluation system that is oppressive towards teachers, and foresee lower requirements for new teachers (European Commission, 2021, d). Moreover, the **inclusiveness of the education system is not guaranteed across all regions of Poland**. For example, in 2019, the early school leaving rate in Northern Poland was 7.5%, and in Southern Poland it was 3.2% (European Commission, 2020, d). ECEC provision is also often not ensured in rural areas, and the quality of services available is often questionable (Najwyższa Izba Kontroli, 2019). **Unfavourable school climates and bullying negatively affect the well-being of students**. More than a quarter (26.4%) of all Polish students who participated in PISA 2018 reported being bullied at least a few times a month (compared with an EU average of 22.1%). Bullying is also more prevalent among low-achievers (36.3% of low-achievers reported being bullied at least a few times a month, compared with 21.2% of high-achievers) (European Commission, 2021, d), which means that bullying especially affects low-achievers, further exacerbating inequalities and disparity in achievement. Finally, **while socio-economic background**

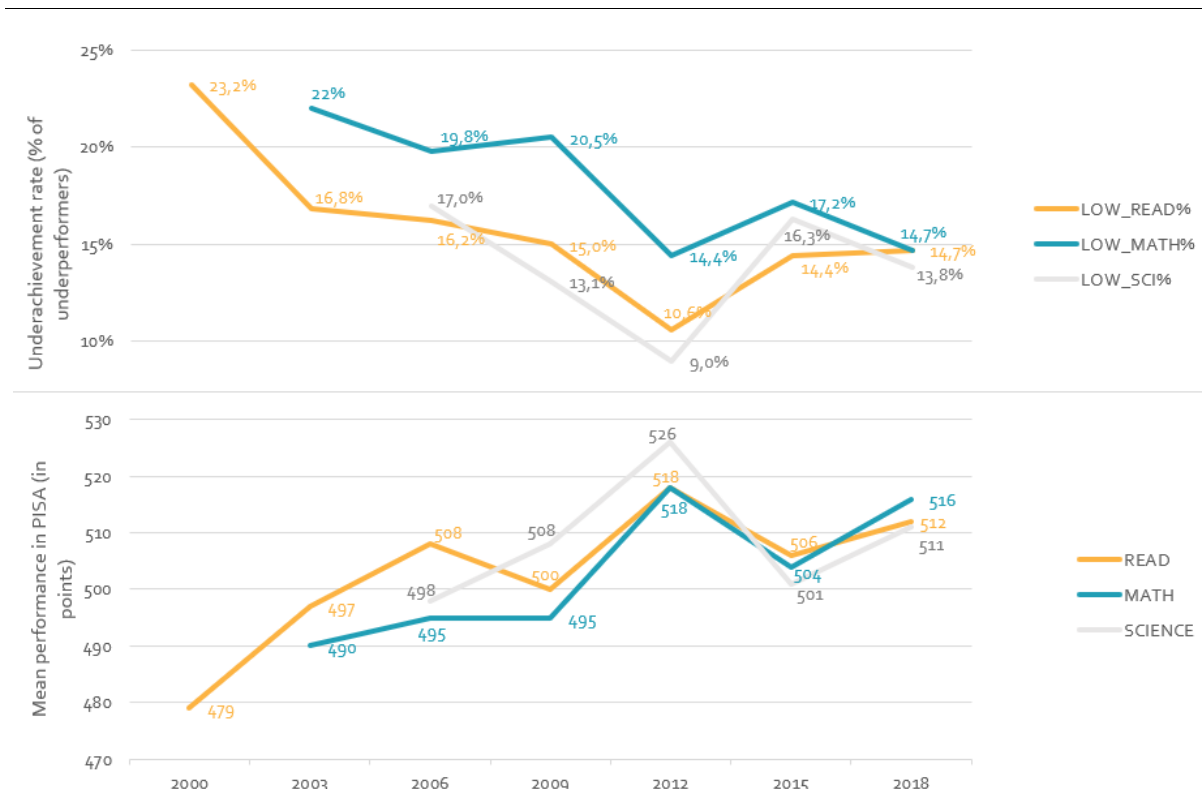
has little effect on the academic achievements of students, it has a great effect on their academic ambitions (European Commission, 2020, d). These challenges may perpetrate existing inequalities in society, and may hinder the ability of the education system to ensure more equal opportunities.

Key trends in students' performance

According to the PISA 2018 results, Poland was one of only four EU countries that achieved the EU target of lower its rate of underperformance to below 15%. In 2018, underperformance in reading was 14.7%; in mathematics, 14.7%; and in science, 13.8% (see Figure 25). At the same time, the share of students who were top performers in all three domains in Poland was also significantly higher than the EU average (5.3%, compared to 3.4%) (European Commission, 2020, d). The mean performance of Polish students in PISA in all three domains (reading, mathematics and science) in 2018 was also well above the EU average. This means that the education system in Poland provides opportunities for most students to gain basic skills in reading, mathematics and science.

While Poland performed exceptionally well in the 2018 PISA assessment, its students have not always been among the top performers. Several significant improvements in the country's performance can be observed since 2000. PISA scores in all three domains were highest in 2012. These scores decreased in 2015, and increased again in 2018. The mean underachievement rates in all three domains have followed an inverse trend. Underachievement rates gradually decreased between 2000 and 2018, with the lowest rates in 2012 (see Figure 25).

FIGURE 25. MEAN PISA PERFORMANCE AND UNDERACHIEVEMENT RATES IN POLAND 2000-2018



Source: PISA data.

Note: the graph presents trends in students' mean achievement in Poland between 2000 and 2018, as well as variations in the mean rate of low-achieving students.

Indicators measuring the equity of the Polish education system have remained more or less stable between 2009 and 2018 (see Figure 26).

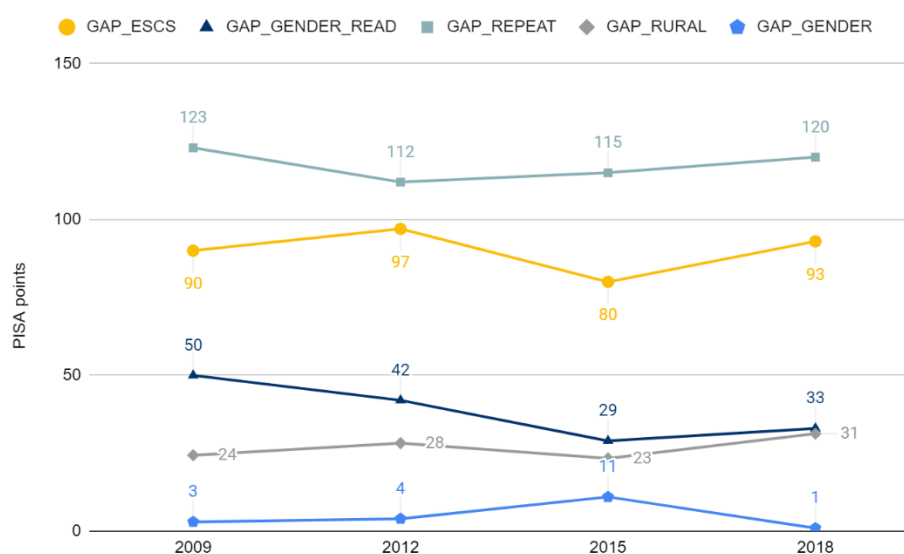
The performance gap between socio-economically advantaged and disadvantaged students decreased between 2012 and 2015. However, due to an increase in this gap between 2015 and 2018, the gap in 2018 is comparable to that in 2009.

The performance gap between boys and girls in reading decreased between 2009 and 2015, and remained stable until 2018. In 2018, this gap was 17 points narrower than in 2009. However, it remains statistically significant and favours girls. The narrowing of the gender gap in reading performance was due to a decrease in girls' performance. A similar trend can be observed in other countries participating in PISA, and is likely to have been caused by the shift from paper-based tests to computer-based tests, which are more detrimental to girls (OECD, 2016, b).

The performance gap between students who have had to repeat a grade, and those who have not, decreased from 2009 to 2012. However, this was followed by an increase up to 2018. Consequently, the performance gap in 2018 did not differ significantly from the gap in 2009. This gap is exceptionally large (120 points), and favours those who did not repeat a grade. However, it is important to note that grade repetition is not very common in Poland compared with other EU Member States (3.3% in 2018, compared with the EU average of 10.4%).

The performance gap between students living in rural and urban areas⁸⁸ remained stable and low between 2009 and 2018. In 2018, this performance gap in Poland was close to the EU average (31 points, compared with 35 points) in favour of students living in cities. While this gap is relatively low, it is still important, as a large share of 15-year-old students in Poland live in rural areas (29.3%, compared with an EU average of 9.3%).

FIGURE 26. PERFORMANCE GAPS BETWEEN STUDENTS IN MATHEMATICS IN POLAND, 2009-2018



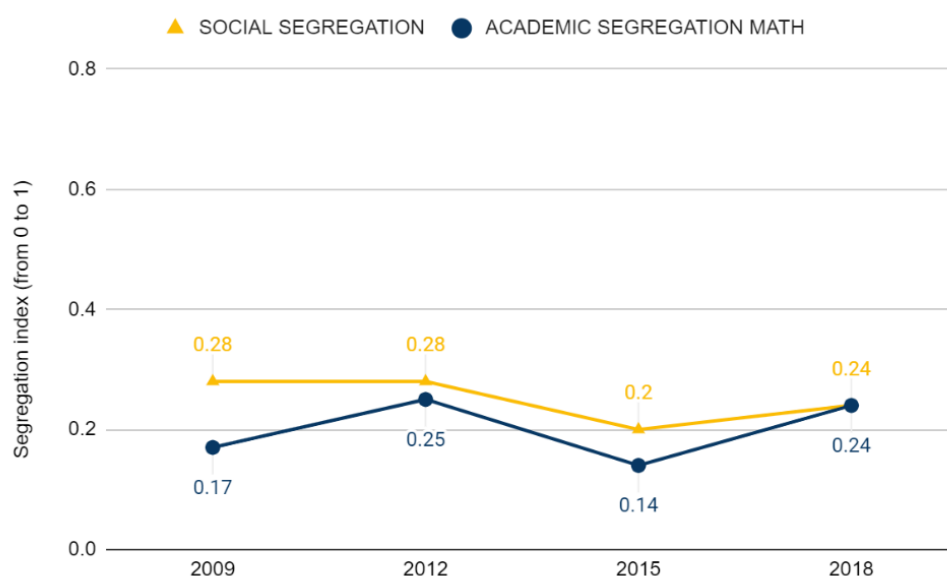
Source: PISA data.

⁸⁸ Cities or urban areas are defined as having 100,000 residents or more, while a rural area or village is defined as having fewer than 3,000 residents

Note: the graph presents trends in performance gaps in Poland between certain categories of students (boys vs. girls; students in rural environments vs. students living in cities...) for the 2009-2018 time period. All gaps are presented as absolute values, so that the graph is easier to understand. However, all these gaps are actually negative (meaning a difference in favour of the most advantaged category in the comparison). While all gaps relate to performance in mathematics (the most interesting domain for analysis), the gap between boys and girls (GAP_GENDER) is also presented, as this is usually larger in reading than in mathematics or science. The gap between students attending an academic vs. a vocational track is not represented, due to the very low rate (less than 1%) of students in VET.

School segregation in Poland also remained fairly stable between 2009 and 2018 (see Figure 27). The social segregation of schools⁸⁹ decreased slightly between 2000 and 2018 (0.32 compared to 0.24). Academic segregation⁹⁰ decreased significantly from 2000 to 2003 (from 0.55 to 0.13). This decrease may be connected to the 1999 education reform, which fundamentally reorganised the school system, with students having to attend the school closest to their place of residence. Due to this reorganisation of schools, the 'elitist' schools lost their prestige, and parents could no longer choose so-called 'better' schools. However, it was possible to find loopholes in these regulations, enabling the system of elitist schools to be recreated. This may explain, at least partly, why academic segregation increased slightly in later years.

FIGURE 27. VARIATION IN SOCIAL AND ACADEMIC SEGREGATION IN POLAND, 2009-2018



Source: PISA data.

Note: the segregation index can have a value between 0 and 1. 0 means no segregation (none of the variance in performance between schools can be explained by the school attended); 1 means complete segregation (the school attended can explain 100% of the variance between schools).

Equity indicators show that the education system in Poland is relatively inclusive. However, some inequalities remain. Analysis of the effects of various individual and school-level factors that may affect student achievement, conducted through the multi-level regression model⁹¹ using PISA 2018 data, confirms these challenges to inclusion.

⁸⁹ Variable SOCIALSEGR. For more information, see Annex 2 – Methodological approach section 2.1.3. Variables used for statistical analysis.

⁹⁰ Variable ACADEMICSEGR. For more information, see Annex 2 – Methodological approach section 2.1.3. Variables used for statistical analysis.

⁹¹ The model tested the effect on students' performance of individual background variables (gender and ESC); academic variables (having more than four periods of mathematics per week); and school climate variables at individual and school level. The only variables presented are those that had a significant effect. For more information, see Annex 1. Country Profiles, Poland.

Boys from socio-economically advantaged background tend to perform better than other students (see Figure below).

FIGURE 28. FINDINGS OF THE MULTI-LEVEL REGRESSION ANALYSIS OF PISA 2018 DATA FOR POLAND

Students in Poland perform better in PISA (mathematics) if:



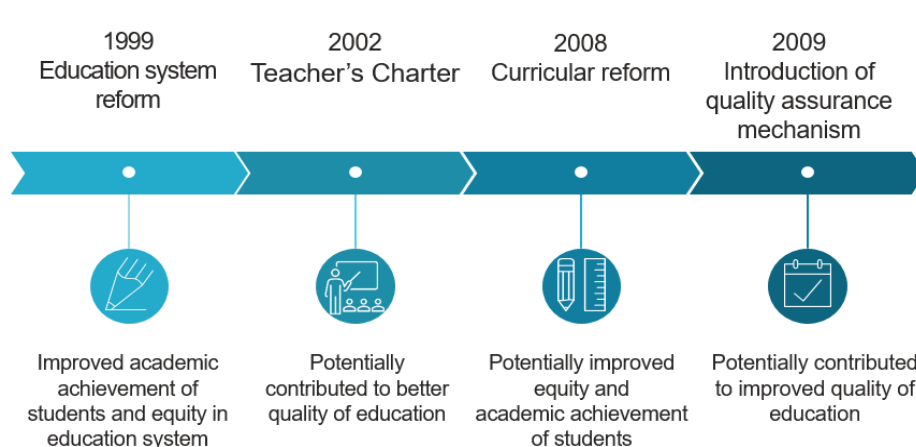
Source: multi-level regression analysis conducted for the study based on the PISA 2018 data. Because mathematics is the most interesting domain (given the positive trends in performance), all the gaps presented are calculated for performance in mathematics

Key policies associated with the improvements observed

Despite these challenges, the academic performance of Polish students is among the highest in the EU (European Commission, 2020, d). This high performance is the result of several important improvements that have taken place over recent decades. The most important positive changes in Polish students' performance include:

- A long-term increase of the mean students' performance in all three domains (since 2003);
- A decrease in the academic segregation index between 2000 and 2003;
- A large increase in the proportion of students having more than four periods of language and mathematics classes per week;
- An increase in the proportion of students in school who receive standardised assessments.

It is often hard to connect improvements in students' achievements with specific educational reforms and policy changes. However, some reforms are likely to be more influential than others, and their effect can be observed from existing studies and assessment data. Potentially influential education reforms that may have positively affected the academic performance of Polish students are presented in Figure 29.

FIGURE 29. REFORMS POTENTIALLY LINKED TO IMPROVEMENTS IN ACADEMIC ACHIEVEMENT IN POLAND


The reforms above target different dimensions of the education system. These areas include the structure of the education system, the national curriculum, the teaching workforce, and assessment practices. While all of these reforms may have contributed to improving quality and equity in the Polish education system, some of these reforms cannot be analysed in a rigorous way due to a lack of variables in PISA dataset that can show the effects of such reforms. Consequently, this country chapter focuses mainly on the 1999 education system reform and its measures relating to changes in the structure of education, the national curriculum and national assessment. This focus was chosen because the effect of the reform can, at least to some extent, be observed through the PISA data and the existing academic literature. In addition, consultations with stakeholders support the findings on the effects of this reform⁹².

Key facts about the comprehensive 1999 reform

The 1999 reform of the structure of the education system was carefully planned for years before its introduction. It was based on the models of Scandinavian education systems, existing studies, as well as the knowledge of education experts. The goal of the reform was to provide the basis for a modern education system in Poland (Jakubowski, 2015). Available studies on the Polish education system consider this reform to be one of the most influential reforms that have shaped educational development in Poland over recent decades. The reform had three main aims:

- To improve quality of education;
- To promote high school education, and increase a number of students in higher education;
- To improve access to education and ensure equal educational opportunities for all.

To achieve these aims, several specific measures were introduced into the Polish education system. These measures included a change in the structure of the education system, a change in the curriculum, the introduction of a new examination system, as well as improvements in teacher training and professional development opportunities. All the planned measures were introduced. These resulted in a complex chain of transformations in Polish education system (Jakubowski, 2021). This chapter will look more closely into the following dimensions of the reform:

- The change in the education system structure;

⁹² For more information, see Annex 1. Country Profiles, Poland.

- Curricular reform;
- National assessment reform.

Before the 1999 reform, basic education (primary and lower secondary education) lasted for eight years and was provided via a single-structure system. After grade 8, students were then streamed into academic or VET educational tracks. The system was subject-based, and prioritised theoretical knowledge. The 1999 reform increased the length of basic education by one year, automatically delaying the streaming of students into academic and VET tracks. Single-structure education was divided to separate educational stages, resulting in the creation of middle schools (see Box 9).

BOX 9. CHANGES IN THE STRUCTURE OF THE POLISH EDUCATION SYSTEM INTRODUCED BY THE 1999 REFORM

The 1999 education reform changed the structure of the Polish education system from the provision of eight-year basic education to a new structure, separated into primary and lower-secondary education levels (Eurydice, 2021, h):

- Six-year primary education (primary school);
- Three-year lower-secondary education (middle school);
- Three-year basic vocational school, three-year general upper secondary school, four-year technical upper secondary school, a post-secondary school for upper secondary school graduates, or a three-year special school for students with SEN.

This change in the education system's structure was motivated by the general goal of improving the quality of education in Poland. Before the reform, educational outcomes differed significantly between schools, and were most pronounced between schools in rural and urban areas.

It was expected that the change in the structure of education and the introduction of middle schools would reduce differences in educational outcomes between schools. Beginning lower-secondary education in a new school was seen as a 'new start' for children, helping to keep them motivated to study and perform well. Moreover, because teachers in middle schools would not have worked with the children before they entered grade 6, they would not know the students and therefore would not have any pre-conceived opinions about them. It was hoped that such conditions would ensure the more equal treatment of children in middle schools, resulting in more equal educational opportunities⁹³. Moreover, as a result of the reform, graduates of small and distant primary schools could continue their general education in bigger and better-equipped lower-secondary schools located in larger towns and cities. This has contributed to more and better educational opportunities for students from rural areas, and greater socio-economic diversity among students within these schools (Jakubowski, 2021).

Another important outcome of the education reform in 1999, which has potentially contributed to the more equal provision of quality education for all, was that the students could choose whether they wanted to follow a general or vocational educational track later than under the old system⁹⁴. It is argued that the change of education system's structure contributed to a decrease in the performance gap between low achievers and high achievers and resulted in more students being able to follow the academic track in upper-secondary education rather than the VET track (Sadura, 2017). Existing studies also demonstrate that the reform positively affected students' academic achievements (Jakubowski, 2021).

In the beginning, the changes in educational structure were not supported by teachers. They were worried that the focus on structural reform might lead to curriculum reform being neglected. They also believed that a lack of available funding would be a great challenge to the reform, hindering its effectiveness. However, as the reform proved successful, teachers started to support it⁹⁵.

⁹³ Information gathered during consultations with relevant national stakeholders.

⁹⁴ Information gathered during consultations with relevant national stakeholders.

⁹⁵ Information gathered during consultations with relevant national stakeholders.

Along with the change to structure of the education system in 1999, curricular innovation was necessary. The new curriculum had to be in line with the changes in education structure and to embody the new goals and values of the education system (see the box below).

BOX 10. CURRICULUM CHANGES INTRODUCED IN 1999

The new national curriculum focused on flexibility and a holistic approach to education. To ensure that by the end of compulsory education, students should acquire the expected level of knowledge and skills, uniform core curricula and learning standards were introduced. The national curriculum introduced several new programmes for each subject, and teachers were able to choose which programme to follow. Teachers were also encouraged to develop their own teaching programme and work according to it, with the programme developed by an individual teacher being approved by the school board. Teachers were also able to choose which textbooks to use in their classes (Zachorska, 1999).

The changes in curriculum introduced by the 1999 reform focused on the teaching of practical skills. They introduced a holistic approach to education, in which the same issues are touched upon in different subjects (Zachorska, 1999).

The new curriculum was viewed differently by different groups of stakeholders. Students, for example, were in favour of the newly introduced curriculum as it appeared more interesting and engaging. According to students, the old curriculum was too focused on facts and knowledge, and did not present logical sequences. Teachers, on the other hand, were somewhat sceptical of the new curriculum. They criticised it as being too repetitive, which created the risk for curricular overload and inefficient learning.

After the 1999 curriculum reform met with a lot of criticism from the educational community for being too repetitive and omitting a number of key thematic areas, this encouraged policy-makers to further revise the national curriculum in 2008 (see Box 11).

BOX 11. CURRICULUM CHANGES (2008)

The new curriculum developed in 2008 aimed to ensure a more holistic approach to education, with less repetition between different levels of education. The new curriculum treated lower- and upper-secondary education as a continuous six-year period of education. Consequently, instead of teaching similar topics in both lower and upper secondary schools, the new curriculum introduced a combined approach in which each educational level covers different topics and has different objectives⁹⁶.

The new curriculum described the outcomes for each education level and defined the main teaching objectives. The curricular reform emphasised the general objectives of the education system, but allowed teachers to develop their own teaching methods and programmes, as well as choosing what resources to use. These changes introduced greater autonomy for schools and teachers in relation to decisions over their teaching practices (Jakubowski, 2021).

The curriculum reform focused on the overall development of students and aimed to change education provision in a way that would prepare students for a changing world. The reform promoted the development of cross-curricular skills and teamwork. In upper-secondary schools, where a student had specialised in a particular subject, other subjects were taught together in an interdisciplinary manner. This meant that, for example, students who specialised in biology would receive combined social science classes instead of having specific subjects such as history. Moreover, after the reform, VET programmes had to include the equivalent of one year of general curriculum (Jakubowski, 2021).

The new curriculum also focused on ensuring equal educational opportunities and inclusion into education by providing the support needed. It foresaw more time for individualised work with

⁹⁶ Information gathered during consultations with relevant national stakeholders.

students, which teachers had to dedicate to the specific needs of students and spend applying new learning methods, such as learning through playing⁹⁷.

The curriculum reform of 2008 was facilitated by the external financial support for which the government at the time had applied. The working group at the ministry responsible for the curriculum also presented credible arguments as to why the reform was needed, which helped to convince policy-makers⁹⁸.

The preparation for the curricular reform in 2008 included several discussions and working groups involving relevant stakeholders and experts, as had been done when preparing for the education reform in 1999. Additional meetings with publishers were organised to discuss the new textbooks that would be needed after the reform. Public consultations were also launched. Training was organised for local government officials, school principals, teachers and teacher training centre employees to ensure they were acquainted with the changes. During such training, the problems pointed out by the participants were also addressed⁹⁹.

The changes were implemented gradually by education level, starting from primary education. This meant that the changes in upper-secondary schools were implemented a few years later than those in primary schools¹⁰⁰.

The 1999 education reform also introduced a new national assessment system (see Box 12). Because the reform completely changed the structure of education and introduced a new curriculum, the assessment system also had to be changed so that it could adequately monitor the new education system and assess whether or not its goals were achieved.

BOX 12. CHANGES IN THE NATIONAL ASSESSMENT SYSTEM INTRODUCED BY THE 1999 EDUCATION REFORM

The comprehensive reform of the education system in 1999 also introduced standardised national assessments at the ends of all education levels – after grades 6, 9 and 12 or 13 (depending on whether a student followed the academic or VET track for upper-secondary education). Exams were firstly held in 2002, and since then have been used to monitor the performance of students at each stage of education (Jakubowski, 2015).

The standardised national assessments were introduced because policy-makers saw them as necessary to provide more information on children's progress and the quality of the education system. Moreover, having assessments (final exams) at the end of secondary education was a requirement of Poland joining the EU. In 1999, Poland was already preparing to join the EU, and thus it had to ensure its education system was compatible with EU requirements¹⁰¹.

The exams were standardised, and individual students' results were available to all teachers and students. The aggregated results were also made available to the general public. Moreover, a specific measure of the 'added value' of each education level was also developed and made available to the public. This measure showed how much students' results had improved, and how their knowledge had increased as a result of attending a specific level of education. The results of the national assessments after grades 9 and 12 or 13 were also used to stream students into different schools, as students with higher grades were accepted into better upper-secondary or tertiary education institutions (Jakubowski, 2015). The assessments were seen as a way to provide feedback and inform learning, rather than to sort or rank students¹⁰².

Even though existing studies find that the education reforms of 1999 resulted in several benefits for students, such as greater access to tertiary education and more equal opportunities in the education system (Wojniak & Majorek, 2018), in 2016, the

⁹⁷ Information gathered during consultations with relevant national stakeholders.

⁹⁸ Information gathered during consultations with relevant national stakeholders.

⁹⁹ Information gathered during consultations with relevant national stakeholders.

¹⁰⁰ Information gathered during consultations with relevant national stakeholders.

¹⁰¹ Information gathered during consultations with relevant national stakeholders.

¹⁰² Information gathered during consultations with relevant national stakeholders.

conservative government in power decided to revert the structure of the system of compulsory education back to the single-structure, eight-year model of basic education provision, similar to the structure that had been in place before the reform of 1999. Public perceptions about the lower-secondary schools had been somewhat negative. It was argued that lower-secondary schools did not increase equal opportunities as promised, and have an environment that facilitates bullying and other undesirable behaviour¹⁰³. Consequently, before coming to power, the government promised that they would eliminate lower-secondary schools. However, these perceptions are not supported by the data, and the academic community expects this recent reform to have negative consequences such as increased inequality and decreased academic achievement (Wojniak & Majorek, 2018).

Observed effects of the reform

The education reform of 1999 focused on several important aspects of the education system. It changed its structure, introducing a new curriculum and assessment system, and focused on ensuring higher competences among teachers. In general, the goals of the school reform were to improve teaching quality and increase educational opportunities. These goals were achieved to some extent. Increased teacher autonomy and the introduction of the core curriculum helped to increase efficiency and transparency in the education system. Under the new system, students followed the same curriculum for a longer period of time and were streamed into different tracks later, and thus it was easier to ensure that all students received the same quality basic education and had same opportunities to succeed academically. Increased autonomy for teachers also allowed them to better adapt their teaching methods to the needs of their students. Moreover, in the system introduced, students had to change school when progressing to lower-secondary education (starting middle school). This meant it could be ensured that middle-school teachers were less biased towards the students, whom they did not know, and would thus treat all students in the same way. According to the national stakeholders, the changes in the education system's structure also helped to increase the motivation of teachers, which further contributed to better-quality teaching. Working in new middle schools was seen as a promotion that motivated all teachers to improve the quality of their teaching¹⁰⁴. The reform increased access to tertiary education and improved inclusion by ensuring more equal opportunities (Wojniak & Majorek, 2018).

Jakubowski, Patrinos, Porta and Wiśniewski (2016) ran PSM and DiD analysis to assess the effects of the restructuring of the education system on the quality of education. The authors matched vocational school students from 2000 with their counterparts in 2003 and 2006 to estimate the change in performance among students in each track with common characteristics. To find the statistical 'twins', the authors used ESCS index, gender, age and language spoken at home. The authors looked at the differential impacts of the reform on students who were in different tracks in 2000. **The analysis shows that students who would have attended the VET track if the reform had not taken place, had benefitted from the reform the most** (Jakubowski, Patrinos, Porta, & Wiśniewski, 2016).

The analysis in the above study presents substantial evidence that **delaying vocational education by one year in Poland significantly improved the mean PISA score between 2000 and 2006**. The improvement in performance for such students was around 100 points from 2000 to 2003, and 116 points from 2000 to 2006. However, the benefits for students in the academic track or mixed schools were rather limited, but in any case were not detrimental (Jakubowski, Patrinos, Porta, & Wiśniewski, 2016).

¹⁰³ Information gathered during consultations with relevant national stakeholders.

¹⁰⁴ Information gathered during consultations with relevant national stakeholders.

While the evidence points to the changes in the structure of education having a positive effect, national stakeholders noted that this positive effect became visible only a few years after the reform had been introduced. Shortly after the change, it was realised that many of the planned changes could not be implemented due to a lack of resources or available competences¹⁰⁵.

While existing studies consider the delay in streaming and the extension of compulsory education to be the most important and most beneficial measures introduced by the 1999 reform, it is also acknowledged that other changes, including the curriculum reform and changes to the national assessment system, also potentially contributed to gradual improvements in the quality of education and the academic achievements of students (Jakubowski, 2015).

When considering the changes to the curriculum, it is also important to acknowledge the effect of the curriculum changes introduced in 2008. Existing studies (Jakubowski, 2021) argue that **the improvement of Polish PISA results between 2009 and 2012 can be attributed to the introduction of the new curriculum in 2008**. Closer analysis of students' responses shows that the higher scores of students in 2012 resulted from better responses to items measuring complex analytical thinking, at least when looking into scores in mathematics (Jakubowski, 2021). As the curriculum in 2008 focused on competences and skills such as problem solving, the improved ability of the students to solve more complex problems could plausibly be a consequence of the introduction of the new curriculum. However, this potential effect on the ability of students to solve more complex problems is not evident from long-term PISA trends. When comparing reading performance between 2000 and 2018, the increase in the mean PISA scores was caused by better results in less demanding tasks, even though slightly better results in more demanding tasks can be observed when comparing 2009 and 2018.

In relation to the introduction of the new standardised national assessment system, a study by Bergbauer, Hanushek and Woessmann (2018) in which the authors analyse how different assessment systems influence PISA results, finds that standardised tests, especially when their outcomes are compared across schools and students, positively affect the academic achievement of students, which shows a positive effect on quality of education. This shows that the introduction of external examinations is likely to have positively affected the academic achievements of Polish students. Existing studies on the Polish education system and its quality confirm that standardised national assessments did indeed create incentives for teachers to improve the quality of their teaching (Jakubowski, 2015). However, according to the national stakeholders consulted, in addition to offering some benefits, the national assessment system also had some negative effects. The introduction of standardised national assessments encouraged, at least to some extent, an excessive focus on the subjects being assessed at expense of time spent on other subjects. The exams are also perceived as having little value for educational planning. While these exams should inform schools and teachers on how to improve their daily practices to achieve better results, education practitioners often lack the skills to interpret the assessment data. Some of the national stakeholders also expressed negative views regarding the public availability of assessment results. According to them, the rankings resulted in a hierarchy among schools and contributed to school segregation and the development of 'elitist' schools¹⁰⁶.

The national stakeholders consulted noted that the education reform introduced in 1999 had several additional benefits that cannot necessarily be seen from the PISA data. More

¹⁰⁵ Information gathered during consultations with relevant national stakeholders.

¹⁰⁶ Information gathered during consultations with relevant national stakeholders.

specifically, the changes in education structure provided more equal opportunities for children not only in terms of formal education, but also other opportunities, including the accessibility of extracurricular activities¹⁰⁷.

Main success factors for, and challenges to the implementation of the reform

Evidence from existing studies shows that the changes to the education system introduced by the 1999 educational reform positively affected the academic achievements of students and the general well-being of students. Several factors contributed to the success of the reform package (see the figure below).

FIGURE 30. SUCCESS FACTORS AND CHALLENGES AFFECTING THE EFFECTIVENESS OF THE 1999 EDUCATION REFORM



Firstly, **the changes in the education system were well designed and comprehensive**. When preparing the changes in the education system that were introduced by the 1999 reform, policy-makers followed the examples of existing education systems in Scandinavian countries. These good practices and existing knowledge allowed policy-makers to better understand how the reform should be designed and translated into the Polish context. Moreover, the decision-making process and the planning of the reform also involved consultations and discussions with the public, relevant national stakeholders, and national education experts. In this way, policy-makers were able to better understand the needs of the target groups, the potential roles of relevant stakeholders, and the potential effects of the reform. Having this information allowed policy-makers to better adjust the reform at the stage of planning and design, to be more in line with the needs of the public, and thus ensure it was more effective.

The changes introduced in the education system were complex and built upon one another. The 1999 reform introduced several important changes, such as changes to the curriculum and the introduction of the new standardised national assessment system. All of these changes complemented each other and followed the same policy direction. The curricular reform introduced in 2008 was also in line with the previous changes introduced in 1999. It served the same purpose, and was based on the lessons learnt from the previous reform¹⁰⁸.

¹⁰⁷ Information gathered during consultations with relevant national stakeholders.

¹⁰⁸ Information gathered during consultations with relevant national stakeholders.

It is important to note that the changes in education system were complemented by improvements in teacher training and support for schools and teachers. The existing studies analysing why various educational reforms tend to be unsuccessful point out that most reforms only introduce formal changes, but do not focus on changing daily teaching practices, which are the most important determinants of academic achievement (Adey, 2004). The coherent policy framework introduced in 1999 went hand in hand with supportive policy mechanisms that helped to develop the capacity of schools to manage and sustain change, such as autonomy accompanied by horizontal accountability measures, professional development systems, effective monitoring mechanisms, and support for networks and collaboration. The new assessment system also ensured that the achievement of the new learning objectives was properly monitored and evaluated, which allowed to flaws to be detected in a timely manner.

Finally, **the reform facilitated the restructuring of schools, which resulted in the diminishing of the status of 'elitist' schools.** Because the 1999 reform changed the structure of the education system from an eight-year, single-structure education to separate education in primary and lower-secondary (middle) schools, schools had to be reorganised, and many new schools were opened. This resulted in the diminishing of the status of the existing 'elitist' schools, which can also be seen from a weakening of the segregation indicators in PISA data. However, while the reform resulted in reduced segregation just it was introduced, this effect diminished over time. After a while, parents were able to distinguish between which schools were 'better' or 'worse', and the 'better' schools started to attract more students from advantaged socio-economic backgrounds (Wojniak & Majorek, 2018).

The positive effects of the 1999 education reform are evident and have been tested by existing studies. The effect on the quality of education is visible from improved mean academic performance, while its positive effect on equity can be seen from the slight narrowing of performance gaps and decreasing segregation. However, some challenges were faced.

Firstly, national stakeholders pointed out that **the effects of the reform in the first years after its implementation were hindered by the lack of a preparation period or piloting of the changes**¹⁰⁹. This means that immediately after the introduction of the reform, some challenges were faced that had not been anticipated. It also meant that some measures, such as ensuring transport for children via special buses, were not successfully implemented. These challenges stemmed from a lack of planned budget and a lack of preparedness among schools and teachers to implement the changes. Planning an inception period or piloting the new measures might have addressed these challenges at least partially, and ensured the effectiveness of the new measures from the outset. The fact that the reform brought significant positive change only after a few years further indicates that inception period or piloting was needed to ensure successful implementation.

As already mentioned, a **lack of financial and human resources created challenges during the implementation of the reforms.** Lack of funding complicated the provision of the new teaching and learning materials and the introduction of planned measures such as school buses. Moreover, teachers lacked the necessary knowledge and skills to introduce the new teaching practices. These challenges were tackled over time as policy-makers recognised the lack of resources and allocated more. However, a longer period of preparation before the reform might have allowed policy-makers to mitigate these changes earlier¹¹⁰.

¹⁰⁹ Information gathered during consultations with relevant national stakeholders.

¹¹⁰ Information gathered during consultations with relevant national stakeholders.

Finally, **negative public perception with regard to middle schools contributed to the reversal of reform.** The public believed that middle schools suffered problems with discipline, and that teachers were unable to cope with students. However, existing studies show that the opposite was true, and that middle schools actually managed to create a favourable and safe learning environment (Wojniak & Majorek, 2018). Policy-makers could have considered organising more public discussion to address these negative perceptions and providing evidence on gains in achievement. Because these negative opinions were not properly addressed, they contributed to a new change in the education system (introduced in 2016), which may negatively affect students, and reverses some of the benefits achieved over the last 20 years.

Lessons for future education reforms in Poland

The 1999 education reform in Poland is seen as very successful by the international community and by academics (Jakubowski, 2015). The reform focused on changing the structure of the education system, introducing a new curriculum and assessment system. While the conditions under which the reform took place were somewhat specific, several important aspects should be considered when planning further education reforms in Poland:

- **Changes in the education system should complement each other.** The 1999 reform was exceptionally complex, as it addressed different aspects of education system. However, the reform aimed to have a holistic vision and ensure that all of the changes introduced built upon one another. This continuity between policies contributed to better results and greater improvements in the quality and equity of the education system. The changes in the education system introduced in 2016, on the other hand, contradict the direction followed by the Polish education system for the last 20 years, and may offset the positive effects of earlier reforms in terms of the quality and equity of the education system¹¹¹.
- **Teachers and schools should be adequately supported when implementing the changes.** A coherent policy framework needs to go hand in hand with supportive policy mechanisms that help to develop schools' capacity to manage and sustain change, such as autonomy accompanied by horizontal accountability measures, smart funding formulas, professional development systems, effective monitoring mechanisms, and support for networks and collaboration.
- **It is crucial to plan sufficient preparation time and piloting of measures.** Existing studies (Jakubowski, Patrinos, Porta, & Wiśniewski, 2016) find that the academic performance of those students most affected by the 1999 reform (students who would have been in the VET track in grade 9 if the reform had not taken place) increased significantly between 2000 and 2006 (an increase of 116 points). However, while this effect is visible in 2003 and 2006, the national stakeholders consulted noted that just after the reform had been introduced, it did not yield any positive change. Consequently, the need for piloting or an inception stage should be considered when planning future reforms.

3.5. Portugal

Educational context and key policy issues

The basic skills of 15-year-olds in Portugal are comparable with the EU average. However, Portugal is one of only a few countries in which clear, positive improvements in the academic performance of students in reading, mathematics

¹¹¹ Information gathered during consultations with relevant national stakeholders.

and science can be observed (European Commission, 2020, e). This indicates the efforts policy-makers in Portugal have made to ensure the greater academic success of the country's students. According to the national stakeholders consulted, improvements in the quality and equity of the Portuguese education system stem from the gradually increasing importance of school autonomy, continuity between different education policy measures, and the willingness and motivation of the schools and teachers to implement the necessary changes¹¹².

It can be argued that participation in PISA has triggered these changes in Portuguese education system. Portugal's low results in PISA in 2000 in all three domains fuelled a discussion about the Portuguese education system (Crato, 2020) and the PISA results were used to legitimise and promote some controversial reforms. These include curriculum reforms in Portuguese, mathematics and natural sciences (Marôco, 2021); the introduction of high-stakes exams; and changes in conditions for teachers (Afonso & Costa, 2009). The changes that were implemented in response to the PISA results focus on quantifiable results, and may not necessarily consider the overall quality of the education system in a holistic manner. Still, it is evident from Portugal's PISA performance (presented in the following section) that the changes have helped Portugal to achieve its goal of increasing the mean academic performance of its students.

More recent reforms have focused on a more holistic approach to education in an attempt to improve achievement. Such recent reforms include an increase in the length of compulsory education, and a recent curricular reform focusing on innovative pedagogical approaches and greater school autonomy (OECD, 2020, f). Policy-makers have also focused on introducing various accountability mechanisms for schools and teachers, including low-stakes exams¹¹³. However, the **quality of education in Portugal is still hindered by a lack of digitalisation, the inefficiency of the school network, and by teaching capacity.** There is still a significant lack of digital skills and knowledge about digital tools among Portuguese teachers, which could jeopardise the provision of education in the light of increasing digitalisation (European Commission, 2020, e). Despite recent efforts to promote municipal and school autonomy, the education system remains centralised, with many important managerial decisions taking place at the central level. Consequently, resource allocation and the management of the education system is often inefficient. The quality of education is further threatened by ageing teachers and a lack of new teachers. As reported by TALIS 2018, less than 1% of teachers from primary to upper secondary levels were younger than 30. A high share of teachers tend to be employed on temporary contracts. In 2017/2018, 17% of primary school teachers and 21% secondary school teachers were employed under such contracts (OECD, 2020, f). The national stakeholders consulted also noted that while the requirements for teachers are being increased to ensure that teachers have the necessary skills and knowledge, this is still often not the case¹¹⁴.

Several recent changes to the Portuguese education system have also focused on ensuring equity. Measures such as the Programme of Educational Intervention Priority Areas (TEIP programme) have focused on social inclusion and the well-being of students (Magalhães, Araújo, Macedo, & Rocha, 2015). Some measures have focused on ensuring that students from socio-economically disadvantaged backgrounds and migrant students receive the support they need, and that the teachers have enough knowledge and skills to work with vulnerable or low-achieving students. Other measures, such as the National Plan for the Prevention of Early School Leaving and the National Programme for the Promotion of School Success, have specifically targeted early school leaving and low academic

¹¹² Information was gathered via interviews with national stakeholders.

¹¹³ Information was gathered via interviews with national stakeholders.

¹¹⁴ Information was gathered via interviews with national stakeholders.

achievement (European Commission, n.d., d). (European Commission, n.d., d). **These measures have, at least to some , been successful.** While in the early 2000s, early school leaving was a serious challenge in Portugal, in 2020 the share of early school leavers was lower than the EU average (8.9%, compared with 9.9%). The national stakeholders consulted also noted that one of the reasons potentially explaining this improvement is the increased focus on equity and inclusion in the education system¹¹⁵. However, **inequalities between students from different socio-economic backgrounds and geographical disparities remain.**

Moreover, **grade repetition remains an important problem in Portugal.** As mentioned in Section 2.2.1, grade repetition in Portugal is the highest of all countries analysed in this study, and is well above the EU average. High levels of grade repetition may hinder the country's academic performance. This indicates that the programmes focusing on grade repetition and underachievement are also crucial to the improvement of Portugal's academic performance.

Existing challenges are further exacerbated by decreasing funding in education system. Between 2010 and 2018, general government expenditure on education decreased by 24%, resulting in a fall of 3 billion in education spending during this period (European Commission, 2020).

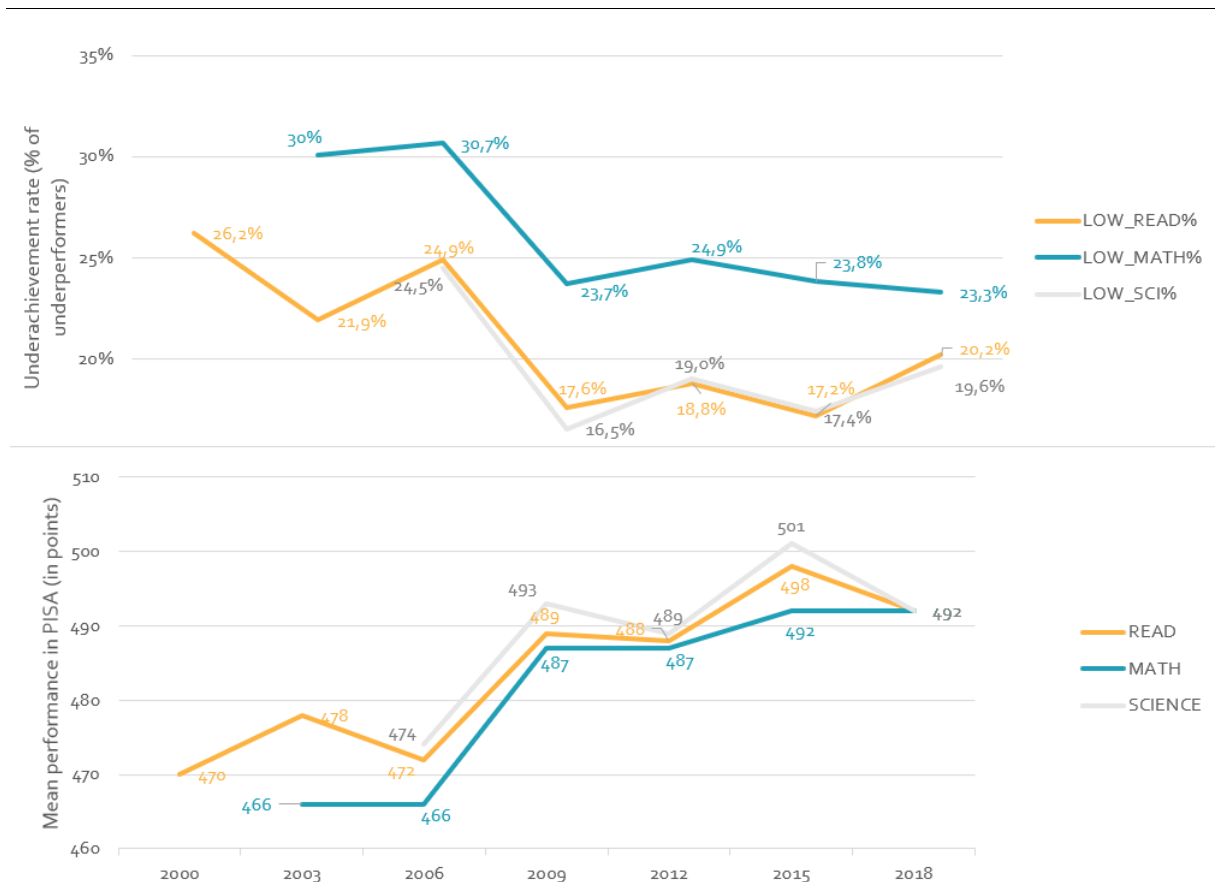
Key trends in students' performance

While Portugal's performance in PISA 2018 was comparable to the EU average, Portugal is one of the few EU Member States in which positive trends can be observed in all of the domains tested (reading, mathematics and science). However, the underachievement rate in all three domains is still well above the EU target of less than 15% (European Commission, 2020, e).

Despite a slight decrease in mean performance and a slight increase in the share of underachievers in mathematics and science in 2018, some statistically significant positive changes in the academic performance of Portuguese students can still be observed (see Figure 31). Since 2006, **mean performance in all three domains (reading, mathematics and science) has improved significantly.** The greatest increase is observed between 2006 and 2009, with a slightly smaller increase being observed between 2012 and 2015. Mean underachievement rates in all three domains have followed a reverse trend – a significant decrease can be seen between 2006 and 2009, and a slight decrease between 2012 and 2015.

¹¹⁵ Information was gathered via interviews with national stakeholders.

FIGURE 31. MEAN PISA PERFORMANCE AND UNDERACHIEVEMENT RATES IN PORTUGAL 2000-2018



Source: PISA data.

Note: the graph presents trends in mean student achievement in Portugal between 2000 and 2018, as well as variations in the mean rate of low-achieving students.

As in many other countries, students' performance in Portugal strongly depends on the background characteristics of the students. However, **while performance gaps between different groups of students remain, some improvements can be observed** (see Figure 32).

The performance gap between students from socio-economically advantaged and disadvantaged backgrounds decreased slightly between 2012 and 2015. However, because this was followed by an increase, the performance gap in 2018 is statistically the same as in 2009.

The performance gap in reading between boys and girls decreased between 2012 and 2015, followed by a slight increase in 2018. Even so, the gap is 14 points narrower in 2018 than in 2009. While the performance of both boys and girls has increased, the increase in boys' performance is slightly greater, resulting in a narrowing of the gap. However, a decrease in the gender gap in reading has been observed in the majority of OECD countries since 2015. It is believed that this general trend is the result of a change in PISA from paper-based to computer-based delivery. Girls generally tend to perform worse on computer-based tests, which contributes to this decreasing gender gap in reading. (OECD, 2016, b). The gender gap in mathematics remained stable and low (not more than 12 points) over the observed time period, with boys performing better than girls. However, the results of the regression equation, which are presented in Section 2.2.2, show that gender is a significantly stronger predictor of mathematics performance among Portuguese students than it is for students in most of the other countries analysed in this study. This

means that even though the gap between girls and boys is relatively low, the teaching methods used in Portugal may favour boys over girls, or that other challenges to equity exist in the education system. Consequently, a focus on more individualised pedagogical approaches in the country could contribute significantly to improving academic performance in Portugal.

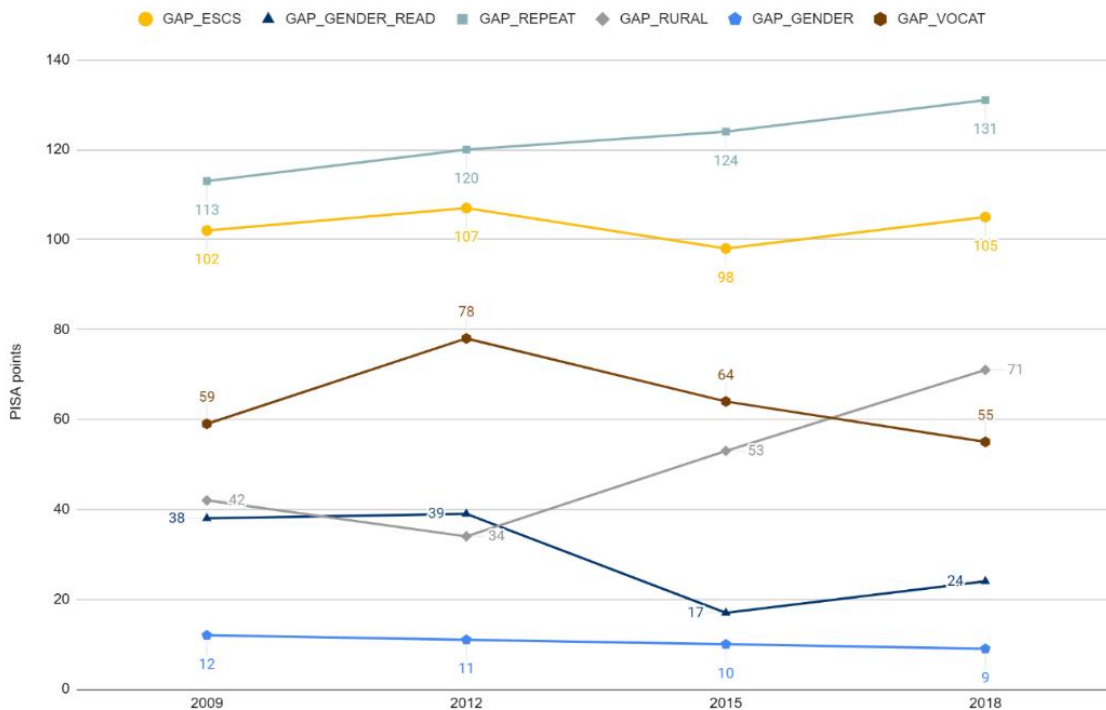
The performance gap between students in VET and academic tracks increased between 2009 and 2012, before decreasing gradually to 2018. Between 2012 and 2018, the gap narrowed by 23 points. This narrowing of the gap is the result of a significant increase in the mean performance of students in the VET track (from 422 points in 2012 to 447 points in 2018), and the stable performance of students in the academic track (around 500 points). It is also important to note that the share of students in the VET track has been increasing constantly over the last 20 years. This also means that a significant part of the improvement in Portugal's mean performance can be attributed to the increasing performance of students in VET. This positive change means that the system has been gradually becoming more equitable for students in different tracks, and that the differences between tracks has gradually been narrowing. Normally, improvements in PISA scores tend to be the result of improvements in the academic performance of students from general schools. Only rarely does it happen because of improvements in the academic performance of VET students.

The performance gap between students living in rural and urban areas¹¹⁶ decreased between 2009 and 2012. However, as this performance gap has gradually been increasing again since 2012, the gap in 2018 is significantly larger than in 2009 (71 points compared to 42 points) and is significantly above the EU average (35 points). This increasing gap has been caused by a significant decrease in the mean performance of students in rural areas and a slight increase in the mean performance of students in urban areas. While this gap indicates serious issues of inequality and the deteriorating quality of education provided in rural areas, it is important to note that the share of students who live in rural areas in Portugal has been decreasing (8.8% in 2009, compared with 2% in 2018) and is significantly below the EU average (9.3% in 2018).

The performance gap between students who had to repeat a grade and those who did not gradually increased between 2009 and 2018, with a total increase of 18 points. This gap is especially problematic, given that the share of students repeating a grade in Portugal is significantly above the EU average (26.6% in 2018, compared with the EU average of 10.4%).

¹¹⁶ Cities or urban areas are defined as having 100,000 residents or more, while a rural area or village is defined as having fewer than 3,000 residents

FIGURE 32. PERFORMANCE GAPS BETWEEN STUDENTS IN MATHEMATICS IN PORTUGAL 2009-2018



Source: PISA data.

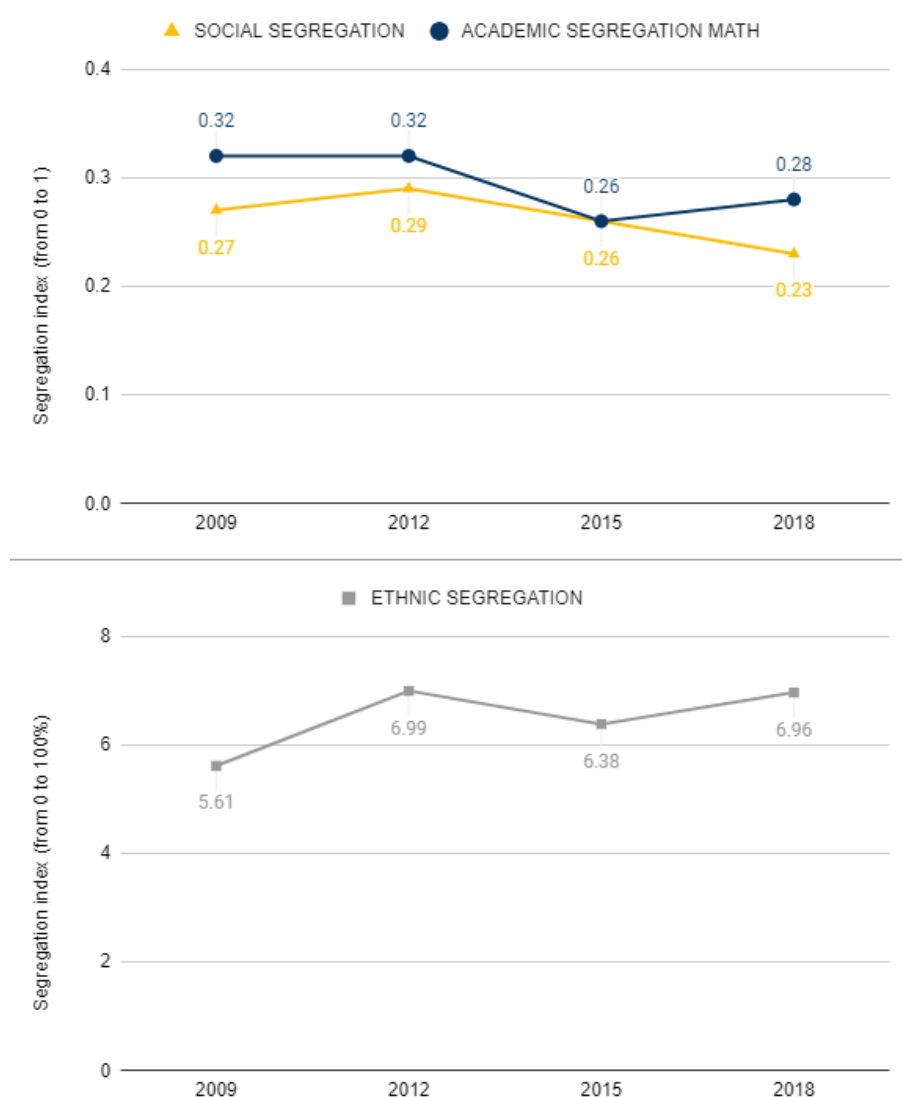
Note: the graph presents trends in performance gaps in Portugal between certain categories of students (boys vs. girls; students in rural environments vs. students living in cities...) for the 2009-2018 time period. All gaps are presented as absolute values, so that the graph is easier to understand. However, all gaps are actually negative (meaning a difference in favour of the most advantaged category in the comparison). While all of these gaps relate to performance in mathematics (the most interesting domain for analysis), the gap between boys and girls (GAP_GENDER) is also presented, as this gender gap is usually larger in reading than in mathematics or science.

With regard to indicators of school segregation, ethnic segregation¹¹⁷ has remained low and stable, while social and academic segregation¹¹⁸ has decreased slightly. Social segregation decreased between 2012 and 2018. However, due to an increase in social segregation between 2000 and 2006, the indicator value in 2018 was similar to that in 2009. Academic segregation has decreased since 2009, despite a slight increase between 2015 and 2018. This decrease may, at least partly, be linked to the reorganisation of the school network, which included the closure of small, often poorly equipped, schools.

¹¹⁷ Variable ETHNICSEGR. For more information, see Annex 2 – Methodological approach section 2.1.3. Variables used for statistical analysis.

¹¹⁸ Variables SOCIALSEGR and ACADEMICSEGR. For more information, see Annex 2 – Methodological approach section 2.1.3. Variables used for statistical analysis.

FIGURE 33. VARIATION IN SOCIAL, ETHNIC AND ACADEMIC SEGREGATION IN PORTUGAL 2009-2018



Source: PISA data.

Note: the segregation index can have a value between 0 and 1. 0 means no segregation (none of the variance in performance between schools can be explained by the school attended); 1 means complete segregation (the school attended can explain 100% of the variance between schools).

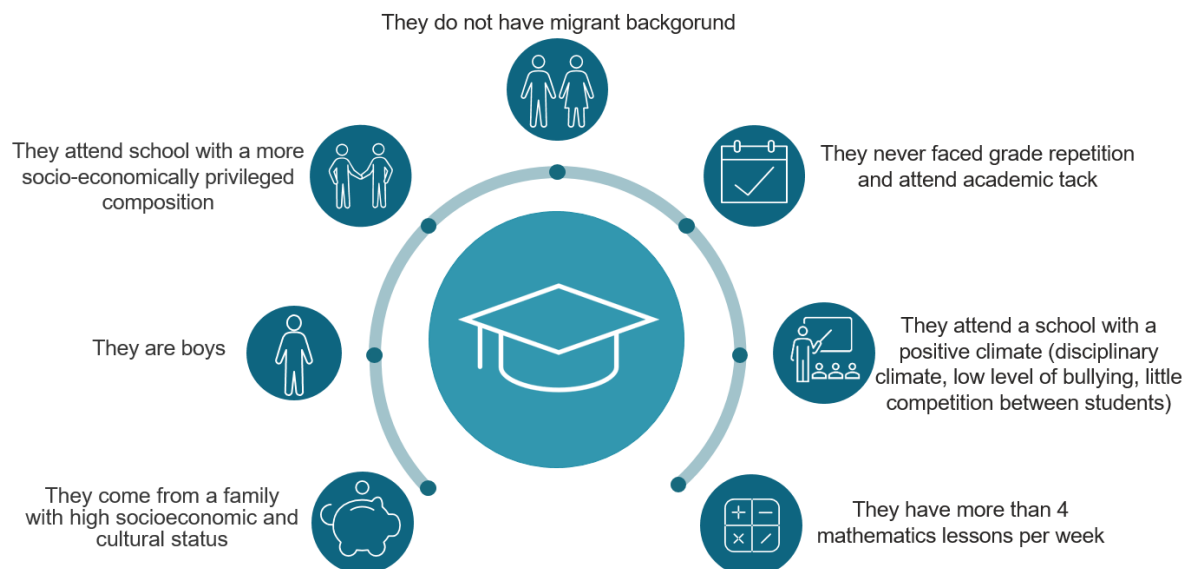
The analysis of equity indicators shows that several important challenges remain and hinder the inclusiveness of the education system. More specifically, Portugal has **high rates of between-school socio-economic segregation and high rates of immigrant isolation** (Liebowitz, González, Hooge, & Gonçalo, 2018). Students from socio-economically disadvantaged backgrounds also tend to have lower levels of educational attainment (OECD, 2020, f). The analysis of the effects of various individual and school-level factors that may affect students' achievement, conducted via the multi-level regression model¹¹⁹ using PISA 2018 data, confirms the challenges in relation to inclusion. Native Portuguese boys from socio-economically advantaged backgrounds, who follow the

¹¹⁹ The model tested the effect on students' performance of individual background variables (gender and ESC), academic path variables (attending VET track), and school climate variables at individual and school level. The only variables presented are those that had a significant effect. For more information, see Annex 1. Country Profiles, Portugal.

academic track and have never repeated a grade, tend to perform better than other students (see the figure below).

FIGURE 34. FINDINGS OF THE MULTI-LEVEL REGRESSION ANALYSIS OF PISA 2018 DATA FOR PORTUGAL

Students in Portugal perform better in PISA (mathematics) if:



Source: multi-level regression analysis conducted for the study based on the PISA 2018 data. Because mathematics is the most interesting domain in Portugal (given the positive performance trends), all of the gaps presented are calculated for performance in mathematics.

Key policies associated with the improvements observed

Despite the remaining challenges, several improvements in the country's PISA performance can be observed:

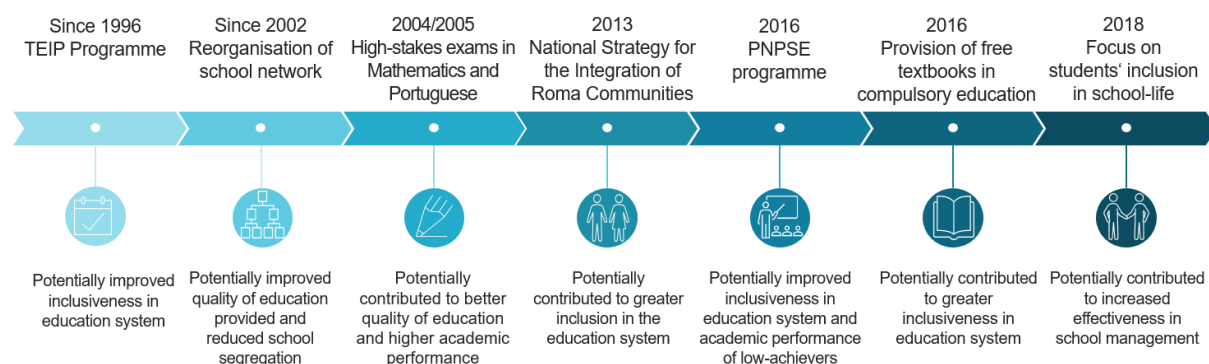
- A steep increase in mean performance in all three domains between 2006 and 2009, followed by a slight and gradual increase between 2009 and 2018;
- A decrease in ethnic, social and academic school segregation (between-schools) between 2006 and 2018;
- A decrease in the performance gap between students in VET and those in the academic track between 2012 and 2018 (due to an improvement in the achievement of VET students).

It would be imperative to understand which changes in education system may have contributed to the observed trends. The national stakeholders consulted were exceptionally cautious about making links between specific reforms and the improvements observed in PISA, as the improvements are likely to be the result of several reforms have been introduced over time. According to some of the national stakeholders consulted, focusing on specific reforms might result in an oversimplification of the complexity of the education system and the dismissal of important factors that affect its quality and inclusiveness¹²⁰. However, despite the complexity of and interconnection between different reforms, it is crucial to attempt to understand the impact of specific reforms to better inform further developments in education policy. Keeping this in mind, it is evident that some of the

¹²⁰ Information was gathered during the interviews with the national stakeholders.

changes and educational reforms introduced may have had a more pronounced positive effect than others on quality and equity in the education system. The changes that have potentially contributed to the observed improvements are presented in the figure below.

FIGURE 35. REFORMS POTENTIALLY LINKED TO IMPROVEMENTS IN ACADEMIC ACHIEVEMENT IN PORTUGAL



The aforementioned reforms focus on different aspects of the education system – school governance, national assessment system and inclusiveness. All of these reforms have in some way contributed to the changes in the quality and equity of the Portuguese education system. However, some of the reforms cannot be analysed in a rigorous way due to the cross-sectional design of the PISA dataset and its lack of variables that can show the effect of reform, or because the effects of the reform cannot be distinguished from the effects of other reforms. Consequently, only some of the reforms are analysed in greater depth.

3.5.3.1. Re-organisation of the school network

The reorganisation of the school network in Portugal had been planned in 1988, when legislation was passed that encouraged the closure of schools with fewer than 10 students (Pinto Ferreira, 2009). However, this legislation was never enforced, and the problem of the inefficient use of resources in the education system remained. The idea of reorganising the school network to focus on the clustering of schools had also already been introduced in 1997 and in 1998. The legislation introduced in 1997 and 1998 intended to facilitate the transition of students between different schools and to give schools greater autonomy. However, this legislative framework envisioned the aggregation of schools as an initiative led by the schools themselves. Consequently, there was no clear timeframe for the reorganisation of schools into clusters, which resulted in very slow progress (Rodrigues, Ramos, Félix, & Perdigão, 2017). The idea of reorganising the school network was again revisited in the early 2000s (see Box 13).

BOX 13. SCHOOL NETWORK REORGANISATION

In 2002, a programme to reorganise first-cycle schools was introduced. The reorganisation of the school network was a lengthy process, including many different measures. However, the two most important measures were the reorganisation of physical infrastructure and the clustering together of schools.

The reorganisation of physical infrastructure focused on the closure of small schools, which often were not well equipped, and redistributing these resources with the aim of improving other schools and providing better conditions for more students. School closures began around 2002–2003, with 472 schools being closed. Between 2005 and 2009, more than 2,500 schools were

closed, and an additional 711 schools were closed in 2010. Between 2011 and 2012, more than 500 further schools were closed.

There were several reasons for closing small schools. First, the student population decreased steeply at the end of the 20th century. The number of students in primary education decreased from 882,000 in 1981 to 443,000 in 2006 (Rodrigues, Ramos, Félix, & Perdigão, 2017). This decrease in the number of students was also not uniform across the whole country, resulting in schools in certain regions working rather inefficiently and not improving the quality of education provided. Such schools, which were often isolated in deprived rural areas, also had high rates of drop-out and grade repetition (Adey, 2004). Second, despite the low average ratio of students per teacher (1 teacher per 8 students), the academic results of students were not improving. Moreover, even though spending on education was high, it did not result in better educational outcomes. Both of these problems pointed to the inefficient use of resources. Finally, a lack of communication between schools at different educational levels was seen as inefficient, further hindering the quality of education (Matthews, Klaver, Lannert, Conluain, & Ventura, 2008).

The reorganisation of the school network should, at least in theory, have focused on combating school failure. This means that low-performing schools should have been the main targets of the reform and of school closures. However, it seems that the main criteria used to decide whether or not a school should be closed was its size. A resolution from the Portuguese government from 2010 (Resolução do Conselho de Ministros no. 44/2010) foresaw the closure of first-cycle schools (i.e. the first four years of primary school) that had less than 21 students. In this document, the ministry argued that there was a relationship between a school's size and its success. However, support is lacking for this claim, and the performance of schools was not considered when choosing which schools to close.

In relation to clustering, different schools providing education in different compulsory education cycles were joined together by establishing a common administrative and managerial body overseeing all schools in the cluster. These school clusters were created to strengthen cooperation between schools and create new tools for formal coordination between them. It was also hoped that establishing school clusters would result in the development of a coordinated path for students between different levels of compulsory education, in a way that facilitating their transition between different education levels (Abalde, 2014).

According to the Ministry of Education, the aim of the reorganisation of the school network was to combat school failure, widen students' access to new technologies, and provide better conditions for students and teachers.

Portuguese authorities have made considerable efforts in restructuring the country's school network. However, some important challenges remain, and certain regional and school-level inequalities remain very pronounced (OECD, 2018, b). (OECD, 2018, b). **Governance of the education system in Portugal is still rather centralised.** The Ministry of Education is responsible for overseeing pre-school, primary and secondary education, and the Ministry of Science, Technology and Higher Education coordinates policies governing higher education (Eurydice, 2021, n). Since 2003, municipal education boards have overseen education policy at municipal level and monitored education provision. Schools enjoy some organisational and pedagogical flexibility. For example, they are responsible for selecting textbooks, due to some flexibility in the curriculum (Eurydice, 2021, k). While schools should in theory also be responsible for hiring part of their staff, in practice the majority of the teaching staff is still hired at national level.

Observed effects of the reform

The PISA data indicate a slight decrease in academic segregation after the reorganisation of the school network. The introduction of the reform reorganising the school network was also followed by an improvement in Portugal's PISA results. However, the effect of the reform cannot be measured using statistical means, due to a lack of variables that can reflect the effects of the reform, as well as the inability to control for the effects of other factors on the quality and equity of education.

Existing studies argue that despite a lack of clear and quantifiable evidence regarding the relationship between the reform and the observed improvements, the school reorganisation reform has been very important and influential. While other countries in the EU have discussed the possibility of similar reforms, only Portugal has managed to implement it on such a scope. The reform created conditions that could facilitate other measures that focus on improving the quality of the education system (Rodrigues, Ramos, Félix, & Perdigão, 2017). More specifically, the closure of schools was accompanied by support measures for parents whose children were transferred to another school due to school closures. Such support measures included free transportation to school, free meals at school for children from families that receive social benefits, and others. According to various academic studies, the existence of these support measures may have significantly contributed to better educational outcomes (Abalde, 2014). The national stakeholders consulted also noted that the closure of small schools provided more opportunities for children. Students who attended small schools that had fewer resources and education tools, often had fewer opportunities. After the reform, such students were transferred to larger and better-equipped schools, which resulted in them having access to more opportunities¹²¹.

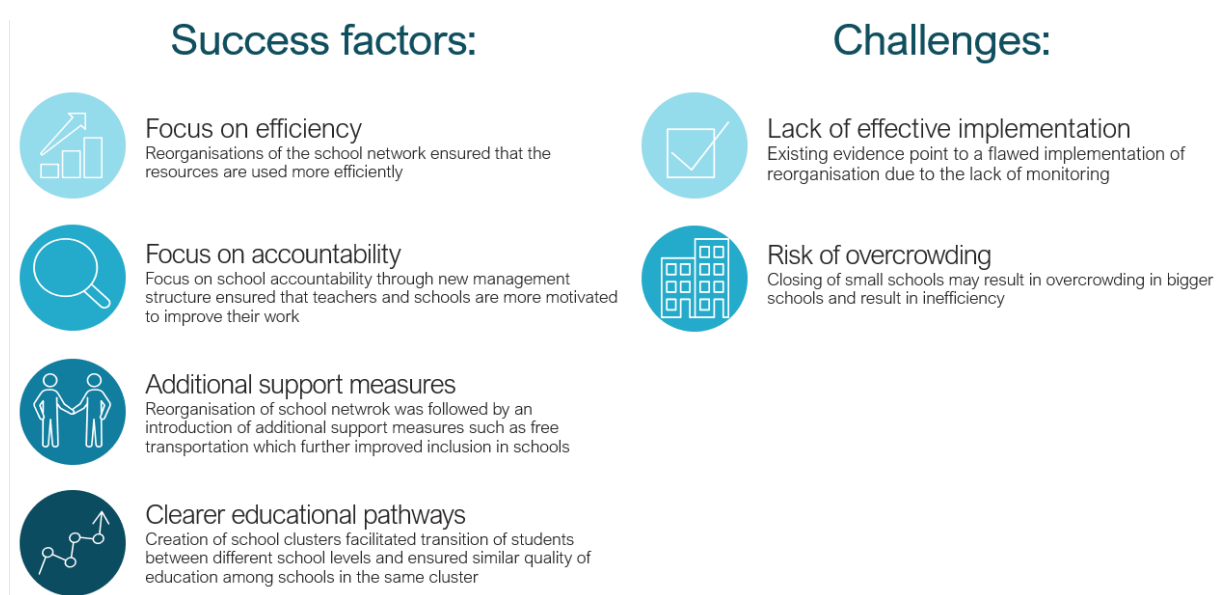
While the reorganisation of the school network is usually evaluated positively, it is important to note that evidence of its effects is scarce. For example, the national stakeholders consulted questioned its effect on the academic achievements of students. However, as mentioned, 472 schools were closed around 2002-2003; more than 2,500 schools were closed between 2005 and 2009; 711 schools were closed in 2010; and more than 500 schools were closed in 2011. A report by the National Council of Education, published in 2014, indicates that more than 2,800 schools were closed in 10 years. However, as these schools each had no more than 21 students, only around 60,000 students were affected in total (on average, 6,000 students per year). In reality, this number will be significantly smaller, as most of these schools had fewer than 21 students. Moreover, existing studies indicate that the implementation of the restructuring was not very smooth or consistent. While in some municipalities, the school network has been fully reorganised as planned, in others new educational institutions coexist with old ones, or no changes have appeared except for the closure of some schools due to a significantly declining number of students (Santos, Cordeiro, & Alcoforado, 2021). Moreover, the study of 12 schools in rural areas also shows that the reality faced by teachers often differs from the picture presented by the central administration. While the central administration presents the reorganisation as a tool to improve the quality of education, teachers question these improvements, as they have rarely seen changes in teaching and learning conditions (Pinto Ferreira, 2009).

Main success factors for, and challenges to, the implementation of the reform

While evidence is relatively scarce regarding the effect of the reorganisation of the school network on quality and equity in the education system, the existing literature and information gathered through stakeholder consultations point to the reform having had potential benefits due to a number of enabling factors. However, the inconsistent implementation of the reform may have slightly hindered its potential positive effect.

¹²¹ Information was gathered during the interviews with the national stakeholders.

FIGURE 36. SUCCESS FACTORS AND CHALLENGES AFFECTING THE EFFECTIVENESS OF THE REORGANISATION OF THE SCHOOL NETWORK



The reform contributed to the more efficient use of resources. As the number of schools became smaller, resources that had previously been spent on maintaining school buildings and similar spending could now be allocated to upgrading the education tools in the remaining schools. In this way, the reform may have contributed to the quality of teaching and learning in those schools.

The reorganisation of the school network also resulted in the greater accountability of schools through the new management structures of school clusters¹²². This ensured that schools and teachers are more motivated to work towards achieving the objectives set by the education system. Increased accountability has also allowed the work of schools and teachers to be monitored.

It is also important to note that the reform created the conditions for other measures that may have contributed to improvements in educational outcomes (Abalde, 2014). This means that while the reorganisation of the school network itself may have not played a crucial role in changes in quality or equity in the education system, the measures that were implemented together with it may potentially have improved the quality of the education system, resulting in better academic achievements.

Finally, the **reorganisation of school network provided clearer and more structured educational pathways for students, which contributed to ensuring more of them remain in education.** As mentioned by the national stakeholders and seen from existing studies (Abalde, 2014), the existence of school clusters in which schools of different educational levels are managed jointly facilitates the transition of students between schools of different levels. This, in turn, contributes to reducing the school drop-out rate. Moreover, close cooperation between schools helps to tackle and reduce potential inequalities between schools in the same school cluster.

Despite potential benefits that stem from the reorganisation of the school network and the measures introduced together with it, several challenges were faced in changing the school management system.

¹²² Information was gathered via interviews with national stakeholders.

Existing evidence points to the lack of effective implementation of the school network reorganisation reform in some municipalities. While in some municipalities the changes have been introduced as planned, in others, no significant steps towards the implementation of the reform have been taken. National guidelines were interpreted differently by local communities. Consequently, while in some municipalities the school network was fully reorganised, in others, new school buildings coexist with old ones. In some municipalities, nothing has changed aside from the closure of schools due to declining school population (Santos, Cordeiro, & Alcoforado, 2021). Consequently, the reform may have resulted in increased inefficiency in the school system in certain regions, with more prominent discrepancies in education provision emerging between municipalities. Monitoring of the implementation of the reform and reinforcement of the planned changes could have helped to overcome this challenge. However, there is no evidence that such measures took place.

The national stakeholders interviewed also emphasised that there is a risk that the reorganisation of the school network could result in certain schools becoming overcrowded. If a schools become overcrowded, teachers may not have enough time to properly attend to the needs of each student, and the resources the schools have may not benefit students as much as they could. Moreover, if school clusters become very large (with several very big schools being connected to one cluster), there is also a risk that the clusters will become too large to be properly managed. In exceptionally large school clusters, it might prove hard to ensure daily assistance for teachers and students or to various different projects in a timely manner¹²³.

3.5.3.2. National assessment system reforms

Portugal has a long history in relation to standardised national assessments. Before the revolution in 1974, students' academic progress relied heavily on standardised national assessments. High-stakes national exams in all subjects had to be taken in grades 4, 6, 9 and 11. After the 1974 revolution, national standardised assessments were abolished (Fernandes, 2009). In 1993, national assessments were reintroduced at the end of secondary education. In 1994, high-stakes standardised national assessments (with a weight of 25% on the final grade) in all subjects were introduced at the end of the 9th grade (Despacho Normativo 644-A/94, de 8/9). In 1995, these high-stakes assessments at the end of grade 9 were replaced with low-stakes tests in Portuguese language and mathematics. At the same time, low-stakes assessments in Portuguese and mathematics at the end of grades 4 and 6 were introduced.

Portugal's disappointingly low results in PISA in 2000 prompted a discussion about the Portuguese education system and the potential need for new education measures (Crato, 2020). The low PISA results were used to legitimise some controversial reforms, such as the introduction of high-stakes assessments. (Afonso & Costa, 2009). In 2002, when a new government came to power, a new approach towards education was adopted, and the focus went from practical knowledge and a focus on competences back to theoretical knowledge and academic results. Under this new approach, it was argued that the teaching of mathematics and science were not sufficiently well covered and tested. Consequently, a task force was assembled, aimed at improving the curriculum and teaching in mathematics and science. The task force proposed a focus on theoretical knowledge rather than competences and transversal skills. To ensure a greater focus on theoretical knowledge, high-stakes standardised national assessments in Portuguese language and mathematics were introduced for students finishing their compulsory education (Decree-

¹²³ Information was gathered via interviews with national stakeholders.

law 209/2002). For more information on the introduction of high-stakes national assessments, see Box 14.

BOX 14. INTRODUCTION OF HIGH-STAKES NATIONAL ASSESSMENTS IN 2004/2005

The new government, which came into power in 2002, believed that to improve the quality of Portuguese education and ensure higher academic performance, education should focus more on theoretical knowledge. Consequently, high-stakes standardised national assessments in Portuguese language and mathematics were introduced for students finishing their compulsory education (Decree-law 209/2002).

These assessments were held for the first time at the end of the school year 2004/2005. Even though a new party was in power at that time, the new Minister of Education still followed the same direction in education policy, and oversaw the smooth implementation of some of the planned reforms, including the introduction of high-stakes exams in Portuguese language and mathematics. The results of these assessments, aggregated at school level, were made available to the public.

The standardised national assessments introduced in 2004 were seen as a measure to improve academic performance (Marôco, 2021). They aimed to ensure that learning objectives were achieved, and acted as an evaluation and monitoring tool for the quality of education. The national stakeholders interviewed noted that the standardised national assessments were seen as crucial for motivating teachers and students to work towards improving educational outcomes¹²⁴.

However, the high-stakes standardised national assessments were viewed controversially. It was expected that the introduction of the assessments would result in the increased quality of education and ensure higher levels of academic achievement. However, some experts and stakeholders believed that the introduction of the high-stakes assessments could result in a narrower curriculum with an excessive emphasis on the assessed subjects. It was also feared that the introduction of high-stakes assessments would result in the prioritisation of academic achievements over the inclusion and well-being of students. The academic community and teachers' unions opposed the introduction of these assessments, as they perceived the risks and potential damage resulting from the changes to be greater than the potential benefits of the assessments¹²⁵.

In 2012, high-stakes standardised national assessments were again introduced at the end of grades 4 and 6 (Decree-law 137/12, from 2 July). In 2016, a new government discontinued these high-stakes assessments, and instead introduced low-stakes standardised national assessments at the end of grades 2, 5 and 8 (Decree-law 17/16, from 4 April). According to the new system, the results of these exams do not heavily impact students' final grades. In grade 2, students take exams in 'mathematics and environmental studies' and 'Portuguese and environmental studies', and in grades 5 and 8, students take exams in Portuguese and mathematics. At the end of lower-secondary education, after completing the 9th grade, students are assessed in Portuguese (with different exams for native and non-native speakers) and mathematics (Eurydice, 2021, o).

Portugal also participates in large-scale international assessments. It has been taking part in PISA since 2000. Participating in large-scale international assessments allows the national education system to be better analysed, so that the quality of education in the country can be compared with that in other countries.

Observed effects of the reform

The high-stakes standardised national assessments in Portuguese and mathematics first held in the school year 2004/2005. Even though no increase in Portugal's PISA scores in

¹²⁴ Information was gathered during the interviews with the national stakeholders.

¹²⁵ Information was gathered during the interviews with the national stakeholders.

mathematics and reading are observed between 2003 and 2006, there is a significant increase from 2006 to 2009, which could be potentially linked to the introduction of the high-stakes standardised national assessments. Statistical means cannot be used to assess a causal effect of the reform on students' achievements, due to the observational nature of PISA studies, which do not aim to collect the data needed to assess cause-and-effect relations, but focus on the evaluation and monitoring of the system. However, available scientific literature (Bergbauer, Hanushek, & Woessmann, 2018) indicates that the introduction of high-stakes exams may have contributed to higher academic performance among Portuguese students.

Bergbauer et al. (2018) assessed the effect that testing practices have on student achievements. The results of the study indicate that standardised assessments which compare the outcomes of the tests between schools and students have a positive effect on academic achievement, and that having a reward system for schools and students can further contribute to better academic outcomes. As the standardised national assessments introduced in Portugal were high-stakes, meaning they played an important role in determining the educational path of students (and, in that way, 'rewarded' them), it is likely that their introduction positively affected students' academic performance. It is also important to note that Portugal's PISA results in mathematics and reading (the domains that were tested through high-stakes standardised national assessments) increased between 2006 and 2009, while the country's mean performance in science (which was not tested through high-stakes standardised national assessments) decreased over the same time period. This further indicates a potential positive effect of the high-stakes standardised national assessments on students' academic performance in the assessed subjects (Marôco, 2021).

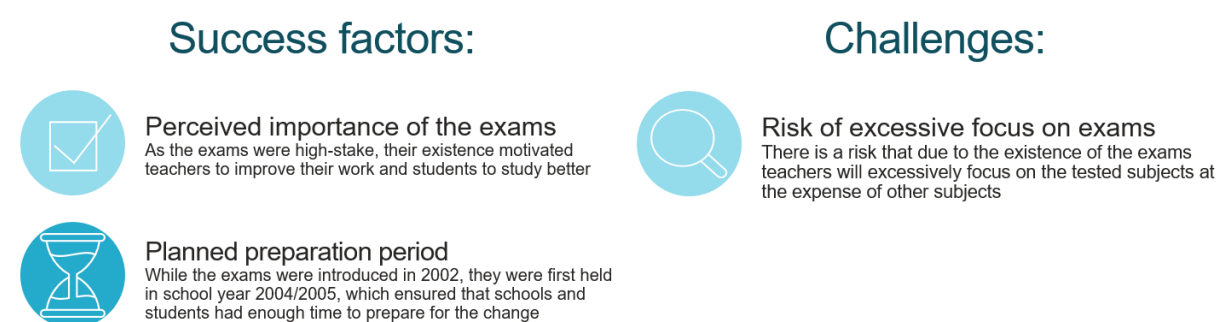
While the high-stakes standardised national assessments may have contributed to improvements in students' academic performance in mathematics and reading, they may also have had some potential negative effects. Existing studies argue that the existence of high-stakes assessments can result in an excessive focus on the subjects tested, with a consequent lack of focus on other important aspects of education such as the well-being of students (Koretz, 2017). The existence of national assessments may also result in teachers and schools prioritising the results of the assessments over learning and inclusion in the education system (Marôco, 2021). This means that even though an improvement is observed in PISA scores, it may not indicate an overall improvement in education in Portugal. The national stakeholders consulted also noted the existence of these risks. They also highlighted that for the assessments to contribute to the improvement of the education system, it is crucial that the results of the assessments are properly analysed and taken into account by policy-makers and schools¹²⁶.

Main success factors for, and challenges to, the implementation of the reform

Several factors may have contributed to the potential positive effect of high-stakes exams on the academic achievements of students. However, certain risks and challenges were also faced. The most important success factors and challenges are presented in the figure below.

¹²⁶ Information was gathered via interviews with national stakeholders.

FIGURE 37. SUCCESS FACTORS AND CHALLENGES INFLUENCING THE EFFECTIVENESS OF HIGH-STAKES EXAMS (2004/2005)



Firstly, **the high-stakes standardised national assessments were perceived as very important, which motivated teachers and students.** Due to the high-stakes nature of the assessments, teachers were motivated to ensure that their teaching prepared students for the assessments and that learning objectives were achieved. The standardised national assessments also worked as an accountability mechanism to ensure that teachers could be held responsible for their work, which should also have motivated them to improve their teaching practices. Moreover, because the results of the assessments influenced their final grades, students were also motivated to study for the exams and thus perform better. However, as noted by the national stakeholders consulted, **the assessments, despite being high stakes, contributed no more than 30% to the final grades of students.** Consequently, these assessments did not have a very significant negative effect on students' future educational trajectories, even if the students got bad grades. However, they still motivated students and teachers to improve teaching and learning practices and to focus on achieving the goals that had been set¹²⁷.

It is also important to note that a **preparation period was foreseen for the implementation of the standardised national assessments.** While the exams were introduced in 2002, they were only held for the first time in the school year 2004/2005. This means that teachers had some time to prepare and adjust their teaching practices.

While the introduction of high-stakes standardised national assessments may have had a positive effect on the academic achievements of students, some challenges may have been faced. More specifically, **an increased focus on the academic achievement is also likely to divert the attention of teachers and schools away from the well-being of students and the inclusiveness of the education system** (Marôco, 2021). As the existence of high-stakes standardised national assessments means that schools may be penalised for the low average performance of their students, it is possible that teachers will spend more time teaching students who are likely to perform well, and will not work as much with those students whose academic prospects are not as bright. This is likely to increase performance gaps between students and contribute to increasing inequalities.

3.5.3.3. Equity of the education system

In early 2000s, early school leaving was a serious issue in Portugal. (European Commission, n.d., d). Serious inequalities between regions and schools were observed. To tackle these problems, various measures were put in place. For example, early school leaving was tackled through programmes focusing specifically on the problem, such as the National Plan for Prevention of Early School Leaving, introduced in 2004. Other

¹²⁷ Information was gathered via interviews with national stakeholders.

programmes tackled various challenges relating to equity in education at the same time, and focused holistically on social inclusion and the well-being of students. Such measures include the TEIP programme (Territórios Educativos de Intervenção Prioritária [Educational Territories of Priority Intervention]) (Magalhães, Araújo, Macedo, & Rocha, 2015). The TEIP programme is seen as one of the most important reforms in Portugal over the last two decades. The programme is presented in the Box 15.

BOX 15. THE TEIP PROGRAMME

The TEIP programme, first introduced in 1996, focuses on inclusive education and better-quality education for the most disadvantaged students. When the programme was launched in 1996, it focused on combating school and social exclusion by granting additional material and human resources to designated schools, as well as an increased level of autonomy.

In the late 1960s and 1970s, compensatory programmes were adopted by several European countries, including Sweden, the UK and Belgium (Demeuse, Frandji, Greger, & Rochex, 2008). The TEIP programme in Portugal was mainly inspired by a similar French programme, 'Zones d'Éducation Prioritaires' (Sampaio & Leite, 2015).

Like other, similar European programmes, the TEIP programme took into account the local and territorial dimensions of social and educational inequalities. Under the framework of the programme, local actors were granted greater autonomy to find the most effective measures to address inequalities in their specific local context (Álvares, 2012). The vision of the programme was that in time, the role of the central administration would become minor and local actors would become responsible for identifying and addressing problems relating to social and educational inequalities. It was also hoped that the programme would facilitate the establishment of local partnerships (Barbieri, 2003). In practice, this resulted in school clusters becoming responsible for addressing issues relating to social and education inclusion, and other local actors still having a limited role in addressing social and school inequalities. The programme was discontinued in 1999, which points to its potentially limited effectiveness. However, as no official assessment of the programme was conducted, the effect of the programme from 1996 to 1999 is unclear.

Despite having been discontinued in 1999, the programme was reinstated in 2006 (TEIP2). The reinstated programme focused on improving the educational outcomes and academic achievements of students, tackling early school leaving, improving school-to-work pathways, and increasing the importance of schools in the cultural life of the communities to which they belong.

The TEIP2 programme was implemented in three separate stages. The first stage was initiated in 2006, and involved 35 schools. The second phase involved 24 additional schools, and began in September 2009. The third stage began in November 2009, and included 46 additional schools, bringing the total number of schools participating in the programme to 105 schools. In 2012, TEIP3 was launched, following the guidelines of TEIP2, with 32 more schools entering the programme. Currently, 136 school clusters are involved in the programme (DGE, n.d.).

Programme schools can receive additional financial and human resources and enjoy increased autonomy. At the same time, they can always consult education experts and school staff can participate in various workshops. During the second phase of the programme, a new role of external expert consultant was introduced in schools. The role of the expert was to provide support for schools participating in the TEIP programme, as well as to supervise and assess the school's progress. These consultants were appointed by the regional bodies of the Ministry of Education, together with the commission supervising the TEIP programme. However, it was not obligatory for schools to have an expert consultant (DGIDC, 2011).

According to the assessment of the TEIP2 programme by the Ministry of Education, published in 2019 and analysing the data from school year 2017/2018, each school or school cluster in the school year 2017/2018 participated in around 11 workshops. Almost half of these focused on ways to better support students' learning processes. Other workshops focused on organisation and management; partnerships between schools, families and the community; and preventing dropout, absenteeism and indiscipline. With regard to the hiring of new teachers under the TEIP2 programme, newly hired staff included 446 teachers, 180 social workers, 82 social service workers, 45 psychologists and 68 other professionals without a degree. On average, each school cluster participating in the TEIP programme got four new teachers and five other new members

of staff. The number of schools deciding to employ an external expert consultant has increased over the years. In the school year 2017/2018, around 95% of all TEIP programme schools employed such consultants, with an average of six working days per year per expert (DGE, 2019). While the TEIP programme is intended to target the most disadvantaged students and schools, there is a lack of clear and transparent criteria for the selection of schools that can participate in the programme. According to existing legislation, schools are invited to join the programme. The Ministry of Education issues invitations based on its analysis of the school and the area in which it is located. However, there are no objective public criteria or thresholds according to which the level of a school's 'disadvantage' is assessed. Consequently, several education experts and academics believe that the selection procedure is not transparent (Ferraz, Neves, & Nata, 2019). The obligations of the schools which join the programme or remain within it are also vague¹²⁸. According to the legislation governing the programme, schools have to define their goals, which are then approved by the Ministry and the schools then have to meet these goals if they wish to remain in the programme. No schools have left the programme since it began in 2006. While this might mean that all schools have achieved their goals, it also raises questions as to whether these goals were ambitious enough, if this condition was really enforced, and what is the planned end goal of the programme if it continues even after these goals have been achieved.

The TEIP programme is seen as an important change in the Portuguese education system in the last 20 years. It has also created favourable conditions for similar programmes to be set up. Consequently, several other measures have been introduced to complement the TEIP programme, and to further contribute to better inclusion within education system. In 2016, the National Programme to Promote Educational Success (Plano Nacional de Promoção do Sucesso Escolar, PNPSE) was introduced. The main aim of this programme is to promote high-quality education for everyone. The programme focuses on ensuring equal opportunities and improving the efficiency and quality of school activities (Verdasca J. , 2021). The programme proposes a preventive approach to school failure by promoting academic success and focusing on improved learning and teaching, especially in the early years of schooling (see Box 16).

BOX 16. THE PNPSE PROGRAMME

The PNPSE programme, introduced in 2016, focuses on ensuring more inclusive quality education and aims to reduce grade repetition through preventive measures. The programme is guided by policy-makers' belief that the local community is best informed and has the greatest expertise about the its own context, the difficulties it faces and the most suitable solutions to their problems. The programme therefore focuses on the role of the local community in addressing educational challenges (Presidência do Conselho de Ministros, 2016). Consequently, schools participating in the National Programme, with the necessary support from the programme, are asked to develop strategic action plans that identify the issues and challenges specific to their local contexts and to design context-appropriate interventions (OECD, 2019, d). (OECD, 2019, d). When developing their strategic action plans, these schools should follow recommendations relating to pedagogical matters, which focus mainly on the importance of preventive measures concerning grade repetition, changes in classroom dynamics, and collaboration between teachers. The schools should also consider the efficiency and sustainability of their proposed or implemented measures (Verdasca, et al., 2019).

Due to the fact that the programme focuses on enabling local communities and schools to address education challenges themselves, one of its main goals is to ensure the provision of professional development to build the necessary capacities among the local actors and support the capacity and competence building at school level. The training programmes take into account the needs of teachers in specific schools and school clusters, to better adapt to and represent the complexities and specificities of the education system in different settings (Barroso, 2013). The professional development courses aim to focus on the needs of the organisation as a whole, rather than focusing on individual needs (Verdasca, et al., 2019).

¹²⁸ Information was gathered via interviews with national stakeholders.

The programme also focuses on a more detailed and comprehensive examination and assessment of students' competences across disciplines. This is achieved by providing additional academic support and tutoring to students who have had to repeat a grade. The programme covers a lot of schools, and is often combined with the TEIP programme (OECD, 2018, a).

The PNPSE programme and its guiding principles are based on the work of Cabral and Alves (2016) on schools' pedagogical organisation and school success (Verdasca J. , 2021). This study, which serves as the basis for the programme, promotes a bottom-up approach to education policy-making, pioneers new teaching practices and curricular management that fosters collaboration among teachers and schools, and focuses on an individual approach to student support (Cabral & Alves, 2016).

Currently, equity is an important focus for the Portuguese education system, prescribed by law (Eurydice, 2021, p). Consequently, in addition to the aforementioned programmes, several measures have been put in place to support those in need. Financial support is available to the families of learners that have lower incomes. Such support includes monthly benefits, tax exemptions, the provision of school meals and books, among other measures. Similar financial support is also available to the families of learners with SEN (Eurydice, 2021, m). Support measures are also available for learners with learning difficulties or those facing various learning challenges. Support measures for such learners include measures to promote academic success, specific tutorial support, support for learning Portuguese as a non-native language, and other measures (Eurydice, 2021, t). However, while various support measures are in place for disadvantaged students, and inclusion appears to be an important part of the education system, certain challenges still remain in this regard. The country has high rates of between-school socio-economic segregation, as well as high rates of immigrant isolation (Liebowitz, González, Hooge, & Gonçalo, 2018).

Observed effects of the reform

Statistical methods cannot be used to test the effectiveness of the TEIP programme, due to the complexity of the measures introduced and the long timeframe of the programme. However, the potential effect of the programme can be assessed through the stakeholder interviews, as well as analysis of the existing literature and assessments of the programme.

The trends in Portuguese PISA performance after the introduction of the TEIP programme, specifically its second stage, indicate its potential effectiveness. More specifically, the second phase of the programme, which began in 2006, coincides with the steepest increase in Portugal's PISA results (from 2006 to 2009). These observed improvements in Portugal's PISA performance were caused mainly by the improved performance of low achievers, which may indicate the potential effectiveness of the programme, as it deliberately targets schools in disadvantaged areas, aiming to improve the results of disadvantaged and underperforming students.

The TEIP programme has potentially achieved a positive effect not only on the academic performance of Portuguese students, but also on equity and inclusion in the education system. More specifically, the national data show that between 2007/2008 and 2010/2011, early school leaving rates decreased most in TEIP programme schools (Ferraz, Neves, & Nata, 2019). **The assessments conducted by the Ministry of Education also showed that the TEIP programme has also been effective in reducing school dropout, absenteeism, grade repetition and indiscipline**¹²⁹.

Most education experts evaluate the programme positively. The programme facilitated schools to experiment with various tools to address educational inequalities. Moreover,

¹²⁹ Information was gathered via consultations with national stakeholders.

continuous monitoring and the strong commitment of schools and programme organisers to achieve the goals set, ensures that schools participating in the programme improve their work and help their students to improve their academic performance, school attendance and discipline. However, the national stakeholders consulted note that the TEIP programme must be considered together with other important measures introduced at the same time, as the TEIP programme may not have been effective without them¹³⁰.

While the findings from consultations with stakeholders, as well as indicators of academic performance and inclusiveness, point to the potential positive effect of the TEIP programme, existing studies analysing the TEIP programme indicate the potential lack of a direct link between the programme and improvements in the academic performance of students (Ferraz, Neves, & Nata, 2019). While in general, the academic performance in PISA of Portuguese schools has improved since the introduction of the TEIP programme, studies comparing the academic performance of students from schools participating in the TEIP programme with students from schools that are not participating, show that the academic performance gap between these schools has increased during the duration of the programme. The data also show that fewer and fewer students from TEIP programme schools participate in national exams, which may mean fewer of these students now enter higher education (Ferraz, Neves, & Nata, 2019). This specifically indicates a potential lack of effectiveness of the TEIP programme. On the other hand, it may also be the case that TEIP schools, given their higher retention rates, now tend to retain more low-achieving students, who then contribute to the lower average academic achievements of schools in the TEIP programme (Ferraz, Neves, & Nata, 2019).

The potential positive effect of the TEIP programme with regard to equity may also be questioned. The national stakeholders consulted also noted that in some cases, participating in the TEIP programme might even have a negative effect on equity in education system, as it may indirectly prompt school segregation. More specifically, participation in the TEIP programme might indicate to the public, teachers and students that the school is “struggling”, and thus lead to stigmatisation, especially given that after entering the TEIP programme, schools often start to attract low-performing students from socio-economically disadvantaged backgrounds. It is then more difficult to motivate teachers to work in such schools, and parents from more advantaged backgrounds try to avoid such schools¹³¹.

Meanwhile, the effect of the PNPSE programme was analysed primarily by looking into changes in grade repetition, as this was one of the main aims of the programme. It is observed that the share of students repeating a grade in 2018, after the programme was in place, was significantly lower than in 2009 (14.6% compared to 29%). According to available national data, in 2016-2018, 30,000 fewer students were retained in the same grade in PNPSE schools than in 2014-2016, representing a reduction in grade repetition in the programme schools of 21%. Success, measured by the percentage of students with a negative/failing overall score in at least one subject, in the second and third compulsory education cycles (school years 5-9), has also improved, with a decline in the share of students having at least one negative score. The share of students with at least one negative score was also lower among programme schools than among schools that did not participate in PNPSE programme. It is also estimated that with the 30,000 reduction in students repeating a grade, the efficiency of schools in the PNPSE programme has significantly increased, resulting in savings of EUR 112 million that would have been otherwise spent on grade repetition and can now be spent elsewhere (Verdasca, et al., 2019). This indicates a potential effect of the programme.

¹³⁰ Information was gathered via consultations with national stakeholders.

¹³¹ Information was gathered via consultations with national stakeholders.

Because PNPSE was implemented in disadvantaged schools and has focused on reducing grade repetition, among other things, statistical analysis focusing on grade repetition was performed. A more complex statistical analysis¹³² using propensity score matching between the most statistically comparable students – statistical ‘twins’ – who participated in PISA in 2009 and 2018, helps us to better understand which students may have benefitted most from the PNPSE programme. It was decided to use the data from 2009, as the students participating in PISA in 2009 had not yet been exposed to the PNPSE programme. Data from 2018 were used as this is the only PISA cycle data available that captures students exposed to the programme. As PNPSE schools cannot be isolated in the PISA database, this Propensity Score Analysis cannot be used to demonstrate causality. It is important to bear in mind that it is difficult to determine whether the effect observed was a consequence of the PNPSE programme or of other changes in the country and its education system. Moreover, because PISA study only includes data on 15-year-olds (on average), it does not necessarily present a full picture of the Portuguese compulsory education system, and may not capture discrepancies in the effect of the programme on students in other years. Still, the statistical analysis of the change in grade repetition may be a good indicator of the effectiveness, if not of the programme itself, then of its grade repetition reduction component.

Propensity score matching allowed us to ‘match’ students in different data sets and analyse the effect of the reduction in grade repetition rate among disadvantaged students. The analysis shows that most of the students who repeated a grade in 2009 came from socio-economically disadvantaged backgrounds. However, significantly fewer students from socio-economically disadvantaged background repeated a grade in 2018 (around 50% in 2009, compared with 21% in 2018). This shows that the PNPSE programme potentially benefitted those students who were specifically targeted by the programme. However, because it is impossible to distinguish between students from PNPSE programme schools and other schools, it is important to remain cautious about this effect.

Methodological note

To apply the propensity score matching method, statistical ‘pairs’ were found in the data sets for 2009 and 2018. This means that students with identical values for most of the background variables that explain differences (variance) in academic achievement (gender, migrant background, variables relating to a student’s socio-economic status, vocational or academic track, a variable indicating whether a student has faced grade repetition, a motivational variable indicating joy to read, and disciplinary school climate) are ‘paired’ together (students from PISA 2009 are paired with students from PISA 2018). These statistical pairs can be seen as being equivalent to making the same observation in different years, i.e. by comparing the performance of a student who has repeated a grade (in PISA 2009, before the reform), with a that of a perfectly comparable student who has received the treatment (did not repeat a grade in 2018, potentially because of the PNPSE programme), to see the effect of the treatment.

After matching the students, a difference-in-difference (DiD) regression model¹³³ was constructed to assess grade repetition and academic performance over time, and to evaluate the potential effect of the decrease in grade repetition on the academic performance of students. The DiD regression model shows that the **PNPSE programme potentially had a positive effect on the academic performance of students who benefitted from it – in this case, students who, according to their profile, would have repeated a grade if not for the implementation of the programme, but who actually did not.** This analysis allows the performance of three different groups of students to be assessed: group 1 (students who did not repeat a grade in 2009, and whose statistical ‘pairs’ did not repeat a grade in 2018); group 2, the ‘treatment’ group (students who repeated a grade in 2009, but whose statistical pair did not repeat a grade in 2018);

¹³² For more information, see Annex 1. Country Profiles, Portugal.

¹³³ For more information, see Annex 1. Country Profiles, Portugal.

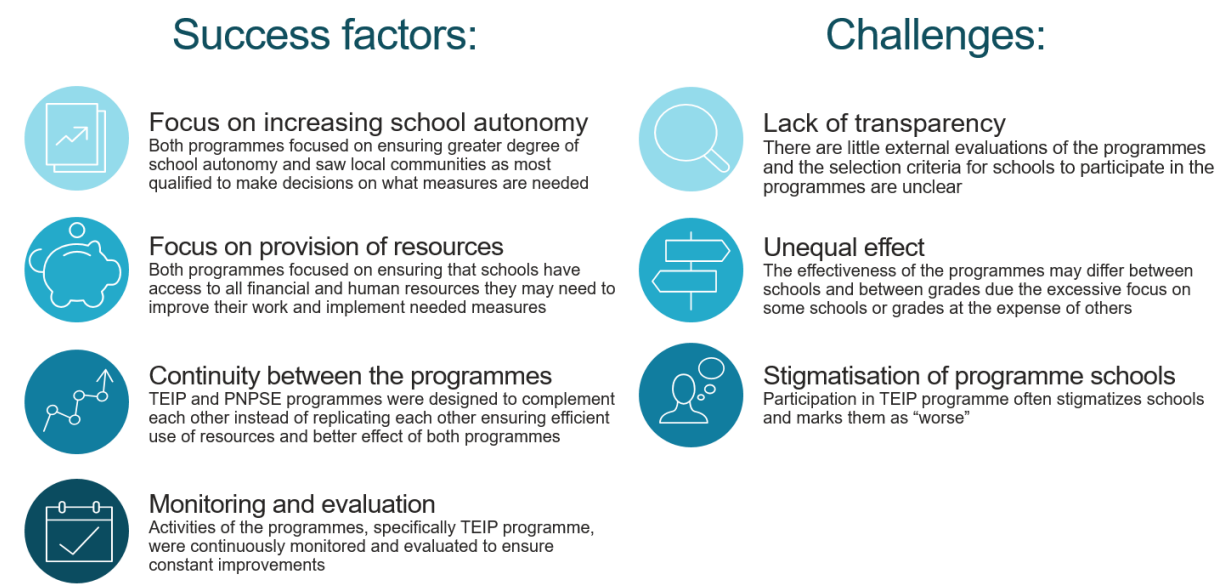
and group 3, students who were targeted by but not affected by the reforms (students who repeated a grade in 2009 and whose statistical 'pairs' repeated a grade in 2018). The analysis shows that the performance in reading of group 1 (students not repeating a grade) increased slightly, from 484.5 in 2009 to 499.7 in 2018. This trend in reading performance is similar to the average trend in Portugal. At the same time, the performance of students who would have repeated a grade in 2009 but did not do so in 2018, potentially because of PNPSE and other factors, increased drastically during the observed time period (from 426.9 in 2009 to 499.7 in 2018). It is estimated that the students who did not repeat a grade in 2018 because of the changed conditions would have scored 442 points in reading if the conditions were the same and they had repeated the grade. Consequently, the analysis clearly shows that preventing grade repetition has a large positive effect on students.

The PNPSE programme has probably contributed to the decrease in grade repetition, whose positive effects can be seen on students. However, the decrease in grade repetition in those schools participating in the PNPSE programme was similar to that seen in schools not participating in the programme. Consequently, the decrease in grade repetition may also have been caused by other policy measures or changes in the Portuguese education system, not necessarily the PNPSE programme. The effectiveness of the PNPSE programme may also be unequally distributed among students from different years. More specifically, a decrease in grade repetition and a decrease in the share of students with at least one negative score are more pronounced in lower grades than in secondary education cycles. For example, in school year 10 (when students are around 16), grade repetition marginally increased compared with lower school years (Verdasca, et al., 2019).

In general, grade repetition in Portugal remains significantly high, as mentioned in Section 2.2.1. This means that further measures to tackle grade repetition and underachievement are likely to have a significant effect on academic performance. In the other countries analysed, grade repetition is low, which means that such programmes will target only a small share of students. While these programmes are still important, their effect on national average performance will not be significant. In Portugal, because the share of students potentially affected by these programmes is large, and grade repetition is especially detrimental to academic success, the positive effect of measures on students who are likely to repeat a grade also results in an improvement in the average academic performance of the country.

Success factors for, and main challenges to, the implementation of the reform

It is believed that both programmes – TEIP and PNPSE – have, at least to some extent, positively affected equity in the Portuguese education system. Several factors may have contributed to the potential effect of the reforms, and several challenges have been faced during the preparation or implementation of these reforms. The most important ones are presented in the figure below.

FIGURE 38. SUCCESS FACTORS AND CHALLENGES INFLUENCING THE EFFECTIVENESS OF THE TEIP PROGRAMME AND PNPSE PROGRAMMES


Firstly, **both programmes focused on providing greater, school autonomy and viewed local actors as being most qualified to choose the most efficient and effective ways to tackle challenges regarding inclusion and the quality of education in school.** More specifically, these programmes acknowledge the importance of schools and local actors in promoting educational success, as well as their advanced knowledge of specific local contexts, which can help in developing more effective actions towards school success than those that might be developed by national-level policy makers with limited knowledge of local contexts. Increased autonomy also allows schools to decide how to target the problems they face in a more efficient way, as they may have much better knowledge than central authorities with regard to what measures may be most effective for their students. In addition, because they do not have to wait for approval from the central authorities, they can implement measures in a timely manner.

It is also important to note that the programmes focused on ensuring the necessary material and human resources. This means that these programmes increased the capacity of participating schools to address local issues. The provision of additional funding to TEIP programme schools allowed them to improve their resources. Moreover, schools may often lack the specific expertise needed to ensure their success, and teachers in specific subjects may not possess the knowledge necessary to ensure the support needed by all students in their classes. The PNPSE programme provides school staff and teachers with workshops and training to ensure they have the capacities needed to tackle challenges that hinder school success. This contributes to the sustainability of the programme's impact. Training helps schools increase their capacity so that they can later tackle the challenges they face with little or no support.

It is important to note that **the activities of TEIP programme are closely monitored and evaluated, and both schools and programme team have a strong commitment to the programme**¹³⁴. For this reason, the weaknesses of the programme and potential challenges may be spotted early on and addressed in a timely manner. However, the objectiveness of such evaluation and the monitoring tools used may be questionable. For

¹³⁴ Information gathered via consultations with relevant national stakeholders.

example, in the existing evaluations of the TEIP programme, TEIP schools are often evaluated without comparing them with schools outside the programme, which means that they are not analysed in the broader context of the Portuguese education system¹³⁵. This means that while existing monitoring may help to improve TEIP schools and address the challenges they face in implementing the programme, it does not necessarily allow the objective assessment of the programme.

Lastly, the **TEIP and PNPSE programmes complement each other**. The two programmes are often implemented together in schools. This can result in the more efficient allocation and use of available resources.

While both programmes have potentially improved inclusion in Portuguese compulsory education and contributed to the high academic performance of Portuguese students, several challenges were faced during the design and implementation of these programmes.

First, **the programmes may lack transparency in their implementation and evaluation**. In the TEIP programme, the criteria by which schools are chosen are somewhat vague, and the procedure for selection is often seen as lacking transparency¹³⁶. Consequently, the schools that participate in the programme are not necessarily those that could benefit most from participation. Moreover, as mentioned, TEIP programme schools are mainly evaluated in isolation and not compared with other schools. This means the programme's evaluation process may be subjective and may not explicitly identify gaps in the general context of the Portuguese education system, as well as in the context of the specific TEIP schools. Consequently, observed improvements in schools may be attributed to the TEIP programme, when in fact they appeared in all schools and should be attributed to other factors.

It is also important to note that the effects of these programmes may be unequal, depending on the individual schools or grades considered. For example, the analysis of PNPSE programme shows that the positive effect of the programme is much more pronounced among students from lower grades, and is not observed among students from higher grades (Verdasca, et al., 2019).

Lastly, **these programmes – in particular, the TEIP programme – may lead to stigmatisation of the participating schools**. Existing studies find that once schools enter the TEIP programme, they begin to attract more and more students from socio-economically disadvantaged backgrounds, potentially contributing to increased school segregation (Ferraz, Neves, & Nata, 2019). While this can be seen as a negative outcome, it is also important to consider that participation in the TEIP programme may indicate to students and parents that the school focuses on equity and provides better conditions for students, especially disadvantaged students, and because of this, such schools attract more disadvantaged students. In any case, studies also find that the stigmatisation of schools results in teachers regarding these schools as worse places to work and, where possible, choosing not to work in them (Quaresma & Lopes, 2011). It is often the case that only those teachers who are unable to gain a position in other schools choose to teach in TEIP schools. These teachers also usually leave as soon as they are able to get a position in a 'better' school. Because teachers often choose TEIP schools as a last option, teachers who teach in them may be those who are not experienced enough to teach in other schools. Consequently, the teaching quality in these schools could worsen and the schools might require a lot of resources to improve it. The use of such resources might also be inefficient, due to the high turnover of teachers. If teachers receive the necessary additional training in TEIP schools and then leave as soon as they increase their competences, the TEIP

¹³⁵ Information gathered via consultations with relevant national stakeholders.

¹³⁶ Information gathered via consultations with relevant national stakeholders.

schools, which invest resources in teacher training, do not themselves benefit from it. However, to tackle this challenge caused by the high turnover of teachers, in 2006 teacher contracts were extended from one year to 4 years¹³⁷.

Lessons for future education reforms in Portugal

It is difficult to identify the specific outcomes of various education reforms, as such reforms are never implemented in isolation and many factors may influence the education system at the same time. The present analysis of Portugal's PISA journey allows us to focus on three aspects of the education system – the management of the school network, the national assessment system, and equity in the education system.

While the implementation process for each reform revealed specific challenges pertinent to the particular change introduced – the reorganisation of the school network, the introduction of high-stakes exams, the TEIP programme and PNPSE programmes – a number of systemic issues exist within the Portuguese education system that shape the outcomes of education reforms, which should be considered by policy-makers in the future. The important lessons to highlight are:

- **It is crucial to acknowledge the important role of schools and local communities in translating reforms into practice.** More specifically, the factors that have potentially contributed to the success of TEIP and PNPSE programmes include their focus on ensuring greater autonomy for schools and envisaging an active role for local communities in the education system and in tackling various challenges in the system. This has allowed schools and local communities to come up with effective measures that work for their specific students in a timely manner and ensure the more efficient use of resources. This indicates that future reforms should also take into account of the important role of schools and local communities in the education decision-making, as local actors often have more information about the situation at the local level and can better evaluate what is needed to ensure that the reforms are effective and that education outcomes are improved.
- **Autonomy should go hand in hand with adequate accountability mechanisms and planned monitoring.** The creation of school clusters and the introduction of high-stakes exams increased the accountability of schools and teachers, and thus potentially motivated them to follow the changes introduced and improve their work. At the same time, accountability mechanisms ensure that underperforming schools and teachers can be held responsible for the weaknesses in the education provided, enabling the system to become more efficient. A lack of monitoring measures in all of the programmes implemented limits their potential for further improvement, as well as limiting understanding of the extent to which their implementation is consistent across schools and regions.
- **Implementation of new measures should be adequately resourced.** The reforms analysed show that it is crucial to ensure the availability of financial, human and administrative resources for the sustainable implementation of change. More specifically, the reorganisation of the school network promoted the more efficient use of available resources, which potentially contributed to the effectiveness of the reform. The TEIP and PNPSE programmes also ensured that the programme schools received more resources to ensure they can improve their capacities to tackle different challenges they face. This allowed the schools to better tackle their

¹³⁷ Information gathered via consultations with relevant national stakeholders.

challenges, as in most cases the schools were already aware of what was needed to improve quality of their education, but did not have enough resources to take action. The need and availability of resources should be considered, especially when the amount of state funding available decreases gradually over the years, as is the case in Portugal. As mentioned, between 2010 and 2018, general government expenditure on education has decreased by 24%, resulting in a fall of EUR 3 billion in spending on education over this period (European Commission, 2020).

3.6. Slovenia

Educational context and key policy issues

15-year-olds in Slovenia tend to perform better in PISA than the EU average (European Commission, 2020, f). This may be a result of Slovenia's focus on ensuring quality and equity in its education system. However, educational outcomes can be hindered by the challenges that remain.

In relation to the quality of education, **policy-makers have focused on modernising the education system by introducing innovative pedagogies and educational measures**. The national curriculum for basic schools and general upper-secondary schools focuses on the introduction of key competences. This has been achieved through amendments to the national curriculum and the implementation of various initiatives such as the Opening up Slovenia initiative, which focuses on introducing innovative open learning approaches. Changes to the Basic School Act also focused on providing greater autonomy to schools so that they could choose for themselves the best pedagogical approaches and ensure higher efficiency in their work (OECD, 2016, a). It is also important to note that a lot of state effort has been put into improving the quality of the VET system. As mentioned in Section 2.2.1, the share of students in the VET track in Slovenia is exceptionally high, which means that improvements in the VET system are especially important for the overall quality of the Slovenian education system, and can contribute significantly to improvements of the academic performance of students. However, the **quality of education is threatened by a lack of new teachers**. Only a small share of teachers in Slovenia are newly trained and young. In 2018, only 3.9% of all teachers were new teachers (compared with an EU-27 average of 11.6%), and only 6.4% were younger than 30 (compared with an EU average of 7.4%) (European Commission, 2020, f). The risk of a future shortage of teachers is especially prominent in STEM subjects. It is estimated that by 2030, 56% of all STEM teachers currently working will have retired. It is unlikely that these teachers will be replaced by new teachers, as enrolment into STEM teaching programmes has decreased by 80% over the past 15 years. If the authorities do not implement effective policy measures to attract more students to join the STEM teaching profession – including, for example, financial incentives – the future quality of STEM education is likely to be jeopardised (Dolenc, Šorgo, & Vrtič, 2021).

In terms of inclusion in the Slovenian education system, **several programmes have recently been implemented to ensure the necessary support for low-performing schools and students, with a particular focus on students from socio-economically disadvantaged backgrounds, such as those with migrant or Roma backgrounds**. Such programmes include the Project for the Successful Integration of Roma Students in Schools (2008-2015), the Guidelines for the Integration of Immigrant Children in Kindergarten and Schools (2012), and the Successful Integration of Immigrant Children Programme (2012-2015), to name a few (OECD, 2016, a). Because Slovenia is a common destination country for migrants from other Balkan countries and from Eastern Europe (IOM, n.d., e), ensuring sufficient support for students with immigrant backgrounds has been an important focus of policy-makers, and several educational strategies have

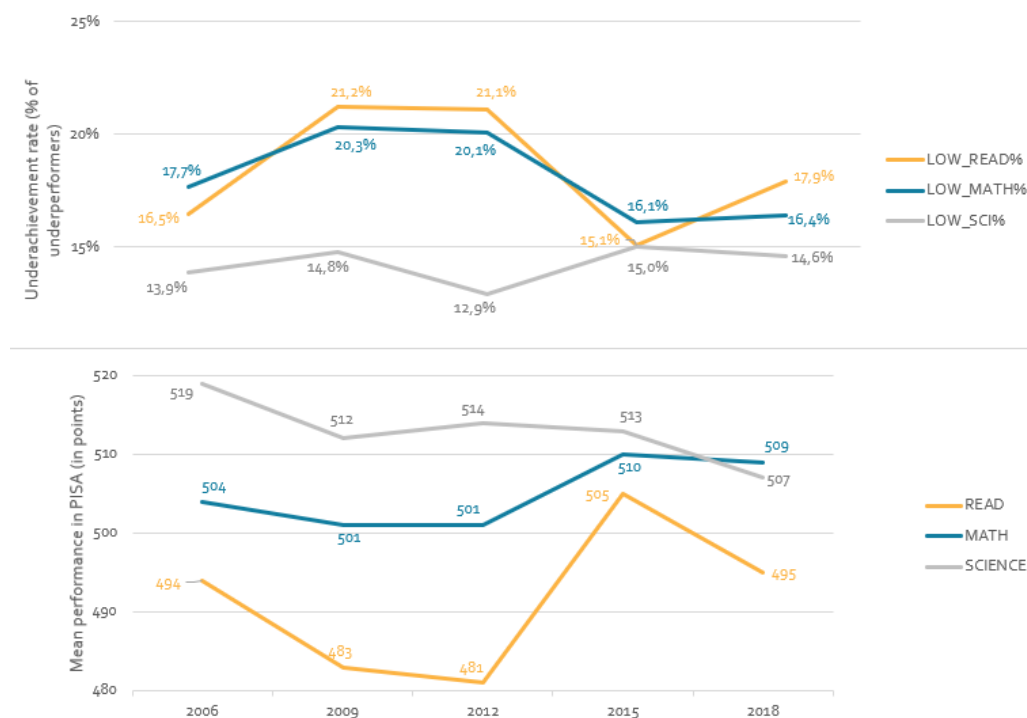
focused on facilitating the integration of such students into the Slovenian education system (OECD, 2016, a). However, some challenges to equity in the education system remain. The gender gap in academic performance is growing, with boys being consistently left behind. Moreover, socio-economic background and school characteristics still play an important role in determining students' academic performance (European Commission, 2020, f). As mentioned in Section 2.2.1, the Slovenian education system is the most segregated of all the education systems analysed in this study. While schools are segregated on the basis of various characteristics of the students, including ethnicity and socio-economic background, the most prominent type of segregation in Slovenia is academic segregation. This means that low-performing students are usually clustered in schools together with other low-performing students, and high-performing students are clustered with other high-performing students. This can further contribute to inequalities in the education system and growing differences between the best- and worst-performing students. **This indicates that school segregation may be one of the key challenges for the Slovenian education system, and that interventions that tackle school segregation through equal access to quality education are crucial.**

Key trends in students' performance

The mean performance of Slovenian students in PISA in all three domains is above the EU average. This means that the education system in Slovenia provides opportunities for most students to gain basic skills in reading, mathematics and science. The underachievement rates in all three domains are also better than the EU average – in 2018, the underachievement rate in reading was 17.9%, compared with an EU average of 22.5%; in science, it was 14.6%, compared with an EU average of 22.3%; and in mathematics, it was 16.4%, compared with an EU average of 22.9% (European Commission, 2020, f).

The mean academic performance of Slovenian students has not changed significantly in mathematics or science, but has increased in reading. Academic performance in reading increased significantly between 2012 and 2015. However, this increase was followed by a slight drop in 2018. The underachievement rate in reading follows a reverse trend (with a significant decrease between 2012 and 2015). No significant changes in the underachievement rate in science can be observed (see the figure below). A more pronounced decrease in the underachievement rate in mathematics can be seen between 2012 and 2015; however, no significant changes are observed in the long term (between 2009 and 2018).

FIGURE 39. MEAN PISA PERFORMANCE AND UNDERACHIEVEMENT RATES IN SLOVENIA 2000-2018



Source: PISA data.

Note: the graph presents trends in mean student achievement in Slovenia between 2006 and 2018, as well as variations in the mean rate of low-achieving students. No data are available for 2000 and 2003, as Slovenia did not take part in these PISA cycles.

The academic performance of Slovenian students largely depends on their background. However, **some improvements across several inclusion indicators can be observed since 2009** (see Figure 40).

The performance gap in mathematics between socio-economically advantaged and disadvantaged students decreased between 2009 and 2015. However, this decrease was followed by a slight increase. Even so, the gap in 2018 was 10 points narrower than in 2009.

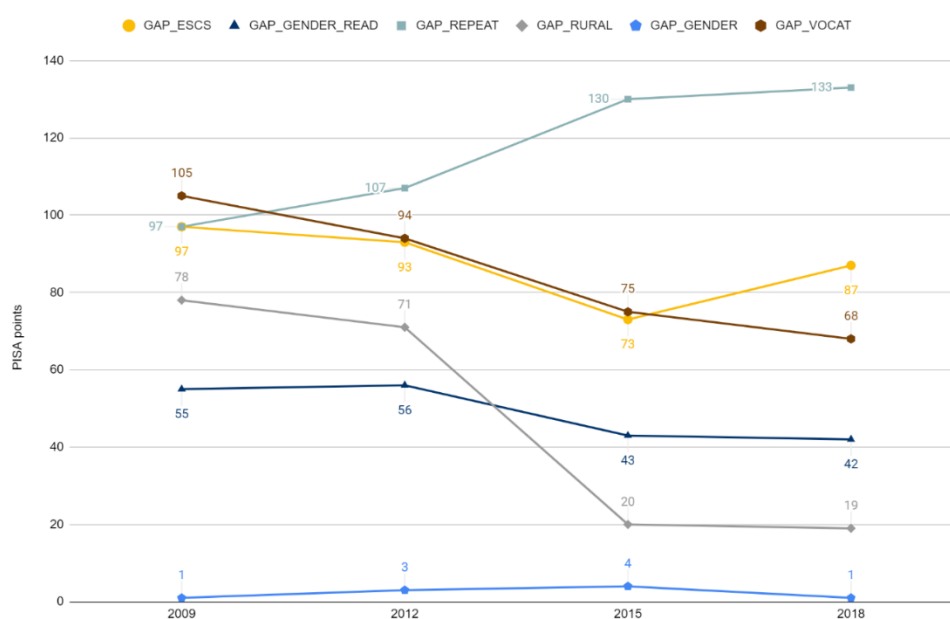
The performance gap in reading between boys and girls decreased between 2012 and 2018. The gap is 13 points narrower in 2018 than in 2009. This narrowing of the gap has been caused by an increase in the mean performance of both boys and girls, with a stronger increase for boys. However, a similar and consistent decrease in the gender gap in reading from 2015 was also observed in other OECD countries. It is believed that this decrease in the gender gap in reading results from a change of the delivery mode used for the PISA tests in 2015, from paper-based to computer-based (OECD, 2016, b) (OECD, 2016, b).

The performance gap between students living in urban and rural areas¹³⁸ decreased significantly between 2009 and 2018. In 2018, this gap was significantly below the EU average (19 points, compared with 35 points), in favour of students living in the cities. This shows that in Slovenia, a student's place of residence has little effect on their academic performance. It is also important to note that the share of students living in rural areas increased from 2% to 4%, which means that the decreasing performance gap may be linked to the changing composition of the rural population.

¹³⁸ Cities or urban areas are defined as having 100,000 residents or more, while a rural area or village is defined as having fewer than 3,000 residents

The performance gap between students following vocational or academic tracks decreased significantly between 2009 and 2018 (from 105 to 68 points). However, as the share of students following the VET track in Slovenia has recently become very high (more than 50%), this gap is still very important. The recently increased share of students attending VET may also partly explain the decrease in this performance gap – as the number of students attending VET has increased and the popularity of the VET system is growing, it is likely that students with diverse backgrounds, including high-performing students, decide to choose the VET track. However, this improvement may also be related to improvements in quality of the VET system.

FIGURE 40. PERFORMANCE GAPS BETWEEN STUDENTS IN MATHEMATICS IN SLOVENIA 2009-2018



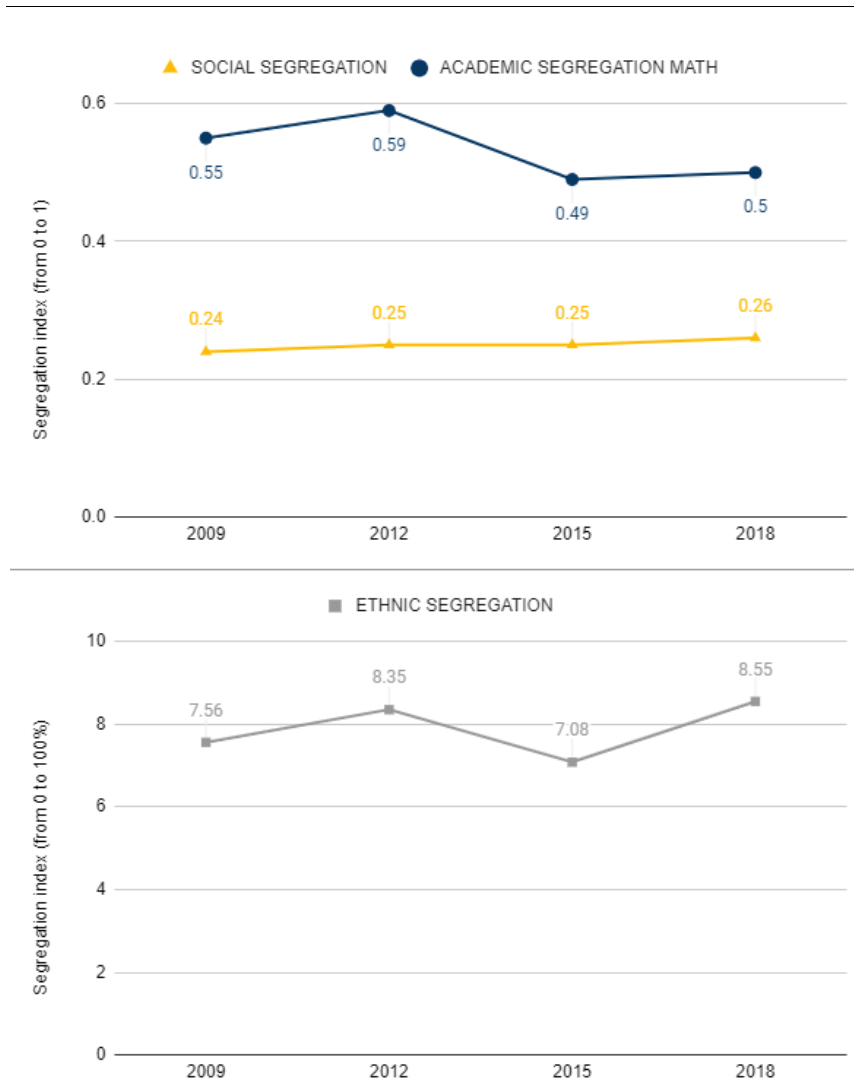
Source: PISA data.

Note: the graph presents trends in performance gaps in Slovenia between certain categories of students (boys vs. girls; students in rural environments vs. students living in cities, and others) for the 2009-2018 time period. All gaps are presented as absolute values, so that the graph is easier to understand. However, all gaps are actually negative (meaning a difference in favour of the most advantaged category in the comparison). While all the gaps relate to performance in mathematics (the most interesting domain for analysis), the gap between boys and girls (GAP_GENDER) is also presented, as the gender gap is usually larger in reading than in mathematics or science.

In terms of school segregation, while social and ethnic school segregation remain stable, academic segregation¹³⁹ decreased slightly across all three domains, with the most pronounced decrease in reading. Between 2006 and 2018, academic segregation in reading decreased by 25 percentage points. This decrease in segregation may be explained, to some extent, by the recent focus on inclusion in the education system. However, despite this decrease, academic segregation in all three domain remains exceptionally high (around 0.5, meaning that around 50% of students' performance can be explained by the school they attend). Slovenia is one of the EU countries in which academic segregation (grouping in schools) is most prominent. This is consistent with the age at which students are first streamed, and the high share of students in vocational education.

¹³⁹ Variables SOCIALSEGR, ETHNICSEGR and ACADEMICSEGR. For more information, see Annex 2 – Methodological approach section 2.1.3. Variables used for statistical analysis.

FIGURE 41. VARIATION IN SOCIAL, ETHNIC AND ACADEMIC SEGREGATION IN SLOVENIA 2009-2018



Source: PISA data.

Note: the segregation index can have a value between 0 and 1. 0 means no segregation (none of the variance in performance between schools can be explained by the school attended) and 1 means complete segregation (the school attended can explain 100% of the variance between schools).

The inclusion indicators show that Slovenia faces serious challenges with regard to equity in its education system. Analysis of the effects of the various individual and school-level factors that may affect students' achievement, conducted through the multi-level regression model¹⁴⁰ using PISA 2018 data, confirms the country's challenges with inclusion. Socio-economically advantaged students and boys perform better than disadvantaged students and girls (see Figure below).

¹⁴⁰ The model tested the effect on students' performance of individual background variables (gender and ESC), academic path variables (attending VET track), and school climate variables at individual and school level. The only variables presented are those that had a significant effect. For more information, see Annex 1. Country Profiles, Slovenia.

FIGURE 42. FINDINGS OF THE MULTI-LEVEL REGRESSION ANALYSIS OF PISA 2018 DATA FOR SLOVENIA

Students in Slovenia perform better in PISA (mathematics) if:



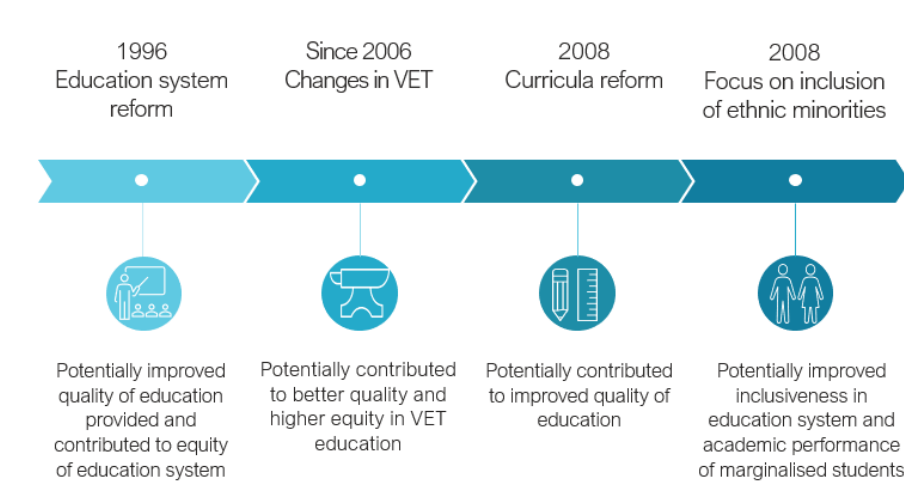
Source: multi-level regression analysis conducted for the study based on the PISA 2018 data. Because mathematics is the most interesting domain in Slovenia (given the positive performance trends), all of the gaps presented are calculated for performance in mathematics.

Key policies associated with the improvements observed

In a nutshell, the most important changes observed in Slovenia are:

- An increase in students' mean performance in reading between 2012 and 2018;
- A decrease in the gap between students in VET and academic tracks between 2009 and 2018;
- A decrease of academic segregation between 2009 and 2018 (part of a greater decrease between 2006 and 2018).

The main goal of this country overview is to understand which specific reforms and developments in Slovenia's education system may have contributed to these improvements. While changes in the education system do not happen in isolation, and a combination of different factors influence educational outcomes, some reforms tend to have a more pronounced positive effect on the quality and equity of education and, consequently, on students' academic achievement. Potentially influential education reforms in Slovenia are presented in Figure 43.

FIGURE 43. REFORMS POTENTIALLY LINKED TO IMPROVEMENTS IN ACADEMIC ACHIEVEMENT IN SLOVENIA


The reforms above focus on different specific areas of the Slovenian education system – changes to the structure of the education system, inclusion within the education system, the national curriculum, and the VET system. However, the effect of some reforms cannot be analysed due to a lack of variables in the PISA dataset that can be connected to these reforms (for example, curriculum reform), or because the effect of a specific reform cannot be distinguished from the effects of other changes in the education system that occurred at the same time (for example, reforms focusing on improving equity). Consequently, it was decided to focus on two specific areas – the structure of the education system, and the VET system.

3.6.3.1. Education system structure

In Slovenia, children are entitled to a place in a publicly subsidised kindergarten from the age of 11 months. Even though pre-school education is not obligatory, the majority of children attend ECEC institutions (Eurydice, 2020, e). **Education is compulsory for pupils from six years until 15 years** (Eurydice, 2020, f). Students in grades 6 and 9 take national assessments. In grade 6, students take exams in their native language, mathematics, and a foreign language. In grade 9, students also take an additional exam in a subject determined by the Minister of Education. Students in basic education receive a basic school certificate at the end of each grade. Students who successfully complete grade 9, receive a final certificate (Eurydice, 2021, q). After completing basic education, students are streamed into general and vocational education tracks (Eurydice, 2020, f).

Even though compulsory school education in Slovenia currently lasts nine years, until the early 2000s education was only compulsory for eight years. This change in the length of compulsory education was introduced as part of a wider package of reforms of the education system in the 1990s (see Box 17).

BOX 17. REFORM OF THE STRUCTURE OF THE EDUCATION SYSTEM IN SLOVENIA IN 1996

After the transition from socialism, Slovenian policy-makers aimed to ensure that the Slovenian education system was of high quality and more comparable to international standards. Between 1993 and 1996, Slovenia introduced several new pieces of legislation to regulate the entire education system from pre-school to higher education. Important legislation included the Kindergartens Act (1996), Basic School Act (1996), General Upper Secondary School Act (1996), Vocational Education Act (1996) and Higher Education Act (1993). Moreover, in 1995, White Paper on Education was published. This provided strategic and professional support for the aforementioned reforms.

Out of all the legislation introduced, the Basic School Act is the one that introduced changes in compulsory education. According to the new legislation, eight-year compulsory schooling (basic school) was replaced with nine-year compulsory schooling. The ages of compulsory schooling were changed from 7-15 years to 6-15 years.

As well as moving from an eight-year to a nine-year compulsory education system, compulsory education was divided into three education cycles. National assessments were then introduced, but were not obligatory, for students in years 3 and 6. Compulsory assessments were introduced for students in year 9. The introduction of this new education system structure also resulted in a greater focus on the inclusion of SEN students into regular schools, greater focus on reducing grade repetition, as well as assessment, curricula, and school autonomy¹⁴¹.

The reform was based on good practices from other European countries. Sweden's system was used as an inspiration for the new structure, and the UK's system was used as an inspiration for the assessment system. The planning process for this reform included consultations with relevant

¹⁴¹ Information was gathered via interviews with national stakeholders.

stakeholders such as teachers, principals and education experts. The reform was supported by the general public, the community of education experts, teachers and politicians¹⁴².

The process of defining the direction for the reforms was somewhat lengthy, as it took time for the relevant stakeholders to reach a consensus regarding the direction of the reforms. Once the concept of the reforms was defined and agreed upon, it was carefully operationalised. As the reform included a lot of different aspects, its implementation was demanding. This resulted in a decision to introduce the reforms gradually¹⁴³. Thus, the implementation of the changes only began in the school year 1999/2000, and proceeded gradually. Different schools introduced the changes at different times, meaning that before implementation was completed, some schools were still following the old education system structure, while others were already working according to the new one. By the school year 2003/2004, all schools in Slovenia were following the new education system structure (Uradni list RS, 1998).

Observed effects of the reform

While at first sight it is reasonable to think that this reform could be analysed using the Difference in Difference (DiD) method, this could not be used due to the lack of a 'control' group against which Slovenian students could be compared (please see the methodological note for more information). However, the effectiveness of the reform in Slovenia can be assessed by analysing the existing literature, as well as information gathered via stakeholder consultations.

Existing studies analysing changes in the structure of education systems in various countries find that an increase in the length of compulsory education tends to increase students' educational attainment and positively affects their future well-being. Several studies¹⁴⁴ have shown that an increase in the length of compulsory education can improve the health outcomes of students and result in students receiving higher incomes in the future. However, its effect on more subjective indicators of well-being such as life satisfaction, is questionable (Clark & Jung, 2017). While the existence of the effect of compulsory education in other countries does not prove that the same effect occurred in Slovenia, it supports the probability of a positive effect.

The national stakeholders interviewed also believed that the reform of the education system structure had a fairly positive effect on the quality of education. According to the stakeholders, the reform may have played some role in a decrease in the share of low achievers after the reform. Moreover, it can be observed that school segregation

Methodological note

The research team explored the possibility of applying the DiD method to test the effects of the 1996 reform. First, a comparison was considered between different cohorts in Slovenia. However, as the length of education increased for all students, it was impossible to find comparable 'treatment' and 'control' pairs. It was then decided to compare Slovenia, in which the reform took place ('treatment group') with Croatia, a similar country with a similar education system in which the reform did not take place (the 'control group'). However, after a thorough examination¹⁴⁵ of student cohorts in both countries, it became clear that the education systems in these countries and their students are not as similar as initially assumed. Due to the differences between the students in Slovenia and Croatia and the different evolution in their PISA results before the effect of the reform can be observed, Difference-in-Difference analysis could not be applied to test the effectiveness of the 1996 education reform in Slovenia. This means that the differences observed between the academic performance of Slovenian and Croatian students are likely to stem from the differences in the two education systems, and not from the fact that Slovenia implemented education reform while Croatia did not.

¹⁴² Information was gathered via interviews with national stakeholders.

¹⁴³ Information was gathered via interviews with national stakeholders.

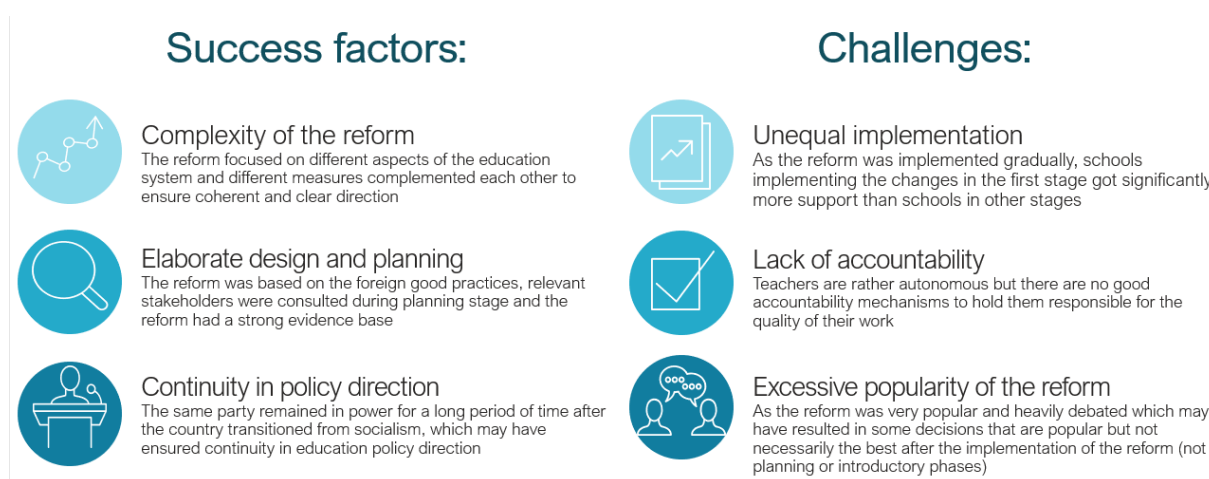
¹⁴⁵ For more information, see Annex 1. Country Profiles, Slovenia.

decreased since the reform¹⁴⁶. However, these observations cannot be directly linked to the reform, due to a lack of statistical evidence.

Main success factors for, and challenges to, the implementation of the reform

The change in the structure of the education system, in which an eight-year compulsory education system was replaced with a nine-year compulsory education system, appears to have increased the quality of education in Slovenia and benefitted students. Even though the statistical analysis did not appear feasible, as the conditions for the chosen method of the analysis were not met, existing studies and the information gathered from the consultations with national stakeholders provided some evidence of the potential effectiveness of the reform. Several factors may have contributed to the success of the reform. However, several important challenges may also have hindered the potential effectiveness of the reform.

FIGURE 44. SUCCESS FACTORS AND CHALLENGES INFLUENCING THE EFFECTIVENESS OF THE 1996 EDUCATION REFORM IN SLOVENIA



First, **the reform was rather complex and addressed different aspects of the education system**. The complexity of the reform ensured that various challenges in the education system were tackled. The reform introduced new and more flexible teaching approaches, more project work, and the ability to choose additional classes¹⁴⁷.

It is also important to note that the planned measures complemented each other. The reform introduced changes in the structure of education, focused on promoting new teaching approaches, changed the national curriculum and introduced new assessment practices. The introduction of different measures at the same time ensured that the direction of these different changes was the same, and ensured the changes were well complemented by each other¹⁴⁸.

Moreover, **the reforms were well thought through and carefully planned**. As mentioned, the reform was based on international examples, especially on the examples of Sweden and the UK. The experiences of other countries allowed policy-makers and

¹⁴⁵ For more information, see Annex 1. Country Profiles, Slovenia.

¹⁴⁶ Information was gathered via interviews with national stakeholders.

¹⁴⁷ Information was gathered via interviews with national stakeholders.

¹⁴⁸ Information was gathered via interviews with national stakeholders.

stakeholders to better understand what could be expected from the reform and to plan for potential future challenges. Moreover, key stakeholders were consulted when conceptualising and designing the reform. While this resulted in a lengthy process, it also ensured that the reform has a strong evidence base, is well developed, and properly takes into account the positions of various stakeholders.

Finally, **the political environment in which the reform was introduced ensured its smooth implementation.** After Slovenia gained independence in 1991, political conditions ensured the continuity of the reforms. Moreover, public understanding that such a reform was needed, together with wide consensus regarding the reform, probably ensured that most of the changes are supported by the public and were properly implemented by the teachers¹⁴⁹.

Despite the existence of factors contributing to the effectiveness of the reform, a number of challenges were faced. First, **even though the reform was carefully planned and the favourable environment ensured smooth implementation and continuity, inconsistencies in implementation process appeared.** Due to the fact that the reforms were very complex, it was decided to implement them gradually. However, consistency was not ensured in the support available for the implementation. The first two waves of schools transitioning to the nine-year system were heavily supported by the national authorities, and the National Educational Institute carefully monitored the implementation process. However, this support was no longer available to the same extent for schools that transitioned to the new system later on. This lack of available support put a lot of pressure on schools and teachers, and may have created additional challenges during the implementation of the reform in some schools¹⁵⁰.

Some challenges were also created by the fact that teachers in Slovenia are fairly autonomous, but no accountability mechanism is in place to help ensure the effectiveness of a school. Consequently, it was hard to hold teachers accountable for properly implementing the changed education programme. This challenge is especially important, given the fact that schools in later waves of the reform implemented the changes with less support from national authorities than the schools that that implemented the reforms in the first waves¹⁵¹.

Lastly, **the popularity of the 1996 education reform may have influenced the decision-making process during its implementation.** According to the national stakeholders consulted, the 1996 education reform was well known by the public and carefully followed by society. Consequently, some politicians may have used the reform and the new changes as an opportunity to gain more support, and thus made decisions that were popular and increased their own support from the public, but were not necessarily the decisions that were most needed. Some decisions may also have been taken at the wrong time due to their popularity (or lack of it). This flawed decision-making, caused by the popularity of the reform, is not seen in the planning or initial introductory stages of the reform, but may have occurred later on, after the reforms began to be implemented¹⁵².

3.6.3.2. Development of the VET system

In the 1990s, after Slovenia's transition from socialism, the country's VET system was reformed to establish social partnerships between the relevant stakeholders. The reforms

¹⁴⁹ Information was gathered via interviews with national stakeholders.

¹⁵⁰ Information was gathered via interviews with national stakeholders.

¹⁵¹ Information was gathered via interviews with national stakeholders.

¹⁵² Information was gathered via interviews with national stakeholders.

reflected the changed discourse in the economy that the state was no longer perceived as the only actor in charge of education¹⁵³.

Since the early 2000s, it has been realised that some goals of the reform of the VET system in the 1990s were not achieved. Enrolment rates into VET decreased, and the dual system that involved other relevant stakeholders in VET education was seen as ineffective. There was also a growing need for VET programmes that focused more on the competences and practical knowledge that are required in the labour market. Consequently, this ineffective dual system was abolished, and a hybrid VET model was introduced. Since 2004, all VET programmes in Slovenia have included training conducted in companies¹⁵⁴.

Since the early 2000s, Slovenian policy makers have also defined specific strategic goals for the development of VET in the country. These goals were derived from national priorities, and defined in national strategic documents such as the National Action Plan for Employment 2004-2006 (Republika Slovenija, 2004). The strategic goals included developing the VET system so that was in line with the needs of society and students, improving the quality of Slovenian VET education, providing greater flexibility for VET students, and facilitating transitions between different types of schools (VET and general education schools), among others¹⁵⁵.

Students normally begin upper-secondary education schools when they are 15 or 16 years old. In terms of VET pathways, prospective students can choose from a wide range of programmes of different types and with different delivery models (apprenticeships and school-based). The VET programmes at upper secondary level include two-year vocational programmes, three-year vocational programmes, four-year technical programmes, two-year vocational technical programmes, and one-year vocational (bridging courses). More than two-thirds of VET learners are enrolled in technical VET programmes, after which they have the possibility to apply to tertiary education institutions (CEDEFOP, 2021).

All upper-secondary level VET programmes are considered formal initial vocational education and training programmes. After the successful completion of these programmes, students receive a nationally recognised confirmation of their VET qualification. While these programmes are free of charge for full-time learners, part-time learners (adults) have to pay tuition (CEDEFOP, 2021).

Choosing a VET track in Slovenia is very common, and the employment rate among VET students is notably high. In 2018, 70.9% of students in upper-secondary education attended VET programmes, and the employment rate among recent VET graduates was equal to 84.5% (European Commission, 2020, f). However, the employment rate among recent VET graduates had decreased to 71.6% in 2020. This decrease is significantly greater than the average for the EU (which was 79% in 2018, and 76.1% in 2020). As this decrease in employment rate is recent, it is likely that it is connected with the negative effects of the pandemic on the economy. It is also important to note that the current employment rate among recent VET graduates is also lower than the employment rate among graduates of higher education. In Slovenia in 2020, this rate was equal to 89.2% (compared with an EU average of 83.7%) (European Commission, 2021, e).

The VET track has become highly popular for several reasons. First, several reforms have recently been implemented to improve the VET system (see the Box below). Moreover, the vocational track is often seen as providing better job security and more opportunities for employment after graduation. This perception is partly influenced by the financial crisis in

¹⁵³ Information was gathered via interviews with national stakeholders.

¹⁵⁴ Information was gathered via interviews with national stakeholders.

¹⁵⁵ Information was gathered via interviews with national stakeholders.

2008. After the financial crisis, many families were left in an uncertain financial position. Hence, parents often encouraged their children to choose the vocational path due to better employment prospects.

BOX 18. CHANGES IN SLOVENIA'S VET SYSTEM SINCE 2006

Between 2006 and 2008, the curriculum for vocational education and training in Slovenia was updated. The aim of the new approach to VET, presented in the new curriculum, was to connect theory teaching and practical education at organisational and didactic levels. This new approach hoped to better connect education institutions with the local economy, and better prepare students for full participation in the labour market. Modern didactic approaches were reflected in the new system through the integration of knowledge, and the individualisation of the learning process (Planning of School-implementation curriculum, 2011).

The curriculum reform has brought greater decentralisation at the level of curricular planning, and made the national curriculum more open. 20% of the curriculum has become flexible and can easily be adapted to meet regional and local needs (CEDEFOP, 2007). This has resulted in the creation of the school-implementation curriculum in the VET programmes. The school-implementation curriculum is prepared by the programme teaching staff, coordinated by the principal. The curriculum is prepared for the entire duration of the educational programme, and differs from the annual work plan, which defines the plan for carrying out educational work for one year. The school-implementation curriculum connects educational planning at national level with teaching work at an individual level. Each school-implementation curriculum should also reflect agreements between the school and the companies in which the practical training is carried out (Institute of the Republic of Slovenia for Vocational Education and Training, 2012).

Together with the implementation of the school-implementation curriculum, advanced didactic teaching principles were introduced to ensure that students gained occupational competences and, at the same time, improved their general knowledge and competences. This included a greater focus on lifelong learning abilities (motivation and strategies), a more personalised approach to education with a more active role for students themselves, and an emphasis on the holistic development of students through the development of cognitive, socio-emotional and behavioural skills (Planning of School-implementation curriculum, 2011).

Under the new reform, students are unable to finish the VET programme for various reasons can acquire a certificate showing their qualification based on the successfully completed modules (CEDEFOP, 2007). This allowed individuals to become more flexible in their learning process. This change is in line with the generally increased importance of the lifelong learning and inclusiveness in education in Slovenia.

The curricular reform was introduced in 2006 with the publication of the methodological manual 'Curriculum at national and school level in vocational and professional education'. Since the school year 2007/2008, new VET programmes have gradually replaced old ones. The development and implementation of the changes to the VET system were carried out by the education authorities and an expert group dedicated to changes in the VET system. The opinions of relevant stakeholders were taken into account. Social partners, however, do not play an active role in VET or in its reforms¹⁵⁶.

It is important to note that while the popularity of VET results in a low level of mismatch between the education and labour sectors and the high employability of young people, in the long run it may result in shortages of high-skilled workers (OECD, 2016, a).

Observed effects of the reform

The changes in the VET system in Slovenia may be seen as positively affecting the quality of VET and the academic performance of students in VET, given the decreasing performance gap between students in vocational and academic tracks (as can be seen in Figure 40). However, the effect of the new VET system and curriculum reforms on students'

¹⁵⁶ Information was gathered via interviews with national stakeholders.

achievements cannot be tested using statistical methods, due to the complexity of the reforms and other factors that may affect the performance of VET students and which cannot be controlled for. The effects of curricular and initial training reforms are difficult to check using PISA data because the specific indices need to be derived from the background questionnaires or variables and introduced into the analysis, which is often not possible. Moreover, because the 15-year-old students participating in PISA are mostly first-year students in VET schools, their performance is not particularly reflective of the quality of the VET programme, as they are still new to it.

The national stakeholders consulted outlined several positive developments caused by the VET reforms. Specifically, vocational *matura* and the introduction of the general education curriculum into VET has improved the quality of VET education. The curricular reform introducing greater inclusion of schools and teachers, as well as representatives of industry, into decision-making processes with regard to learning content. This also resulted in teaching practices that better combined theory and practice¹⁵⁷.

The curriculum reform also provided greater autonomy to schools through the school-implementation curriculum. A study on the effect of school autonomy on students' achievements found that increased school autonomy, particularly in relation to decision-making in an academic context, often has a positive effect on students and their academic achievement (Hanushek, Link, & Woessmann, 2013). This shows that a generally positive relationship can be observed between school autonomy and academic achievement. At least to some extent, this may also be the case in Slovenia. If so, this may explain the potential effect of the reform on the academic performance of students. However, the existence of such a relationship cannot be tested.

While several improvements indicate that the VET reforms have been beneficial, concerns exist that the VET system still faces some challenges. Even though graduates of VET schools can receive vocational *matura* and later access some higher education programmes, technical education programmes still appear to be of a slightly lower quality than general education programmes, at least academically. Because VET programmes are more often chosen by students from lower socio-economic backgrounds, this may further perpetuate existing socio-economic inequalities¹⁵⁸.

It is also important to note that the improvements observed in the results achieved by VET students may also be a result of the increasing popularity of VET rather than perceptible improvements in the quality of VET education. As more and more students enter VET programmes, the observed improvements in academic performance of VET students may stem from changes in the student bodies in VET schools rather than from the reforms to VET system. Some of the national stakeholders consulted did indeed argue that while the VET reforms since 2006 have helped to improve quality of VET programmes, the connection between the changes and the improvement in students' results is questionable¹⁵⁹. Furthermore, the extensive focus on general subjects in VET schools, while having a potentially positive effect on students' performance in PISA, may negatively affect the quality of vocational training and the future availability of higher-level specialists.

Success factors for, and main challenges to, the implementation of the reform

While the effect of the changes to the VET system cannot be tested statistically, it is evident that they have still improved the quality of VET programmes and potentially contributed to the narrowing of the performance gap between VET students and students from general

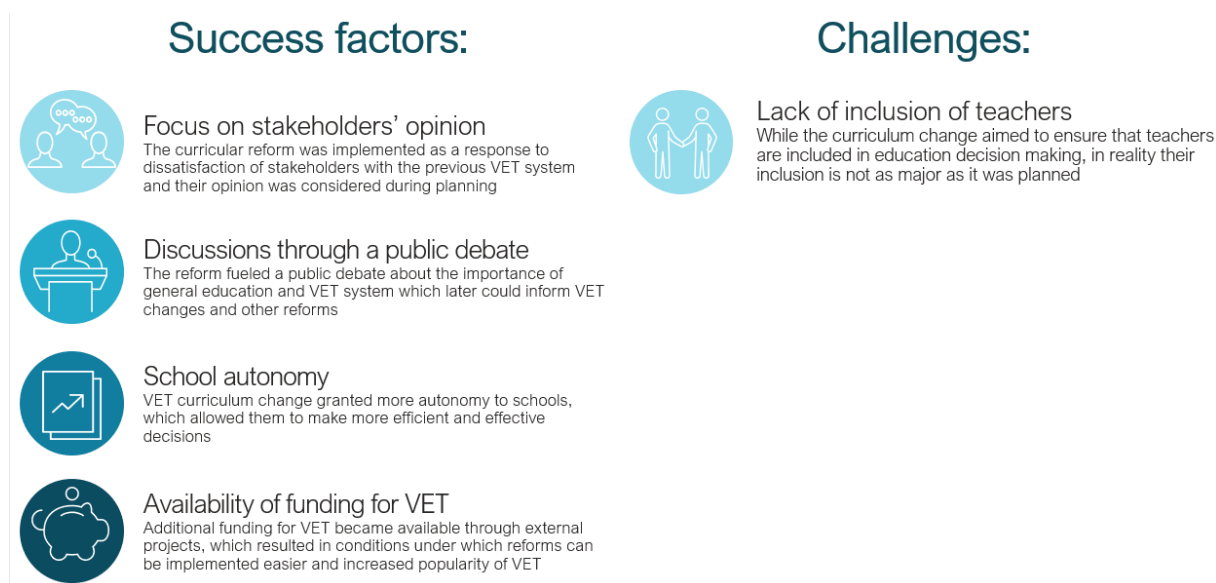
¹⁵⁷ Information was gathered via interviews with national stakeholders.

¹⁵⁸ Information was gathered via interviews with national stakeholders.

¹⁵⁹ Information was gathered via interviews with national stakeholders.

programmes. Several factors may have contributed to these potential positive effects of the reform. It is also important to note, however, that some important challenges were faced during implementation. The most important success factors and challenges are presented in the figure below.

FIGURE 45. SUCCESS FACTORS AND CHALLENGES INFLUENCING THE EFFECTIVENESS OF VET REFORM



First, **when planning the curriculum reform, opinions of relevant stakeholders were taken into account.** Even though social partners did not play an active role in the planning and design of the reform, their opinions were considered. The reforms were implemented as a result of the dissatisfaction of industry representatives with the lack of a qualified labour force, and mismatches between VET education and the needs of the labour market¹⁶⁰.

The VET curriculum reform also opened up a public debate regarding the role of general education in the education system. This public debate focused on the relevance of the traditional curriculum and its potential replacement by a curriculum that focuses more on key competences and qualifications. The public debate also touched upon the role of general education in the VET system. These discussions resulted in the inclusion of parts of the general curriculum into VET programmes, as well as increased public interest in the education system, in relation to both general and VET programmes¹⁶¹. This may have contributed to increasing public awareness of the importance of education and the need for education reforms.

Moreover, **curriculum reform granted greater autonomy to VET schools through the introduction of the school-implementation curriculum.** As previously mentioned, greater autonomy allows schools and teachers, who have the most information on VET students and their needs, to adjust their teaching methods in ways that are most beneficial to their students, and which can bring about the best educational outcomes. The school-

¹⁶⁰ Information was gathered via interviews with national stakeholders.

¹⁶¹ Information was gathered via interviews with national stakeholders.

implementation curriculum also allows the school curriculum to be adapted to the needs of the local labour market.

Lastly, the **availability of funding for VET has facilitated the implementation of various changes**. Since the early 2000s, several projects – including several ESF-funded projects – have been implemented to improve the VET system in Slovenia. Consequently, VET schools have received sufficient resources to implement the necessary improvements, as well as upgrading and modernising their educational tools. This has created an environment in which it may have been easier for schools to implement curricular and other changes.

Despite the potential positive effect of VET reform on student achievements, some challenges were encountered in the implementation of the changes to the VET system.

As the VET system includes some parts of the general education curriculum, a compromise is needed to ensure that neither the professional development nor the general education part of the VET is neglected. However, this has often resulted in a lack of professional content. At the same time, some people have criticised the VET system as focusing too much on professional competences and neglecting the content of general education. **This indicates that there were some tensions and disagreements between different stakeholders regarding what should be prioritised in VET programmes, and what level of both academic and vocational subjects should be covered.** However, these tensions were addressed through discussions between the policy-makers and relevant stakeholders. After long and demanding discussions, agreement was reached over what should be taught in vocational education and training programmes¹⁶².

Moreover, **in practice, teachers did not participate as much in the planning of the curriculum as had been planned (or as much as was needed)**. This resulted in a lack of coordination among the teachers, and too little focus on the integration of key competences into teaching (Planning of School-implementation curriculum, 2011). The interviews with national stakeholders confirmed that the roles of schools and teachers in the decision-making process were not as significant as had been planned¹⁶³.

Lessons for future education reforms in Slovenia

It is difficult to isolate the specific outcomes of individual education reforms, as reforms are not implemented in isolation, and their potential effects are interconnected with the effects of other reforms and other factors influence the education system. However, some of the reforms in Slovenia seem to have had a more pronounced effect than others. The present analysis of Slovenia's PISA journey and the changes to its education system focuses on two educational changes – changes to the structure of the education system in 1996, and changes introduced into the VET system since 2006.

The implementation of each reform involved different specific challenges the Slovenian education system might face, and different factors contributed to the effectiveness of the reforms. However, analysis of the two educational areas – the structure of the education system, and the VET system – highlighted some important issues that should be taken into account when implementing future reforms in Slovenian education system. These lessons include:

¹⁶² Information was gathered via interviews with national stakeholders.

¹⁶³ Information was gathered via interviews with national stakeholders.

- **Public acceptance is an important condition for smooth implementation of reforms.** The educational reforms in the 1990s were widely supported by the public and by teachers, which ensured that schools were motivated to implement the changes introduced, particularly at the beginning. While these conditions cannot be replicated when implementing other reforms, public acceptance and buy-in can be facilitated through extensive debates and consultations that are informed by evidence. However, the example of the 1996 reform reveals the later risk of a widely accepted reform becoming focused on the popularity of various decisions, not necessarily on their need.
- **Ensuring an adequate delivery system (professional development, funding, monitoring) is key for a reform to be implemented.** The example of the 1996 education reform highlights the crucial role of support for schools and the monitoring of the implementation process. Because this reform was implemented gradually, the schools implementing the reform at the beginning were highly motivated, heavily supported by the national authorities, and their progress was carefully monitored. Consequently, the implementation of these changes was fluent and effective. The schools that implemented the reforms at a later date did not enjoy the same level of support, and their progress in implementing the changes was not as carefully monitored. Consequently, they faced more challenges and benefitted less from the changes introduced.
- **The essential role of schools and teachers in decision-making processes should be acknowledged, and the support of schools and teachers is crucial to the implementation of reforms.** It can be argued that the changes in the VET curriculum have potentially been successful due to the increased autonomy of schools and teachers (even though this is still more limited than was initially planned). As schools and teachers usually possess the most information about their students and the local situation, they also tend to be able to make the best decisions that are most in line with the needs of their students and the local labour market.

3.7. Sweden

Educational context and key policy issues

Sweden's performance in PISA has been worsening since 2006. Only recently has the country managed to slightly increase the academic performance of its students to the level attained in 2003 (OECD, 2017, b). Nevertheless, the average academic performance of Swedish students in PISA 2018 was better than the EU average (European Commission, 2020, g). This shows that **the country has faced several challenges with regard to quality and equity of its education system, but has managed, at least to some extent, to address them.**

In the 1990s, Swedish education system was very centralised. However, with a change in direction of public policy management, it was decided to also change the style of the management in the education system. Two main changes were introduced – governance of the education system was decentralised, and support for independent schools was introduced. It was hoped that these changes would ensure the more efficient management of the education system and create conditions for new pedagogies and educational approaches to be developed. However, **while decentralisation may have brought about some improvements in the education system, these changes may have had**

a negative effect on inclusion in the education system¹⁶⁴. Decentralisation and increased support for independent schools are analysed in more detail in Chapter 3.7.3.1.

More recent efforts to improve the quality of Sweden's education system include ensuring a holistic approach to ECEC and school education through curriculum development, developing a better quality assurance system, and promoting continuous professional development for teachers (OECD, 2015, a). Early intervention measures, such as frequent testing in grades 1, 3, 6 and 9, aim to ensure that students receive the assistance needed to acquire the necessary skills and knowledge foreseen in the curriculum for their grade (OECD, 2017, b). Schools in Sweden are also equipped with innovative tools, and policy-makers focus on modernising schools through digitalisation (European Commission, 2020, g). However, **educational quality is threatened by a shortage of teachers**. Due to teacher shortages, it is estimated that in 2033, the Swedish education system will be missing 45,000 teachers, equal to 21% of the current teacher population. Recent initiative 'Boost for Teachers Salaries' increased the salaries of one-third of teachers, but failed to attract more professionals to the teaching profession, and created new inequalities and divisions between teachers (European Commission, 2020, g). Moreover, the turnover of school principals in Sweden is high, with 50% of school principals working at a school for less than three years. The turnover of principals is also higher in schools with worse academic results, which further threatens the quality of education in those schools, and may increase inequalities between schools (European Commission, 2020, g).

Given Sweden's focus on the quality of education, it is also important to note that **the need for monitoring and evaluation of the education system has received more and more attention from policy-makers**. Following decentralisation, central authorities aimed to empower municipalities and schools to choose the educational path that was most suitable for them and their students by not providing any guidance with regard to education management, or by monitoring the education system on a central level. Consequently, knowledge about educational outcomes was scarce and only information about students in upper-secondary schools (older than 16) was available at a national level. This resulted in the central authorities not really knowing what was happening in schools, and may have contributed to increasing discrepancies between schools. To address this challenge, it was decided to introduce more monitoring tools into the education system. Support for schools and municipalities is now also provided through school inspectorates and the national agency for education. Educational outcomes are also now monitored through the national assessment system¹⁶⁵. This system is discussed in more detail in Section 3.7.3.2.

In relation to the equity of the education system in Sweden, policy-makers have focused on improving the accessibility of ECEC activities and ensuring better support for migrant students. More specifically, pre-school classes for six-year-olds, which were introduced in 1998, became compulsory in 2018. Since the school year 2001-2002, municipalities have been obliged to ensure that parents who are unemployed or on parental leave have access to ECEC activities for their children. Since 2002, fees for pre-school institutions have been subject to a maximum tariff (Skolverket, 2007). Moreover, as the number of immigrants to Sweden has increased (OECD, 2020, d), ensuring inclusive education for newly arrived students is crucial. To ensure better inclusion for migrant students, the Education Act now includes a definition of 'newly arrived students' as students with special needs. These students are defined as migrants aged between 7 and 18 years old, without basic knowledge of Swedish. These students are labelled 'newly arrived' for up to four years after they enter the Swedish education system. Defining them as 'newly

¹⁶⁴ Information gathered via consultations with national stakeholders.

¹⁶⁵ Information gathered via consultations with national stakeholders.

arrived students' facilitates the provision of specific support measures, such as introductory classes or additional classes in Swedish as a second language (OECD, 2017, b).

Despite the existing support measures, educational outcomes still largely depend on a student's background, which shows a lack of equity in the education system.

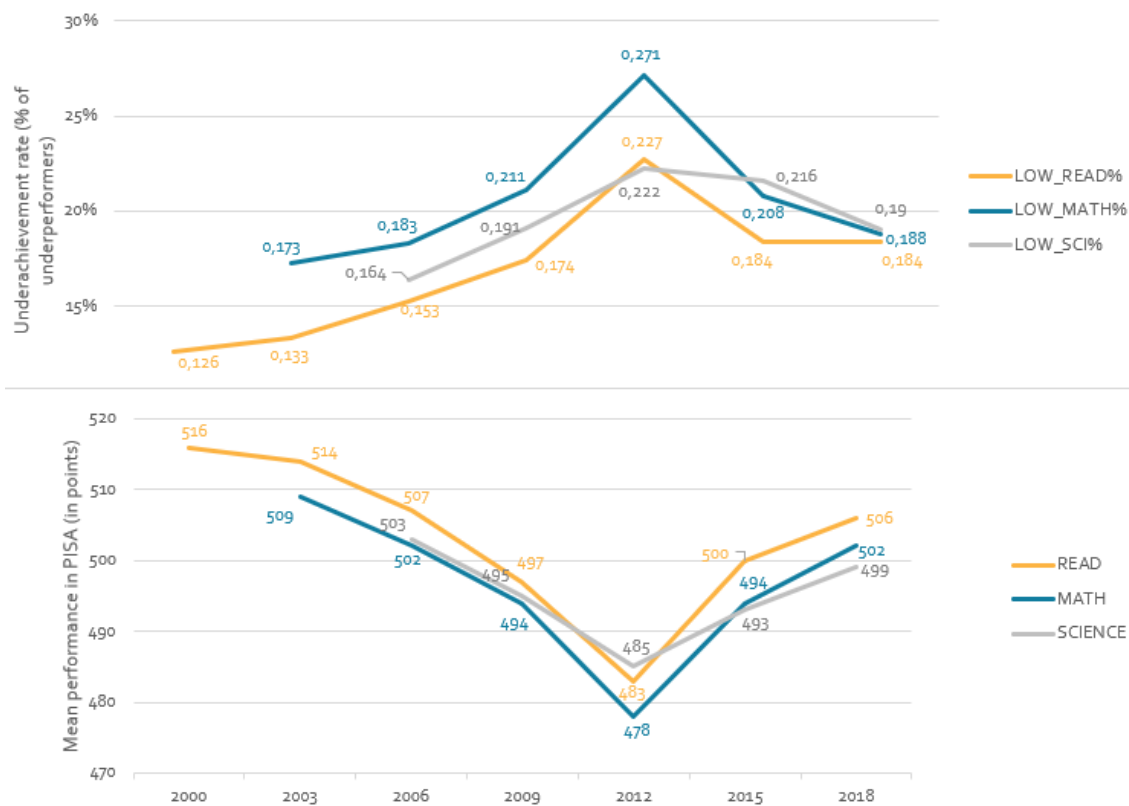
Recent reports show that the performance gap between native and migrant students is increasing, the gender gap in performance remains high, and socio-economic background significantly affects the academic achievements of students (European Commission, 2020, g). (For more information, see Section 0.) For example, early school leaving in 2020 was higher among boys than girls (9% versus 6.3%) and higher among migrant students than among native students (15.6% versus 5.3%) (Eurostat, n.d., b). This inequality between students from different socio-economic backgrounds may point to inefficiency in the policies targeting educational inequalities and aiming to ensure greater inclusion. It could also be the result of the increased popularity of independent (private) schools in Sweden, which in reality do not provide equal access to all students, despite the fact that the existing rules do not allow schools to be selective.

Key trends in students' performance

In 2018, Sweden's mean performance in PISA in all three domains (reading, mathematics and science) was better than the average performance of EU countries (European Commission, 2020, g). This means that the education system in Sweden provides opportunities for most students to gain basic skills in reading, mathematics and science. The share of top performers has also increased significantly. For example, in 2018, 13.3% of Swedish students were top performers in reading (compared with an EU average of 8.5%) (OECD, 2019, a). These improvements are rather recent. While a national audit raised concerns about schools participating in PISA potentially excluding too many foreign-born students from participating in PISA 2018, which could have affected overall PISA improvements (Riksrevisionen, 2021), it is unlikely to have affected the rising share of top performers in the country.

As shown in Figure 47, **no significant changes can be seen in the long-term trends in Swedish PISA performance**. Mean performance in all three domains in 2018 was more or less the same as in 2006. However, the performance of Swedish students fluctuated strongly over the observed period. The mean academic performance of 15-year-old Swedish students in all three domains (reading, mathematics and science) decreased significantly between 2000 and 2012. However, between 2012 and 2018 this trend was reversed, and mean performance in all three domains increased significantly. Underachievement rates followed a reverse trend –underachievement rates in all three domains increased until 2012, and have gradually decreased until 2018.

FIGURE 46. MEAN PISA PERFORMANCE AND UNDERACHIEVEMENT RATES IN SWEDEN 2000-2018



Source: PISA data.

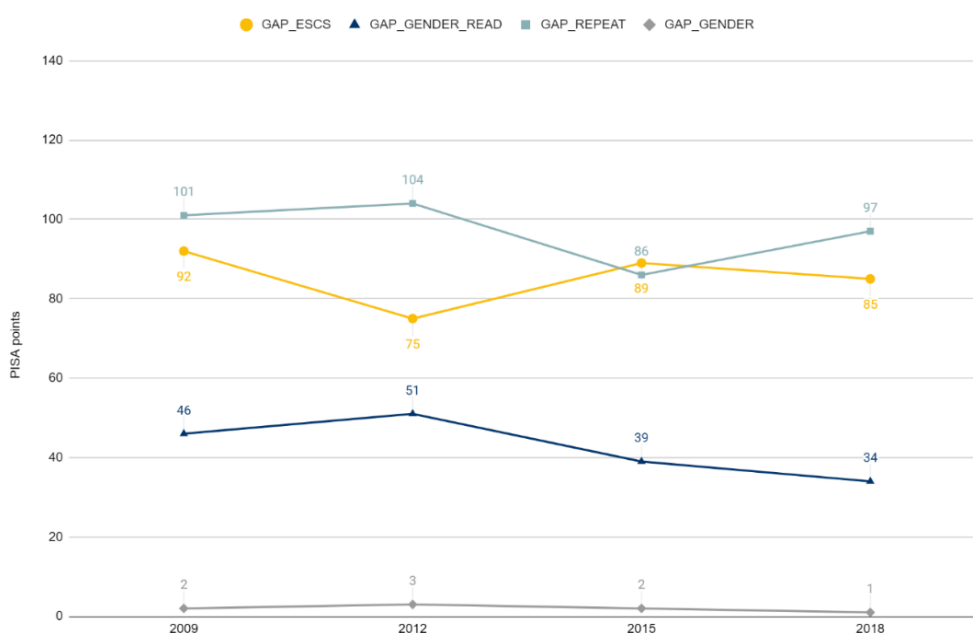
Note: the graph presents trends in mean student achievement in Sweden between 2000 and 2018, as well as variations in the mean rate of low-achieving students.

Slight changes in the performance gaps between different groups of students are observed between 2009 and 2018 (see Figure 47).

The performance gap between students from socio-economically advantaged and disadvantaged students decreased between 2009 and 2012. However, because this decrease was followed by an increase in the gap, the gap in 2018 is not statistically different from what it was in 2009.

The performance gap between boys and girls in reading decreased between 2012 and 2018. Although it remains statistically significant, the gap in 2018 is 17 points narrower than in 2012. This gap has narrowed because even though the reading performance of both boys and girls improved, the increase among boys was greater, indicates that the equity of the education system has improved. However, similar trend of a narrowing gender gap in reading performance is observed in most countries participating in PISA. This change is believed to be the result of a change in PISA assessments from paper-based to computer-based tests, in which girls usually perform worse (OECD, 2016, b).

The performance gap between students who repeated a grade and those who did not remained stable between 2009 and 2018. While this gap is quite high, it is important to note that the share of students in Sweden who had to repeat a grade is relatively low (3.5% in 2018, compared with the EU average of 10.4%). This means that grade repetition is quite rare, but the students repeating a grade face a serious challenge.

FIGURE 47. PERFORMANCE GAPS BETWEEN STUDENTS IN MATHEMATICS IN SWEDEN 2009-2018


Source: PISA data.

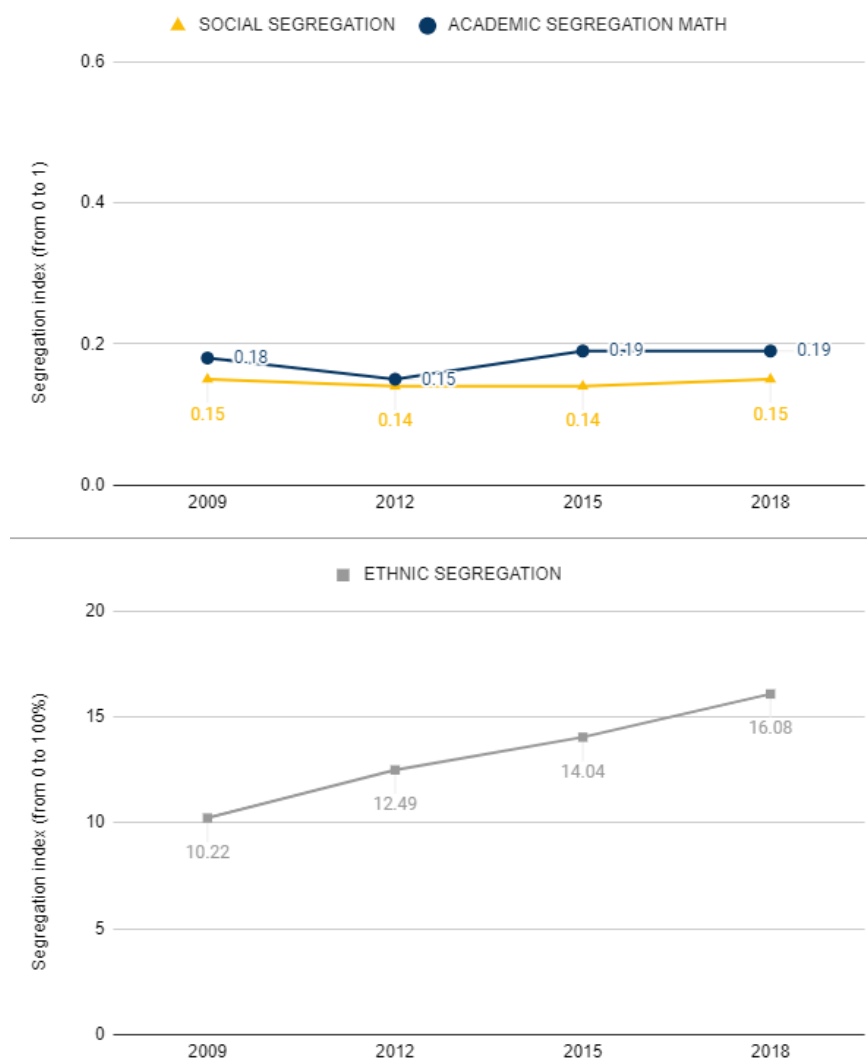
Note: the graph presents trends in the performance gaps in Sweden between certain categories of students (boys vs. girls; students who repeated a grade vs. students who didn't...) for the 2009–2018-time period. All gaps are presented as absolute values, so that the graph is easier to understand. However, all gaps are actually negative (meaning a difference in favour of the most advantaged category in the comparison). While all the gaps relate to performance in mathematics (the most interesting domain for analysis), the gap between boys and girls (GAP_GENDER) is also presented, as the gender gap is usually larger in reading than in mathematics or science. Gaps based on VET and rural environment are not represented as (1) the rates of students in VET in Sweden is equal to 0%; and (2) the RURAL variable was not available in Sweden in 2015 and 2018.

Indicators of school segregation demonstrate that Sweden faces challenges with regard to the inclusiveness of its education system. As seen in Figure 48, while social segregation¹⁶⁶ remained stable between 2009 and 2018, ethnic and academic segregation¹⁶⁷ increased. Academic segregation in all three domains increased between 2000 and 2006, and remained stable until 2018. The increase in academic segregation before 2009 can be partly explained by the increasing popularity of independent (private) schools. At the same time, ethnic segregation increased by 6 percentage points between 2009 and 2018, which indicates the over-representation in certain schools of students with diverse ethnic and immigrant backgrounds.

¹⁶⁶ Variable SOCIALSEGR. For more information, see Annex 2 – Methodological approach section 2.1.3. Variables used for statistical analysis.

¹⁶⁷ Variables ACADEMICSEGR and ETHNICSEGR. For more information, see Annex 2 – Methodological approach section 2.1.3. Variables used for statistical analysis.

FIGURE 48. VARIATION IN SOCIAL, ETHNIC AND ACADEMIC SEGREGATION IN SWEDEN, 2009-2018



Source: PISA data.

Note: the segregation index can have a value between 0 and 1. 0 means no segregation (none of the variance in performance between schools can be explained by the school attended); 1 means complete segregation (the school attended can explain 100% of the variance between schools).

The fundamental principle behind the education system in Sweden is access to equitable education regardless of gender, socio-economic background or place of residence, and the education system largely focuses on promoting lifelong learning (Eurydice, 2018, j). However, as can be seen from equity indicators, inequity exists in Swedish education system despite existing priorities regarding inclusion and the availability of various support measures. **School segregation is still identified as one of the three main challenges in the Swedish school system by the Swedish National Agency for Education. School segregation according to the socio-economic background of students is becoming more and more visible** (Kornhall & Bender, 2019). Analysis of the effect of different individual and school level factors that may affect students' achievement, conducted through a multi-level regression model¹⁶⁸ using PISA 2018 data, confirms the

¹⁶⁸ The model tested the effect on students' performance of individual background variables (gender and ESC), academic path variables (having repeated a grade), and school climate variables at individual and school level. The only variables presented are those that had a significant effect. For more information, see Annex 1. Country Profiles, Sweden.

challenges with regard to inclusion. Socio-economically advantaged students who are Swedish, speak Swedish at home and have never faced grade repetition, tend to perform better in PISA in mathematics (see Figure below).

FIGURE 49. FINDINGS OF THE MULTI-LEVEL REGRESSION ANALYSIS OF PISA 2018 DATA FOR SWEDEN

Students in Sweden perform better in PISA (mathematics) if:



Source: multi-level regression analysis conducted for the study based on the PISA 2018 data. Because mathematics is the most interesting domain in Sweden (given the positive performance trends), all of the gaps presented are calculated for performance in mathematics. The results from the regression analysis presented show that some variance in the academic performance of different students can be explained by their specific characteristics or external factors. As noted by one of the national stakeholders consulted, differences in these factors can also explain some variation in Sweden's PISA scores. Because the PISA assessment is taken each time by different students, it is natural that their backgrounds are different, and they are often affected by different external variables. Consequently, the variance in performance may not be so much over time as between different cohorts of students. As performance trends can be observed by analysing data from other large-scale international studies such as TIMSS, it is reasonable to believe that indeed a lot of variation in academic performance can be explained by the fact that the different cohorts of students have different backgrounds, and are affected by different external factors¹⁶⁹.

Key policies associated with the improvements observed

Despite the worsening in Sweden's results in PISA from 2006 to 2012 and remaining challenges in the country's education system, several improvements can be observed over the years. The most important improvements observed include:

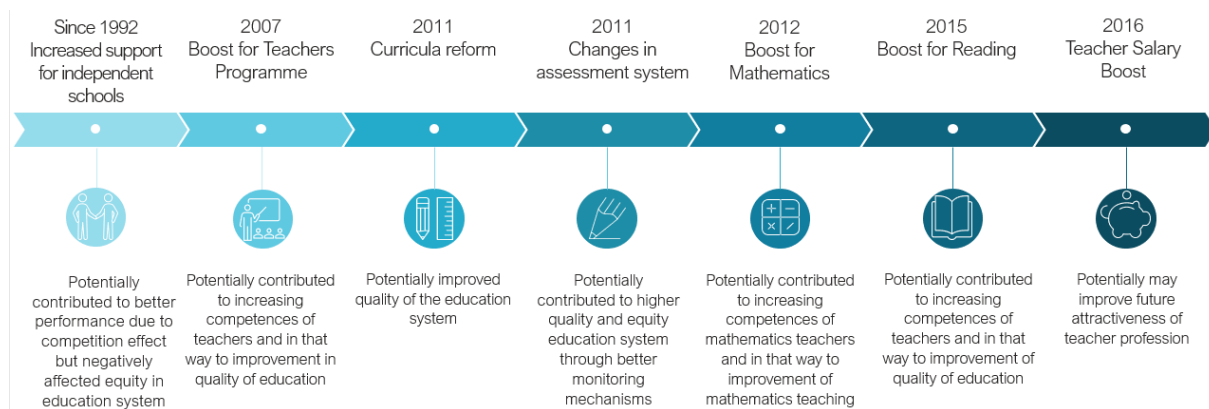
- An increase in mean performance in reading between 2012 and 2018;
- An increase in mean performance in mathematics between 2012 and 2018;
- An increase in mean performance in science between 2012 and 2018.

Relatively high results for Swedish students are somewhat recent. While changes in academic performance could be the result of differences between students in different cohorts, the observed improvements are, at least to some extent, believed to be the result

¹⁶⁹ Information gathered via consultations with national stakeholders.

of recent policy changes (European Commission, 2020, g). The challenge is to understand which specific reforms and developments in the education system may have contributed to these improvements. While the changes in education systems do not happen in isolation, and several factors and reforms may affect educational outcomes at the same time, some reforms can be identified as potentially having a greater effect on quality and inclusiveness in the education system. Potentially influential education reforms in Sweden are presented in Figure 50.

FIGURE 50. REFORMS POTENTIALLY LINKED TO IMPROVEMENTS IN ACADEMIC ACHIEVEMENT IN SWEDEN



The reforms above focus on different aspects of the education system – the school system, conditions for teachers, the national curriculum, and the assessment system. While all of the reforms may have contributed to improving quality and equity in the Swedish education system, the specific effects of some reforms cannot be analysed due to a lack of variables in the PISA data that show their effect, or the fact that some reforms took place at the same time, so the effect of a specific reform cannot be distinguished. Consequently, it was decided to focus on two priority areas – the school system and the assessment system. These priority areas were chosen because the effects of the reforms connected with these areas can be, to some extent, observed in the PISA dataset, and their effectiveness is analysed in the existing literature¹⁷⁰.

3.7.3.1. School system reform

In the end of the 20th century, the Swedish school system was one of the most centralised in Europe. However, ideas about public management in Sweden changed, and this has affected education management in the country. It was decided to decentralise the education system, and these decentralisation efforts were driven by a focus on goals and results. These changes resulted in responsibility for education being shifted from central government to the local municipalities; independent schools receiving the same funding as public schools; and parents and students having more freedom to choose a school¹⁷¹.

¹⁷⁰ For more information, see Annex 1. Country Profiles, Sweden.

¹⁷¹ Information gathered via consultations with national stakeholders.

BOX 19. DECENTRALISATION AND INCREASED SUPPORT FOR INDEPENDENT SCHOOLS

In the 1990s, the education system was very centralised. It was believed that such a system was ineffective. Moreover, it was argued that public schools had a local monopoly in the education system, which allegedly negatively affected the quality of education. With new public management ideas gaining popularity, it was decided to change the management of the education system. Several changes were introduced¹⁷²:

- Responsibility for organising and managing education shifted from the state to municipalities;
- More support was provided for independent (private) schools;
- Parents and students were given more freedom to choose a school.

The decision to decentralise the education system and to introduce more support for independent schools was political. It was not based on an analysis of academic performance, as in 1990s, little was known about how well Swedish students were performing. Improving the academic performance of students was also not the main objective of these reforms. The reforms aimed to create an environment in which it would be easier for the new schools to open and for new pedagogies to be developed. It was hoped that with more diverse schools, parents and students would have more freedom to choose what kind of school and pedagogy was best for them, and that this could result in the highest educational outcomes¹⁷³.

To decentralise the education system, responsibility for the management of the education system was transferred from the state to the municipalities. No guidance was provided to the municipalities in implementing this shift. It was hoped that in this way, the local authorities would be empowered to make their own decisions and develop education systems that worked best for their students. This shift was accompanied by a change in funding formula. Since the 1990s, municipalities have been responsible for allocating funds to schools. They use a formula to determine the funds given to each school depending on their number of students¹⁷⁴. It was hoped that with a new funding system, schools would be motivated to improve their teaching, as they would have to compete for students in order to receive more funding.

Moreover, in 1992, a new reform introduced a specific funding system through vouchers for independent (private) schools (Böhlmark & Lindahl, 2015). These schools were given funding per-student, which was based on the average operating costs of the municipal schools in the same municipality. In the beginning, independent schools received funding equal to 80% of the average costs of public schools in the municipality. Later on, this amount was increased to 100%, which meant that both public and independent schools received the same amount of funding per student¹⁷⁵. This reform was complemented by a more general reform implemented in 1994, which allowed parents to choose any municipal school and extended the voucher system to upper secondary education schools (Sahlgren, 2016).

There is no evidence that policy-makers analysed good practices from other countries when reorganising the education system and planning greater support for independent schools. These decisions were made at a central level, and the schools were not involved. It is also unclear whether schools were consulted when the system was changed. However, the national stakeholders noted that in relation to questions other than decentralisation or support for independent schools, teachers are normally consulted at least to some extent¹⁷⁶.

The support for independent schools resulted in a rapid change in the governance of the Swedish education system, from centralised to decentralised (Lundahl, Sweden: Decentralization, deregulation, quasi-markets – and then what?, 2002). Today, the Swedish education system remains fairly decentralised. The general goals and learning outcomes of the education system are defined at a central level, and the government has the responsibility to set and oversee the framework of the whole education system. Municipalities are responsible for organising education at pre-school, compulsory and

¹⁷² Information gathered via consultations with national stakeholders.

¹⁷³ Information gathered via consultations with national stakeholders.

¹⁷⁴ Information gathered via consultations with national stakeholders.

¹⁷⁵ Information gathered via consultations with national stakeholders.

¹⁷⁶ Information gathered via consultations with national stakeholders.

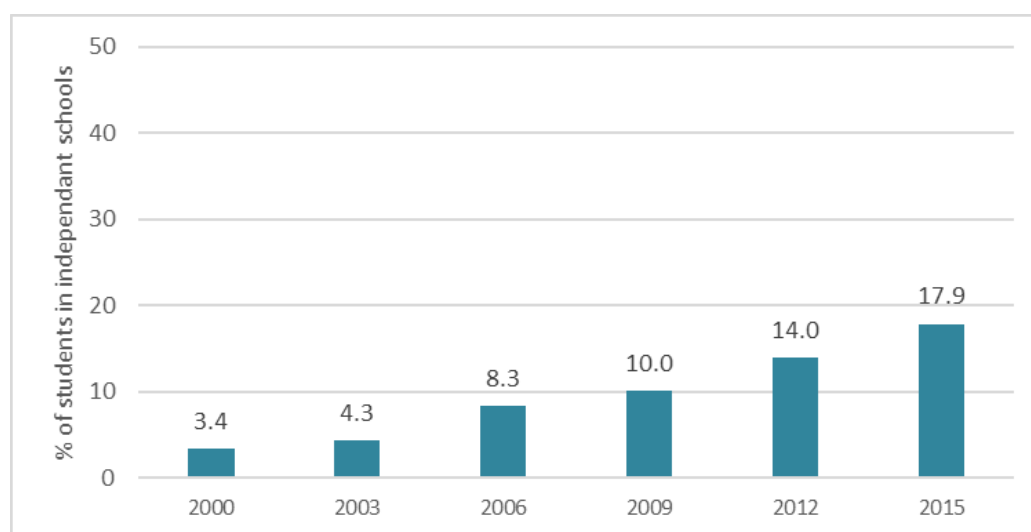
upper-secondary levels, as well as organising adult education, the activities of leisure time centres, and Swedish lessons for migrants (Eurydice, 2021).

Schools in Sweden may be either municipal or independent (private). However, both municipal and independent schools can be grant-aided by the state. Grant-aided independent schools are required to follow the national curriculum. However, independent schools can also offer supplementary education programmes (Eurydice, 2020, h).

The system of independent schools in Sweden was somewhat unique in the 1990s (currently, other countries, for example Slovenia, also provide financial support to private schools. Under the existing voucher system, the schools receive the same per-pupil funding as state schools. Because the schools receive funding from the state, they cannot charge fees for education. However, they can still be for-profit, by saving some of the voucher funds received through cutting their costs. This could include having larger classes or a higher teacher-student ratio, among other things. Independent schools also cannot be selective. This means that the schools cannot choose students on the basis of their individual characteristics. Still, the independent schools tend to attract students with better academic results and more privileged backgrounds. While students automatically get a place in a public school close to their home, they have to apply to independent schools, which means that parents have to be invested in their child's education and plan ahead. Families that are privileged enough to do this are usually better educated and wealthier. Newly arrived migrant children are also unable to access independent schools, as their parents could not register¹⁷⁷. Consequently, this system often results in more socio-economically advantaged students attending independent schools¹⁷⁸.

Before the introduction of increased support for independent schools in the 1990s, few independent schools existed, and most students attended the public schools closest to their home. Currently, students rarely attend the schools that are closest to their residence, as they practice the policy of free school choice, which is especially popular in urban areas (Edmark, Frölich, & Wondratschek, 2015). Due to the increased support for independent schools, the percentage of students who attend independent schools has increased from around 3% of all students in 2000 to around 25% nowadays. Consequently, the share of students attending independent schools and tested by PISA has also increased (see figure below).

¹⁷⁸ Information gathered via consultations with national stakeholders.

FIGURE 51. SHARE OF STUDENTS FROM INDEPENDENT SCHOOLS IN PISA


Source: PISA data.

It is also important to note that in the 1990s and early 2000s, most students attending independent schools attended schools that were run by non-profit associations and foundations. The number of students attending such schools has remained relatively stable. However, the number of students attending independent for-profit corporation schools has increased (SCB, n.d.). The increased popularity of for-profit schools may have had a negative effect on the quality of education. As noted by the national stakeholders, for-profit corporation schools focus primarily on profit and reduce the costs of education by, for example, increasing the number of children in classrooms, which may jeopardise the quality of education and limit the availability of individual support for each child that is necessary for success¹⁷⁹.

Observed effects of the reform

Decentralisation and increased support for independent schools were introduced in the hope of promoting pedagogical innovation and freedom. These goals have, at least partly, been achieved. Students now rarely attend the schools that are closest to their homes due to the available alternatives (Edmark, Frölich, & Wondratschek, 2015). New pedagogies have also been developed in some of the newly opened schools. More specifically, because the authorities were not regulating the activities of schools, they could come up with different approaches to education and implement different pedagogical tools, allowing greater choice and variety in the education system. However, most schools still follow a similar approach to education and use the same pedagogies¹⁸⁰.

The effects of the changes introduced on the quality of the education system are seen as controversial. Moreover, due to the lack of monitoring and evaluation mechanisms put in place during the design and implementation of the reform, the data needed to assess the effect of the reforms on students' academic performance are scarce¹⁸¹. However, existing studies can help to determine the potential effects.

Existing studies show that in generally, increased school autonomy in developed high-income countries results in better educational outcomes (Hanushek, Link, & Woessmann,

¹⁷⁹ Information gathered via consultations with national stakeholders.

¹⁸⁰ Information gathered via consultations with national stakeholders.

¹⁸¹ Information gathered via consultations with national stakeholders.

2013). Consequently, the changes introduced to decentralise the education system in Sweden may have resulted in a better quality of education and better academic performance among students. Moreover, studies focusing on how the increased support for independent schools affected students' performance in TIMSS and national exams shows that the observed effect is positive. However, this effect is observed only for around a decade after the reform was implemented (into the early 2000s). The studies also show that this increase in average academic performance primarily stems from external effects such as increased school competition, and not necessarily from significantly higher academic performance of students in independent schools. The studies also find that the independent schools have a positive competition effect on municipal schools, and not the other way around (Böhlmark & Lindahl, 2015). Still, the observed effects are rather modest, and it is impossible to determine whether the observed changes are the result of other factors¹⁸².

Positive effects of increased support for independent schools on academic performance are not visible from the analysis of PISA data. The mean performance for Sweden in all three domains assessed in PISA decreased until 2012. This decline in academic performance is often associated with decentralisation and the increased support for independent schools. However, while the reforms may have contributed to this decline in academic performance, it is observed that the academic performance of students in Sweden started to decrease before the reforms were implemented. National data showing this are scarce, as Sweden did not monitor its education system, but the results of other large-scale international assessments before 2000 (TIMSS trend data from 1995 to 2019) show a similar decrease in mathematics and science performance in grade 8¹⁸³. The biggest decrease was observed between 1995 and 2003; in mathematics, for instance, Sweden lost 40 score points, which is quite substantial.

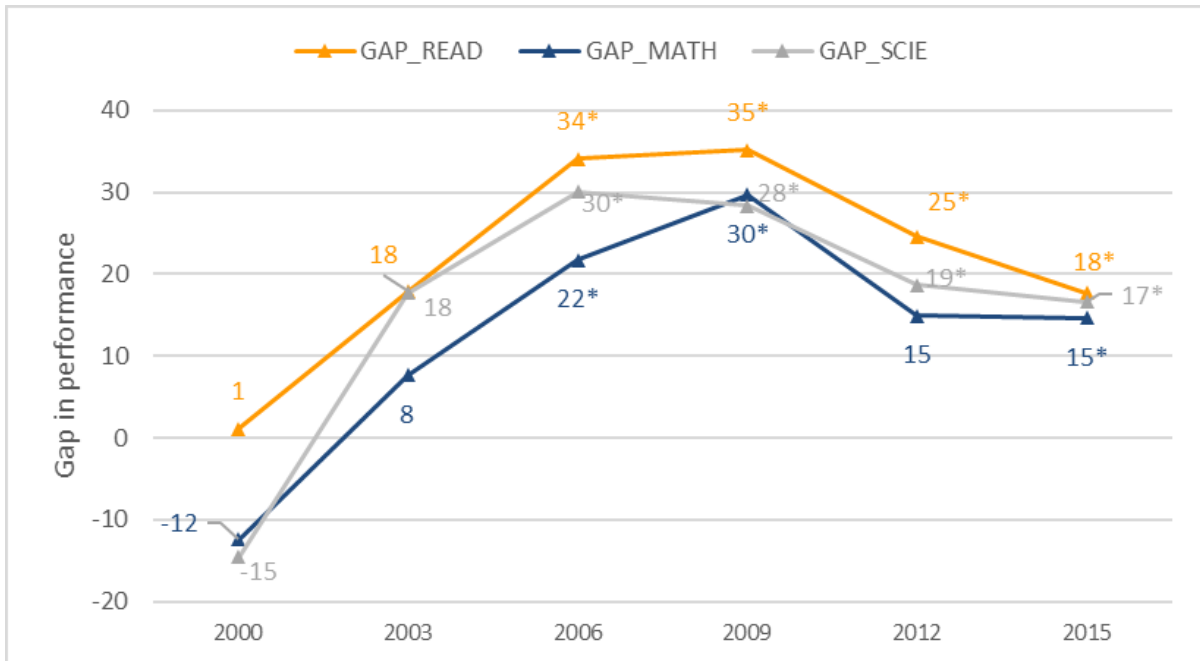
Increased support for independent schools has also affected equity in the education system. It was hoped that increased support for independent schools would result in a more inclusive education system. It was foreseen that as more new schools were established, students and parents would have the opportunity to choose a school that was most suitable for their needs, and thus be able to access more equal education opportunities. However, the opposite effect is observed¹⁸⁴. Existing studies show that while in the 2000s, Sweden's education equity indicators, as measured by PISA, were significantly higher than in the majority of countries (Holmund, et al., 2014). In 2018 these indicators are equal to the average for all countries participating in PISA. Comparison of the performance of students attending public and independent schools also shows that this gap in performance increased in favour of independent schools until 2009 (see the figure below).

¹⁸² Information gathered via consultations with national stakeholders.

¹⁸³ Information gathered via consultations with national stakeholders.

¹⁸⁴ Information gathered via consultations with national stakeholders.

FIGURE 52. PERFORMANCE GAP IN MATHEMATICS BETWEEN STUDENTS IN INDEPENDENT AND PUBLIC SCHOOLS

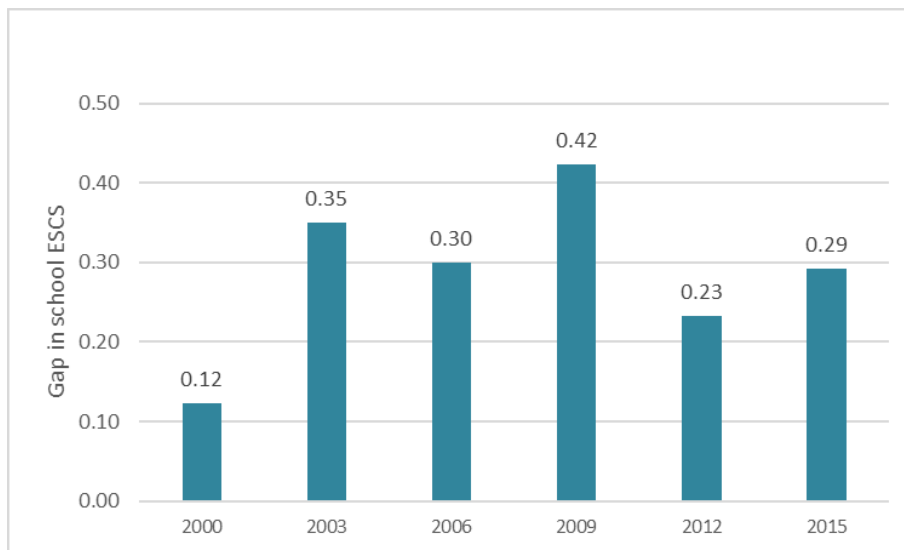


Source: PISA data.

Note: the gap is computed as independent schools minus public schools. When the gap is negative, it means that performance is better in public schools; when it is positive, performance is better in independent schools

The performance gap in favour of independent schools shows that the competition effect foreseen in existing studies may not have appeared. The fact that the performance gap is similar across all three domains, and that the trend in public and independent schools follows a 'communicating vessels' pattern (i.e. when the independent schools improve, the public schools decline and vice versa), leads to the conclusion that the general trend possibly results from non-malleable background factors such as the composition of the schools. Indeed, the performance gap between students in different schools increases specifically when differences in the socio-economic status of students in both schools become more pronounced (see the figure below).

FIGURE 53. GAP IN SOCIO-ECONOMIC STATUS BETWEEN STUDENTS IN INDEPENDENT AND PUBLIC SCHOOLS



Source: PISA data.

Note: the gap is computed as independent schools minus public schools.

Even though the analysis of the PISA data does not indicate that the increased support for independent schools has resulted in increased academic performance through the competition effect, existing studies analysing the results from national assessments or TIMSS do observe such an effect, even though it is modest (Sahlgren & Sanandaji, 2016). It is possible that a modest competition effect appeared due to the fact that the voucher system provides both independent and public schools with similar opportunities to become established and improve. Moreover, as funding depends on the number of students in a school, all schools may be motivated to improve their teaching to attract more students and gain more funding.

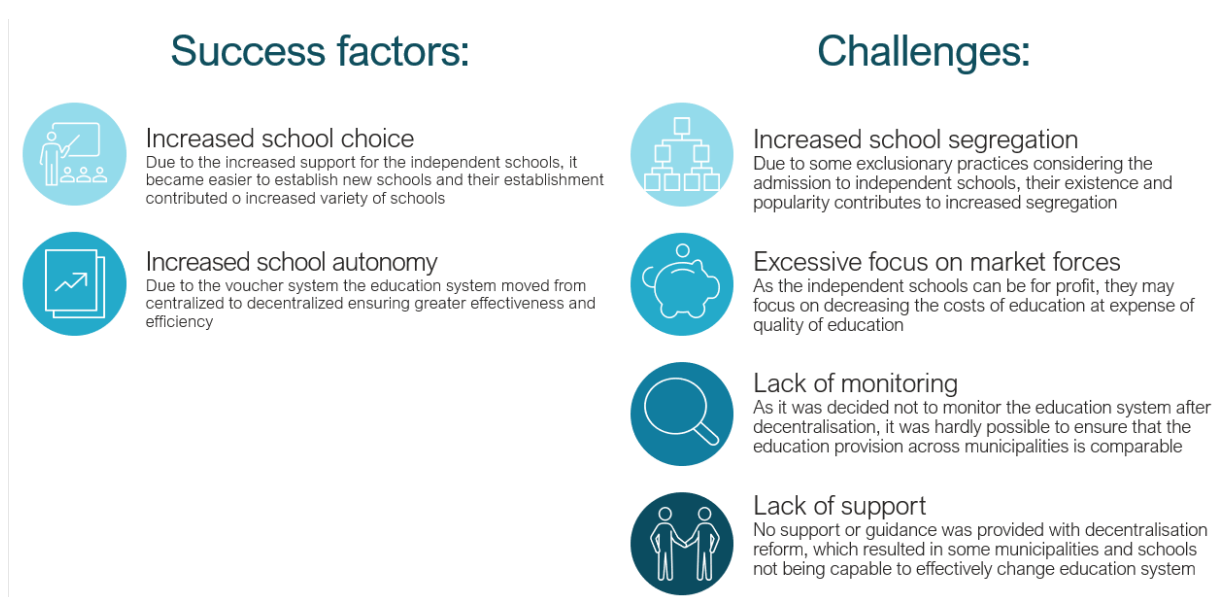
Existing studies also argue that the decrease in equity in Sweden's education system is the result of the increased popularity of independent schools. These schools tend to attract students from similar backgrounds and of a similar academic level, contributing to an increase in school segregation (Holmund, et al., 2014). A regression analysis constructed to analyse the differences between students in public and independent schools also shows that the differences in performance between students from public and independent schools are the result of the different socio-economic backgrounds of students in these schools. However, it is important to note that the available data do not allow us to test if the relation between increased support for independent schools and the increase in inequity is statistically valid¹⁸⁵.

Factors shaping the implementation of the reform

Support for independent schools in Sweden is seen as controversial. While the main objectives of the reforms were achieved, several negative developments in the Swedish education system are often seen as consequences of these reforms. The main success factors and challenges are presented in the figure below.

¹⁸⁵ Information gathered via consultations with relevant national stakeholders and experts.

FIGURE 54. SUCCESS FACTORS AND CHALLENGES INFLUENCING THE EFFECTIVENESS OF THE REFORMS INTRODUCING MORE SUPPORT FOR INDEPENDENT SCHOOLS



First, **the support for independent schools created favourable conditions for the creation of new schools.** The introduction of the voucher system for independent schools disrupted the monopoly that public schools had in the education system, and resulted in independent schools enjoying the same conditions as public schools, which decreased the costs and risks involved in opening a new independent school. This created conditions under which many new schools were opened, creating more possible choices for parents and students. This variety of schools also resulted in a greater number of different pedagogies and educational methods being available for students¹⁸⁶.

Moreover, **decentralisation and increased support for independent schools resulted in greater autonomy for schools.** Available studies on school autonomy do indeed find that increased autonomy can contribute to better-quality education and result in the better academic performance of students (Hanushek, Link, & Woessmann, 2013). The national stakeholders consulted also pointed out that while in some cases, local authorities and schools may have struggled due to a lack of support, due to their increased freedom and autonomy, some schools were able to develop new pedagogies and educational methods that benefit their students¹⁸⁷.

While decentralisation and increased support for independent schools have achieved their main objectives (to increase school choice and create conditions under which a greater number of different pedagogies can develop), the changes have also had some negative consequences, such as worsening equity in the education system.

First, **the characteristics of the independent schools increase the risk of exclusionary practices.** Sweden's independent schools cannot be selective. However, while every child automatically gets a place in the school closest to their residence when they are close to school age, students have to be registered on a waiting list for the available places at an independent school. While this registration is available to everyone, to gain a place in very popular independent schools, parents may have to register their

¹⁸⁶ Information gathered via consultations with relevant national stakeholders and experts.

¹⁸⁷ Information gathered via consultations with relevant national stakeholders and experts.

child for the school well in advance. Usually, only parents with socio-economically advantaged backgrounds have the stability needed to plan so far in advance and are sufficiently invested in their child's future to do so¹⁸⁸. This also automatically results in recently arrived immigrant students not being able to attend the most popular independent schools, as they were not in the country to register for the independent school.

Independent schools can also be run for profit, which may negatively affect the quality of the education offered. While independent schools cannot charge fees, they can reduce their costs to make a profit. For example, schools may have larger classes or higher a teacher-to-student ratio. This may negatively affect the quality of the education provided. Because the education system is decentralised and there is little monitoring, these negative effects may not be properly addressed¹⁸⁹.

Moreover, **it was hoped that through the liberalisation of education with the introduction of the voucher system, more small independent schools will be established.** Policy-makers hoped that this change would motivate small companies, organisations or private persons and would result in a range of different schools being opened. However, **because schools can be run for profit, multinational companies saw this new system as an opportunity, and began opening schools throughout Sweden.** These schools do not necessarily improve the education system in Sweden, as they may not introduce new pedagogies or educational methods. The funding of these corporate schools is also heavily criticised by the public¹⁹⁰. Available studies confirm this, as they find that even though the Swedish population values individual freedom and choice, eight out of ten Swedes perceive profit-making in the welfare sector negatively, and take a more radical stance against the marketisation of the education system in Sweden than most political parties (Lundahl, Arreman, Holm, & Lundström, 2013).

It is also important to note that decentralisation did not foresee a sufficient level of monitoring and evaluation mechanisms to ensure the effectiveness of the education system. According to the national stakeholders consulted, increased differences between schools were an unintended consequence of the decentralisation reform that resulted from a lack of monitoring. When the management of education was changed to provide more freedom to municipalities and schools, the central authorities decided not to collect any data about education. This meant that different municipalities and schools may have operated in their own way without being supervised, resulting in serious discrepancies between municipalities and schools. Once it was realised that a decentralised system without supervision might contribute to worsening equity in the education system, policy-makers introduced monitoring of the education system through national assessments in grades 3, 6 and 9. The national stakeholders revealed that future efforts to ensure closer monitoring will include the restructuring of National Agency for Education, which will open offices in different regions of Sweden to ensure that the Agency is closer to the schools and is better able to monitor and support them¹⁹¹.

A lack of support and guidance may also have resulted in greater discrepancies between municipalities and schools. Following the changes in education management, the central authorities aimed to empower municipalities and schools to create their own education systems and methods. Hence, it was decided to provide no guidance or support to municipalities and schools. However, it was hard for some municipalities to organise education on their own, and schools struggled to ensure that the education provided was of the same quality. As the national stakeholders revealed, the state is now trying to

¹⁸⁸ Information gathered via consultations with relevant national stakeholders and experts.

¹⁸⁹ Information gathered via consultations with relevant national stakeholders and experts.

¹⁹⁰ Information gathered via consultations with relevant national stakeholders and experts.

¹⁹¹ Information gathered via consultations with relevant national stakeholders and experts.

address this lack of support and guidance for schools. Measures to ensure this have included introducing clearer regulations for conditions in schools through changes in education law in 2010; more guidance to schools and teachers on how to implement the national curriculum when the new curriculum was introduced in 2011; and the restructuring of the National Agency for Education so that it will be able to better liaise with schools and support them¹⁹².

Lastly, **it is important to note that the public is not satisfied with the existing management of the education system in Sweden.** It is widely believed that profit as a motivation for schools is not bringing any benefits to society. The fact that large corporations are profiting from taxpayers' money is also not seen favourably. Consequently, there are a lot of public debates about how the system should be changed. It is possible that in the future, independent schools will have to operate on a non-profit basis, or that the system governing how students apply to independent schools will be changed to become more inclusive. However, no concrete changes are planned at the moment¹⁹³.

3.7.3.2. National assessment system

When it was decided to decentralise the education system in the 1990s, the central authorities discontinued any central monitoring of the education system and transferred all responsibility for the management of the education system to the municipalities. However, it was subsequently realised this was not efficient¹⁹⁴. Available statistics showed high discrepancies between the grades students achieved in schools and their results in high-stakes standardised national assessments. Students' results were also rather low (Skolverket, 2015). Moreover, while the results from standardised national assessments were gradually worsening, the grades students were getting in school gradually improved, which indicated inconsistent monitoring of student achievement by schools. Consequently, changes to the assessment system were introduced in 2011, together with the new national curriculum (see the Box below).

BOX 20. CHANGES TO THE STANDARDISED NATIONAL ASSESSMENT SYSTEM IN SWEDEN (2010-2012)

The changes to the assessment system aimed to improve central monitoring of the education system, and were introduced together with a new curriculum. It was hoped that these changes would contribute to the better quality of education and ensure better monitoring of students' academic performance. It was believed that teachers, parents and students required more information about students' development and progress, and the introduction of more frequent assessments could provide this information and thus contribute to ensuring a better quality of education. It was also hoped that the existence of a standardised national assessment system would help to identify and tackle existing discrepancies between schools and contribute to greater equity in the education system¹⁹⁵.

Before the introduction of the new curriculum, students were assessed in school years 5 and 9. However, it was realised that this system was not efficient. Because the new curriculum introduced more specific objectives in education, it was decided that a better system was needed to assess whether the outlined objectives had been achieved. Both the new curriculum and the new assessment system aimed to ensure that the main objectives of the education system were clearer¹⁹⁶.

The reform of the national assessment system was carried out between 2010 and 2012. The National Agency for Education was responsible for carrying out the introduction of the new

¹⁹² Information gathered via consultations with relevant national stakeholders and experts.

¹⁹³ Information gathered via consultations with relevant national stakeholders and experts.

¹⁹⁴ Information gathered via consultations with relevant national stakeholders and experts.

¹⁹⁵ Information gathered via consultations with relevant national stakeholders and experts.

¹⁹⁶ Information gathered via consultations with relevant national stakeholders and experts.

assessment system. In its planning, the assessment system took into account the experiences of other countries, particularly other Nordic countries. The planning of the change began in early 2010 with discussions and meetings with municipality officials and school principals. These focused on presenting the rationale behind the changes to the relevant stakeholders. It was hoped that these discussions would help the stakeholders to understand why the changes were needed and ensure their future cooperation with regard to the national assessment system. At the end of 2010, discussions and meetings with teachers were organised. These meetings focused on explaining to teachers the changes being introduced, and helping them to find ways to adapt their teaching practices. In addition, various support materials were made available online. In 2011, discussions and meetings with students and their parents were also organised¹⁹⁷.

Since 2011, student progress has been assessed via national tests in core subjects in the 3rd, 6th, and 9th grades. Two additional tests for 6th- and 9th-grade students in science and social science were also introduced (OECD, 2015, a). Under the new system, student achievements can be evaluated in greater detail, and their needs for support or intervention can be spotted earlier. It is also believed that having assessments in grades 3, 6 and 9 creates “checkpoints” that allow different schools to structure their teaching and learning schedules in a similar way. It means that schools will teach similar subjects and topics at particular educational levels, as they have to prepare their students for assessments. This also facilitates student mobility between schools.

In 2016, compulsory standardised national assessments were also introduced in the first year of school. Children in the first year of school are assessed on their development in reading and writing and understanding of numbers. A few years later, in 2019, compulsory standardised national assessments in mathematical thinking and linguistic awareness were also introduced in pre-school-classes. These compulsory assessments in mathematics focused on the knowledge requirements described for year 3, and in languages, on the knowledge requirements in Swedish and Swedish as a second language that are described for years 1 and 3, respectively.

According to the available evaluations, conditions in the education system were favourable for the implementation of the new assessment system and new grading. Due to the discussions and meetings organised with relevant stakeholders, schools and teachers were informed early on about the changes and had enough time to prepare for their implementation. In the event that they faced any challenges, they were able to ask for clarifications or support on aspects of the reforms that appeared unclear or difficult. However, differing conditions at local and school levels complicated the implementation of the new assessment system (Skolverket, 2015).

Teachers are responsible for assessing and grading their students. However, they are seen as being objective and are widely trusted. The National Agency for Education emphasises the importance of teachers in the assessment procedure and, consequently, in creating conditions for equal and fair assessment. Data from the assessments’ used to be publicly available online. The results were available at school level and, nationally, by gender or migration background. However, a few years ago a court in Gothenburg ruled that Statistics Sweden should not share the information on the composition of private schools, pupils’ backgrounds and results with the public or municipalities, due to privacy obligations. This significantly complicates the monitoring of the education system in Sweden (European Commission, 2021, f).

The purpose of the national tests has changed slightly over the years. Until 2017, the national tests supported equal and fair assessment and grading, providing a basis for the analysis of the extent to which knowledge requirements were being met at different levels, and contributing to the clarification of syllabi and the wider achievement of learning objectives among students. Since 2018, the role of the national assessments has been more limited. The assessments in school year 9, at the end of compulsory education, are seen as high-stakes, and the results of these assessments are used to admit students to upper-secondary education schools. In the assessments in school year 6, students already receive grades. However, these assessments are used only for monitoring purposes, and the grades received do not play a very important role in determining the future of the student. Assessments in the pre-school year, school year 1 and school year 3 are only used

¹⁹⁷ Information gathered via consultations with relevant national stakeholders and experts.

to assess if students possess the minimum standard of knowledge required. Students do not receive grades for these assessments, and the results of the assessments are only used to identify underachievers, so that they can receive the help they need¹⁹⁸.

In addition to the changes in the national assessment procedures, the internal assessment system was also changed in 2011 to enhance assessment practices in compulsory education (see the Box 21). Before 2011, grades were first introduced in year 8.

BOX 21. CHANGES IN THE GRADING SYSTEM IN SWEDEN

A new grading scale was introduced together with the new curriculum and new assessment system. This aimed to enhance assessment practices in compulsory education¹⁹⁹. The new scale comprises six grades from A to F, where A to E count as passes and F is considered as a fail. Under the new system, the grades are also introduced earlier – in school year 6, instead of school year 8 (Eurydice, 2020, g).

In the new internal assessment system, there are specified knowledge requirements for grades A, C and E, which specify what the students should be able to do for each grade at the end of school years 6 and 9. There are no knowledge requirements for grades B and D. These grades must be given when the requirements for the grade below (i.e. C or E) are satisfied entirely, but the knowledge requirements for the grade above (A or C) have been reached only predominantly. For other occasions when grades are given, specifically in the autumn term in grades 6–9 and spring term in grades 7 and 8, knowledge requirements are not specified. The teacher then must assess what is the reasonable level of knowledge that the student should have (Skolverket, 2015). The grading system is absolute, which means that in theory everyone can receive high grades. Teachers are consulted when setting the specific knowledge requirements for each grade²⁰⁰.

The new grading scale was introduced for similar reasons to the new assessment system. It was hoped that it would provide more guidance to teachers and students as to what is expected, and that with clear knowledge requirements, the new grading scale would help teachers focus more on the curriculum²⁰¹. A more subtle scale, in addition to providing clearer information to the students, also increases the clarity of teachers' assessments of students' knowledge. Consequently, it was foreseen that with this additional clarity in place, the grades rewarded in schools would be more accurate. Lastly, policy-makers also assumed that more grade levels would lead to increased student motivation. As the differences between grades became smaller and it consequently became easier to achieve a slightly better grade, more students were assumed to make an extra effort to reach the nearest higher grade, and so improve their knowledge.

One of the main reasons for the earlier introduction of grades was the important role of grades as information carriers. The idea was that by having grades earlier, it would be easier to spot any problems or difficulties a student might be facing earlier and, consequently, provide the necessary support and ensure more suitable conditions for the student's development at an earlier moment. This is especially important for students with learning difficulties or other challenges. Moreover, as grades were perceived very negatively by students in grade 9, it was hoped that introducing earlier grades would reduce some of the stress associated with grades²⁰².

The new assessment system and grading system, which were introduced together with the new curriculum, were regarded positively by teachers. Due to the discussions and meetings organised with relevant stakeholders, schools and teachers were informed about the changes early on and had enough time to prepare for their implementation and ask for clarifications or support on aspects of the reforms that appeared unclear or difficult. While the grading and the assessments were seen negatively at first by the public, their

¹⁹⁸ Information gathered via consultations with relevant national stakeholders and experts.

¹⁹⁹ Information gathered via consultations with relevant national stakeholders and experts.

²⁰⁰ Information gathered via consultations with relevant national stakeholders and experts.

²⁰¹ Information gathered via consultations with relevant national stakeholders and experts.

²⁰² Information gathered via consultations with relevant national stakeholders and experts.

importance was communicated clearly by policy-makers. At the moment, they are accepted by the public²⁰³. However, the available evaluations show that implementation has not been as smooth as expected. Differing conditions at local and school level complicated the implementation (Skolverket, 2015). Moreover, teachers faced difficulties in applying the new grading criteria, as the new knowledge requirements were not clear enough for them (Skolverket, 2014). It is also important to note that the assessments and introduction of grades were stressful for students. This, however, is monitored and taken into account when presenting the grades and assessments to students. For example, in school year 3, assessments are introduced as a part of casual learning and play activities to ensure that the children do not stress about them²⁰⁴.

Sweden also participates in large-scale international assessments. Sweden has been taking part in PISA since 2000. Participating in large-scale international assessments allows the national education system to be better analysed and comparisons to be made between the quality of education in Sweden and in other countries.

Observed effects of the reform

Existing studies show that the effects of introducing student assessments largely depend on the type of the assessment introduced. It is observed that standardised tests which compare outcomes between schools and students have the greatest effect on students' academic achievement. At the same time, internal testing that cannot be compared between schools and classrooms has no effect or a negative effect on the academic achievement of students (Bergbauer, Hanushek, & Woessmann, 2018). Even though the results from the assessments are not publicly available, the existence of the standardised assessments itself may still help keep schools accountable and ensure a better quality of education.

Sweden's results in the 2015 PISA cycle, which took place four years after the introduction of the national assessments, are significantly higher than its results in the 2012 PISA cycle. This may indicate a delayed positive effect of the introduction of national assessments. However, it is important to acknowledge that the Swedish results in the 2012 PISA cycle are uncharacteristically low. Hence, it is possible that the cohort participating in PISA in 2012 had specific characteristics or were affected by specific external factors that contributed to their low achievement, and that the cohort participating in PISA 2015 were no longer exposed to these factors, or did not share the same individual characteristics. If this were the case, the reforms implemented might be irrelevant to the changes in PISA scores.

Regardless of the effect of the changes on academic performance, the main objectives of the reforms have, at least to some extent, been achieved. The assessments aimed to provide more guidance to teachers and improve the monitoring of the education system. Assessments in grade 3 also aim to identify students who are underachievers, to ensure they can receive the support they need. According to the national stakeholders, these changes took place²⁰⁵. However, while these objectives have been achieved, it is important to note that the usefulness of the assessments for monitoring of the education system may be questionable. While a lot of information is collected during the assessments, not all of it is used. For example, the scores that students receive from the assessments in grade 3 are only used to determine whether or not a student passed the assessment. The scores the students receive for the different fields assessed are collected for this reason, but they are not used later for any comparative analysis and are not shared with any relevant

²⁰³ Information gathered via consultations with relevant national stakeholders and experts.

²⁰⁴ Information gathered via consultations with relevant national stakeholders and experts.

²⁰⁵ Information gathered via consultations with relevant national stakeholders and experts.

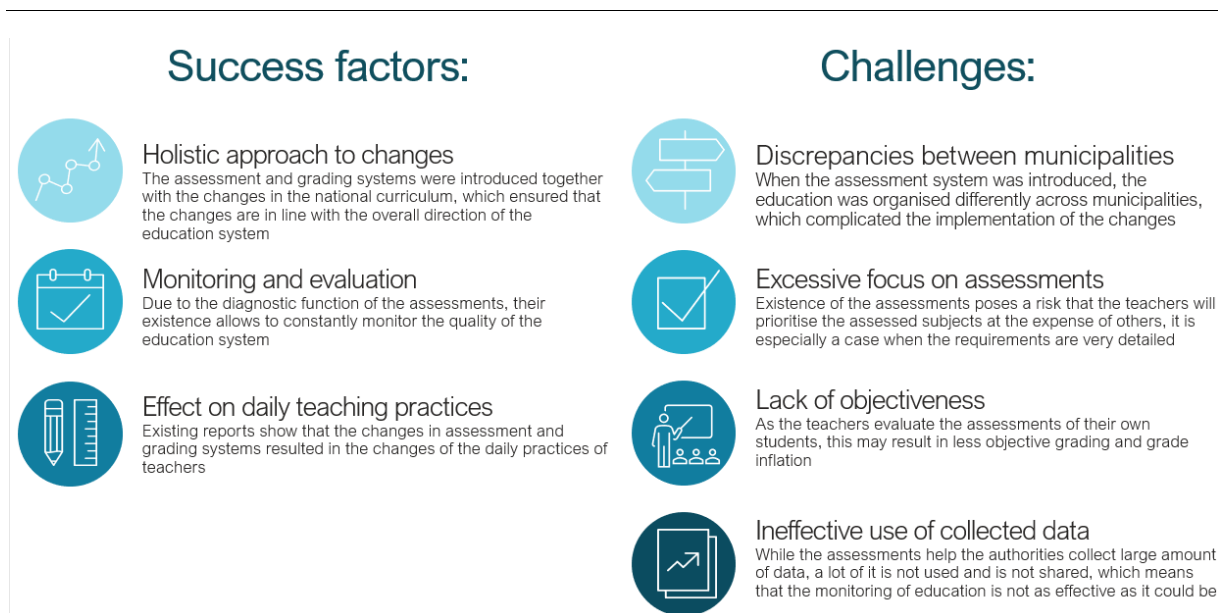
stakeholders. The data may be analysed at local level, but it is unclear how many municipalities actually do this, as it requires a lot of resources, and the results of such analyses, if they appear, are normally not available to the public. While information on whether a student passes the assessment helps to identify underachievers, these data cannot be used to observe how well education objectives are achieved. It is also important to note that, as teachers grade the assessments of their own students, grade inflation often occurs. In cases where grades are revised by the school inspectorate, they tend to be lower. Higher grade inflation is observed in independent schools²⁰⁶.

According to the national stakeholders interviewed, the new grading system may be useful for teachers and students, as it provides more information about the achievements of students. The knowledge requirements set can also be used to guide teachers as to what should be the focus of their teaching. However, as the grades are given internally by the teachers who teach the students, they tend to be higher than they should be, and can rarely be used for monitoring purposes to improve the quality of education. It is planned to shift to digital national assessments in the near future. After shifting to digital testing, it is currently proposed that the assessments should be evaluated centrally. However, this is not yet confirmed²⁰⁷.

Factors shaping the implementation of the reforms

It is hard to determine the effect the introduction of the new assessment system and new grading system had on students' academic performance. However, it is clear that most of the objectives set for these changes were achieved. The new system provided more guidance for teachers and ensured that education system could be better monitored. Several factors may have contributed to the potential effectiveness of the reforms. However, the new reforms still faced a number of challenges. The main success factors and challenges are presented in the figure below.

FIGURE 55. SUCCESS FACTORS AND CHALLENGES INFLUENCING THE EFFECTIVENESS OF THE CHANGES IN ASSESSMENT AND GRADING SYSTEMS



²⁰⁶ Information gathered via consultations with relevant national stakeholders and experts.

²⁰⁷ Information gathered via consultations with relevant national stakeholders and experts.

First, **the changes in the assessment system and grading criteria contributed to changes in daily teaching practices.** This means that the reforms actually affected students and their learning process. Consequently, the effect of the reforms is more likely to be long-term.

The existence of the assessment system and new grading scale also focuses a lot on identifying underachieving students, which ensures that these students get the support they need, in a timely manner. The assessments up to school year 3 focus specifically on identifying those students who are underachievers to ensure the necessary support can be provided for them. Moreover, even when grades are introduced in grade 6, in addition to providing information about students' level of knowledge, they also help to identify those students who are not performing well enough. This ensures that these students also receive the support they need²⁰⁸.

It is also important to note that shortly after the new curriculum, new assessment system and new grading were introduced, they were followed by increased support for teachers to ensure they are competent enough to implement the new changes. More specifically, shortly after the changes were implemented, in 2012, the second phase of the "Boost for Teachers" Programme was launched, providing more opportunities for teachers' professional development. The programme provided schools with funding for professional development activities and offered teachers a lot of support and guidance on how to follow the new curricula. Existing support for schools and teachers may be one of the contributing factors explaining why the new assessment and grading system were accepted by teachers. Moreover, the existence of this support ensured that schools and teachers were better able to implement the changes²⁰⁹.

Lastly, **the assessment system and new grading scale were introduced together with the new national curriculum, which ensured that the changes were in line with the general direction in the education system.** It is often a case that the national curriculum and national assessment system are introduced at different times, which results in discrepancies between the curriculum and the assessment system. Because the national assessment system and new grading scale were introduced in Sweden as a part of the new curriculum change, it was significantly easier to ensure that the assessment system was in line with the curriculum and is fit for monitoring how well its objectives are achieved²¹⁰.

The introduction of the assessment system and new grading scale also had some flaws. Some challenges occurred that may have hindered the effectiveness of the changes.

First, **due to the fact that the education system in Sweden is very decentralised and was barely monitored before the assessment system was introduced, the way in which education was organised differed between the municipalities.** This meant that it was difficult to introduce a unified assessment system. While in some municipalities, no changes or only minor changes to the provision of education had to be made in order to be more in line with the new curriculum and assessment system, in other municipalities a lot of changes had to be made²¹¹.

The introduction of the national assessments may also result in an increased focus on results in the education system. While this may help to increase academic achievement, it might also result in other important aspects of the education system, such as the promotion of student well-being, being overlooked. Excessively focusing on results

²⁰⁸ Information gathered via consultations with relevant national stakeholders and experts.

²⁰⁹ Information gathered via consultations with relevant national stakeholders and experts.

²¹⁰ Information gathered via consultations with relevant national stakeholders and experts.

²¹¹ Information gathered via consultations with relevant national stakeholders and experts.

might also mean that some topics and subjects that are not assessed, are likely to receive less attention during classes²¹².

Moreover, **excessive focus on assessment and the specific criteria set out in assessments may result in teachers focusing excessively on details when evaluating the students.** When the assessment system was introduced in 2011, it featured very specific criteria regarding how students should perform in order to receive a particular grade. As the national stakeholders revealed in consultations, very detailed assessment criteria could result in very strict grading. In some cases, if the assessment criteria are very detailed, teachers may focus on them too much and may not consider that a student may be generally knowledgeable but may have forgotten a specific word or fact on the test day or due to stress. Consequently, it became clear that the curriculum should be very detailed and set clear objectives, but that the assessment criteria should be slightly more lenient to account for times when students have the knowledge, but perform less well because of stress or external conditions. In such cases, it is likely that in their daily lessons, teachers will focus not only on the specific assessment requirements but also on other important aspects of education, such as competence development and the well-being of students. This challenge will be tackled by changes to the national curriculum that are intended to be introduced in the upcoming year. The new curriculum will provide more guidance for teachers through more detailed descriptions of educational objectives and more guidance on how to implement the curriculum. However, the new curriculum provides more generic and lenient requirements in the assessments, which will allow teachers to focus on a wider range of issues in the education system²¹³.

The assessment system may also lack objectivity, as the teachers who teach the students also evaluate their assessments. In general, teachers in Sweden are trusted with the evaluation of assessments, and it is believed that they are objective. However, the existing evidence shows that some grade inflation appears, particularly in independent schools. If the grades are reviewed by the school inspectorate, these tend to be lower than those awarded by the teachers. This indicates that there may be a lack of objectivity in teachers' evaluation of assessments, which makes it harder to compare the results of the assessments between schools, and may not show up existing problems in the system²¹⁴.

Lastly, **the information collected from the assessments is not used as effectively as it could be.** The assessments in school years 6 and 9 are graded and these grades are available to relevant stakeholders. This allows a better understanding of how well the students in these school years are doing. However, not all information is analysed at either central or local level. Moreover, the results from the assessments in earlier school years, such as school year 3, are not shared with the relevant stakeholders. As the main objective of these tests is to identify which students are underperforming, only information regarding whether or not a student passed the assessment is available. While this information is enough to identify underachievers, it means that the information collected is not being used efficiently. The scores the students receive for their assessments are still collected at a local level and could be used to better understand how well the goals of the education system are being achieved, and to analyse trends in students' performance. However, because grades are perceived as putting too much pressure on students, they are not awarded in lower school years, and the scores of the assessments are not shared with the relevant stakeholders. Moreover, it is important to note that the information available from the assessment is not analysed at central level. While municipalities can use it to better understand the educational achievement of local students, not all municipalities have the resources to use these data. The information from such analyses is normally not publicly

²¹² Information gathered via consultations with relevant national stakeholders and experts.

²¹³ Information gathered via consultations with relevant national stakeholders and experts.

²¹⁴ Information gathered via consultations with relevant national stakeholders and experts.

available, so it is hard to determine in how many municipalities such analysis actually occurs, or what its results are. The data are also not analysed at any other level. This means that these assessments are not used as efficiently as they could be to evaluate and monitor the education system²¹⁵.

Lessons for future education reforms in Sweden

The present analysis of Swedish education system focuses on changes in two specific education areas – the school system and assessment practices.

Each reform presented in the overview of Sweden took place under specific conditions that either contributed to its success or created specific challenges. While the specific conditions that contributed to success of the reforms may be hard to replicate when implementing other reforms, the overview of Swedish education highlights several important aspects that should be taken into account when introducing future education reforms. The important lessons learnt are as follow:

- **Monitoring of the education system is crucial to ensure that the objectives set are actually achieved, and that no serious inequalities appear.** Decentralisation and increased support for independent schools were introduced without any monitoring or evaluation mechanisms being foreseen. This may have contributed to the significant discrepancies in the education system that developed in the years following the changes. Consequently, the experience from this reform shows that monitoring and evaluation are crucial components of the education system and should be foreseen when planning any changes.
- **Support for schools and teachers is crucial to the effective and efficient implementation of reforms.** When it was decided to decentralise the education system, the municipalities and schools were left to figure out how to organise education by themselves. While this was done with the aim of empowering the municipalities to make decisions and organise education in the way that is best for them, many municipalities did not have enough resources or capacity to do so, and teachers did not feel they received enough guidance to ensure the provision of education that is similar in different places. Consequently, serious discrepancies appeared between municipalities and schools. Policy-makers later realised that this approach was not successful. When the curriculum was changed in 2011, a new assessment system and a new grading system were introduced along with it. These changes were followed by the “Boost for Teachers” programme, focusing on the professional development of teachers, as well as increased financial support for schools. The existence of this programme, according to the national stakeholders, is one of the reasons why the changes introduced were perceived positively and were implemented fairly successfully. This shows that the existence of support for local municipalities, schools and teachers is crucial when introducing new reforms. Teachers and schools are the actors that have to implement changes in their daily activities, which means that the effectiveness of the reforms will essentially depend on how well they are able to do this.
- **A holistic approach towards the changes can ensure better implementation and the wider acceptance of the changes.** The new assessment system and grading system were introduced together with the new national curriculum. This ensured that there no discrepancies emerged between what is planned in the national curriculum, and what is tested through assessments. In this way, it was

²¹⁵ Information gathered via consultations with relevant national stakeholders and experts.

easier for the teachers and students to understand the changes, and the implementation process was more effective.

4. What can we learn from the country reforms?

The previous chapter of this report described in detail the situation in seven EU Member States that have demonstrated improvements in their academic performance and equity, as measured by PISA. To that end, an analysis of the selected education reforms was performed, to assess the extent to which these reforms could have contributed to improvements in education, and to identify possible barriers to the greater impact of education reforms. This chapter attempts to distil down the most valuable lessons from the seven case studies, as well as from the wider literature on policy reform, to understand what drives – or impedes – the planning and implementation of education reform and the achievement of their intended impact.

On the one hand, it is important to highlight that ‘education policy implementation does not only refer to the strict implementation process but needs to be seen in its broader context’ (OECD, 2016, p. 6). Such contextual conditions shaping the reform implementation process usually refer to socio-economic factors, political climate, social and cultural characteristics, demography, the economy, and various other aspects of a country’s development. Moreover, differences in the institutional landscape, diverse educational systems and philosophy of education also indicate that similar reforms might lead to distinctly different changes (as visible in Table 9 below). All of these factors combined affect the ways in which an education policy is shaped and implemented. In the first part of this chapter, we reflect on the types of reforms and interventions most often undertaken by European countries in their quest to improve the quality and equity of their education systems. In the second part, we analyse what conditions are necessary for these reforms to achieve their intended impact.

TABLE 9. OVERVIEW OF THE REFORMS ANALYSED IN THE REPORT

	Reform	Effect	Why	Sources of evidence ²¹⁶
Education governance and structure				
BG	Introduction of obligatory pre-school education (2002)	Positive effect on student outcomes and equity	The introduction of compulsory pre-school for 6-year-olds targeted vulnerable children at least to some extent, and was accompanied by an additional set of measures (such as professional development, ECEC curricula). However, the effectiveness of the reform was hindered by rushed implementation and a lack of time to address infrastructure shortages and the financial costs associated with ECEC attendance by poorer families. These challenges are being addressed with a new iteration of the ECEC reform, which introduces mandatory pre-school education for children from 4 years old (adopted in 2020, coming into force in 2023/2024).	PSM (propensity score matching) and DiD (difference-in-difference) performed in this study US-based experimental study (Meloy, Gardner, & Darling-Hammond, 2019) Stakeholder consultations (interviews conducted in this study)
PL	Education system reform ('middle schools') (1999)	Significant positive effect on student outcomes	The education reform in 1999 focused on several important aspects of the education system. The main changes to the structure of the system were to move away from eight-year basic education provision to a new division separating primary (six years) and lower-secondary education (three years) levels. The delay of streaming and the extension of compulsory education are considered to be the most important and beneficial measures introduced by 1999 reform. It is also acknowledged that other changes, including the curriculum reform and changes to the national assessment system, potentially contribute to the gradual improvement of the quality of education and the academic achievements of students (Jakubowski, 2015).	PSM (propensity score matching) and DiD (difference-in-difference) performed by (Jakubowski, Patrinos, Porta, & Wiśniewski, 2016) Stakeholder consultations (interviews conducted in this study)
PT	School network reorganisation (2002)	Potential positive effect on student outcomes and equity	Due to the changing demographic situation in the country and the allegedly inefficient management of the school system, a measure was introduced in 2002 that aimed to improve the school network (closing small, underperforming schools and introducing school clusters). According to stakeholders, the reform potentially contributed to reducing school segregation and increasing academic the performance of Portuguese students between 2006 and 2009 through the optimised use of resources, as well as the increased accountability of schools, and the provision of more structured educational pathways for students. However, there is a lack of rigorous quantitative evidence on the effectiveness of the reform.	Stakeholder consultations (interviews conducted in this study)

²¹⁶ The intensity of the blue colour indicates the strength of available evidence (from more rigorous quantitative analysis to qualitative perceptions of the stakeholders consulted).

SI	Education system reform (1999-2003)	Potential positive effect on student outcomes and equity	The reform increased the length of compulsory education, introduced changes to the curriculum and the assessment system, increased the focus on inclusion in education, and promoted modern pedagogical approaches. The national stakeholders interviewed believe that the reform has had a positive effect on the quality of education and on students, as the share of the low-achieving students has decreased after the reform, and other improvements have been observed. Moreover, while inequalities in the education system persist, and marginalised students such as Roma do not have the same educational opportunities as students from advantaged backgrounds, segregation has decreased since the reform.	Stakeholder consultations (interviews conducted in this study)
SE	Decentralisation reform and change in school funding formula (1992)	Potential positive effect on achievement but negative effect on equity	Sweden began a large school decentralisation reform in 1992, transferring decision-making powers over the allocation of funds to municipalities and implementing a large-scale school voucher programme that led to the development of publicly funded but privately operated schools. The reforms aimed to improve the management of the education system, to disrupt the monopoly the public schools had, to provide more choice for parents and students, and to create an environment for innovation. Several studies have tried to assess the effect of the reform on school segregation and students' outcomes, finding moderate effects on segregation and limited effects on students' outcomes (Böhlmark & Lindahl, 2015), (Sahlgren & Sanandaji, 2016). However, the positive effect of this reform is not visible from the analysis of PISA data. Another study (Böhlmark, Holmund, & Lindahl, 2015) also supports the claim that the existing performance gap can be attributed mainly to the differences between students in different schools, as the studies do not find evidence that the voucher system may have contributed to the variation in students' test scores. (Tyrefors & Vlachos, 2017) point out a negative effect of students attending voucher schools instead of municipal schools at secondary level, with the effects being more negative for low-ability students. These results show that in certain contexts, school autonomy combined with school choice can have adverse effects on students' performance and equity	Regression models comparing internal and external evaluations of the exact same standardized tests by (Tyrefors & Vlachos, 2017) Stakeholder consultations (interviews conducted in this study)
Curricular reforms				
EE	Curricular reform and subsequent revisions (since 1996)	Potential positive effect on student outcomes	Estonia's national curriculum, and the high level of autonomy it provides to schools, is seen as important enabler of Estonian PISA success. The national curriculum reforms (which have been taking place since 1992) are deemed to be successful, as they introduced modern education concepts early on and followed a similar discourse throughout subsequent curricular changes. Existing studies on Estonia's performance in PISA list the curriculum reform of 1996, which introduced competences into the curriculum and greater academic autonomy to schools, as an important reforms that has potentially contributed to the high academic achievements of Estonian students (Tire, 2021).	Panel estimates from PISA by (Hanushek, Link, & Woessmann, 2013) on the positive effects of school autonomy on achievement in high-income countries Qualitative study on Estonian PISA success by (Tire, 2021). Stakeholder consultations (interviews conducted in this study)

LV	Curricular reform (2006) and accompanying ESF project 'Natural Sciences and Mathematics' (2009-2011)	Potential positive effect on student outcomes	Since regaining its independence, Latvia has tried to modernise its education system through new curriculum developments. The 2006 curriculum reform and parallel ESF project "Natural Sciences and Mathematics" are seen as major contributors to improvements in the quality of Latvian education. These changes are potentially linked to an increase in Latvia's mean PISA performance in mathematics and science between 2009 and 2012, and to a decrease in underperformers in 2012. As national stakeholders revealed in interviews, the curricular reform of 2006 focused a lot on the skills and knowledge tested in PISA. Consequently, it is widely believed that this reform has significantly contributed to the improvement in Latvia's PISA scores. Because the reform was also accompanied by greater autonomy for schools and teachers over curricular content, other studies (Hanushek, Link, & Woessmann, 2013) also link it to improved student achievement.	Panel estimates from PISA by (Hanushek, Link, & Woessmann, 2013) Stakeholder consultations (interviews conducted in this study)
PL	Curricular reform (2008)	Potential positive effect on student outcomes	The new curricula focused on expected learning outcomes rather than on detailed descriptions of what subject content teachers should cover. They also introduced cross-subject topics, emphasised applications, and left decisions to teachers over how some topics should be arranged over time. These changes also emphasised teacher autonomy, leaving more room for teachers to develop individual teaching programmes and the use of various materials. Existing studies (Jakubowski, 2021) argue that the improvement in Polish PISA results between 2009 and 2012 can be attributed to the introduction of the new curriculum in 2008. Closer analysis of the PISA responses shows that the higher scores of students in 2012 resulted from better responses to items measuring complex analytical thinking, at least when looking at scores in mathematics	Comparing PISA trends in Poland over time (Jakubowski, 2021) Stakeholder consultations (interviews conducted in this study)
SI	VET curriculum reform (2006-2008)	Positive effect on quality of VET system, but the effect on the academic performance is unclear	Changes to the VET system in Slovenia had already been implemented in the 1990s, following the country's transition from socialism. The reforms since the 1990s have focused on increasing the quality of VET education tracks, ensuring closer cooperation between education institutions and industry, and creating more flexibility in the system. The VET reform introduced in 2006 granted more autonomy to schools and teachers, which allowed them to tailor the curriculum to the needs and interests of their students and the need of the local labour market. The curriculum also introduced more academically oriented content, along with a focus on practical skills. The changes to the curriculum are potentially connected to improvements in the quality of VET education system and a decreasing performance gap between students in VET and academic tracks, according to stakeholders' perceptions. Existing studies also link greater autonomy with improved performance (Hanushek, Link, & Woessmann, 2013); however, more rigorous research is needed in the specific context of Slovenia.	Panel estimates from PISA (Hanushek, Link, & Woessmann, 2013) Stakeholder consultations (interviews conducted in this study)
National assessment and monitoring				
BG	Introduction of state matriculation exams (2003)	Potential positive effect on	An increase in mean PISA scores for Bulgaria in all three domains shortly after the introduction of external examinations indicates the potential success of the assessment reform. The main reasons for this potential success may have been the increased accountability of schools and teachers, and an improved evidence base for education	Empirical model based on the dataset of over 2 million students in 59 countries observed over six waves in the international PISA

		student outcomes	<p>policy-making. However, there are some challenges that may have negatively affected the implementation of the reform. These challenges point to the fact that Bulgaria does not yet have a well-developed and transparent culture of assessment. There are no statistical means to assess a causal relationship between the introduction of the assessments and students' achievements using PISA data, due to the great number of other variables that may have contributed to students' achievement. However, the plausible effect of this reform could be inferred from the available scientific literature, in particular the work of Bergbauer et al. (2018).</p> <p>However, while some argue that assessments work as a tool for accountability, others argue that there is little evidence that high-stakes assessments, which are significant for students' educational outcomes, can lead to educational improvement. It is argued that instead, assessments may even be harmful to students and may divert the focus of teaching away from a holistic approach to student development, to teaching 'for the test' (Koretz, 2017).</p>	<p>student achievement test 2000-2015 by (Bergbauer, Hanushek, & Woessmann, 2018).</p> <p>Stakeholder consultations (interviews conducted in this study)</p>
EE	National assessment and school evaluation system (since 1997)	Potential positive effect on student outcomes	<p>Reforms to the national assessment and internal school evaluation system have been indicated as one of the main reasons for Estonia's success in PISA (Tire, 2021). The existing system also helps keep schools and teachers accountable and motivated, and is seen as a monitoring and evaluation mechanism to ensure that challenges and education gaps are spotted in time. There are no statistical means to assess a causal effect of the introduction of the assessments on students' achievement using PISA data, due to the great number of other variables that may have contributed to the students' achievement. However, the plausible effect of this reform can be inferred from the available scientific literature, and in particular the work of Bergbauer et al. (2018).</p>	<p>Empirical model based on the dataset of over 2 million students in 59 countries observed over six waves in the international PISA student achievement test 2000-2015 by (Bergbauer, Hanushek, & Woessmann, 2018).</p> <p>Stakeholder consultations (interviews conducted in this study)</p>
PL	National assessment reform (2002)	Inconclusive effect on student outcomes	<p>The comprehensive reform of the education system in 1999 also introduced standardised national assessments at the end of all education levels – after grades 6, 9 and 12 or 13 (depending on whether a student follows the academic or VET track of upper-secondary education). The existing studies on Polish education system and its quality suggest that the standardised national assessments indeed created incentives for teachers to improve the quality of their teaching (Jakubowski, 2015). The assessments were seen as a way to provide feedback and inform learning, rather than to sort or rank students. There is a lack of rigorous quantitative analysis to understand the effects of the assessment reform on student outcomes in Poland; however, studies conducted in other countries suggest positive effects. However, stakeholders also report that the introduction of high-stakes standardised assessments may have reinforced a culture of 'teaching for the test'.</p>	<p>Empirical model based on the dataset of over 2 million students in 59 countries observed over six waves in the international PISA student achievement test 2000-2015 by (Bergbauer, Hanushek, & Woessmann, 2018).</p> <p>Stakeholder consultations (interviews conducted in this study)</p>

				Stakeholder consultations conducted by (Jakubowski, 2015)
PT	High-stakes exams in Portuguese and mathematics (2005)	Potential positive effect on student outcomes in math and reading	The system of national assessments in Portugal has changed over the years. While at the moment, the education system does not focus on high-stakes exams (though high-stakes exams in grades 9 and 12 still exist), in 2002 the new government introduced high-stakes exams in Portuguese and mathematics at the end of compulsory education. These exams were held for the first time in 2004/2005. The PISA data and existing studies point to a potential positive effect of these exams on the academic performance of Portuguese students in reading and mathematics (evident by an increase in Portugal’s PISA performance from 2006 to 2009). However, the prioritisation of standardised assessments may also result in teachers and schools prioritising the results of the exams over learning and inclusion in the education system (Marôco, 2021). This means that even though improvement in PISA scores is observed, it may not indicate an overall improvement in education in Portugal. Because two PISA domains – reading and mathematics – are tested in high-stakes exams, they may have become the focus of the teaching practices in Portuguese schools while other subjects may be neglected, according to the national stakeholders consulted.	Empirical model based on the dataset of over 2 million students in 59 countries observed over six waves in the international PISA student achievement test 2000-2015 by (Bergbauer, Hanushek, & Woessmann, 2018).
				Stakeholder consultations (interviews conducted in this study)
SE	Changes in assessment and grading system (2010-2012)	Potential positive effect on student outcomes	Due to a lack of monitoring in the education system and large discrepancies between the grades given to students in schools and their results in high-stakes assessments, as well as generally low results, Sweden’s national assessment system was reformed in 2011. Internal school assessment practices were also modified – grades were introduced earlier and were better defined. The aim of these changes was to ensure better monitoring of the education system and to provide more guidance for teachers on the objectives of the curriculum. The assessments in the early school years, such as school year 3, also aimed to help identify underachieving students at an earlier stage. These changes may potentially be connected with an increase in PISA scores in 2015, as suggested by studies conducted in other countries (Bergbauer, Hanushek, & Woessmann, 2018). However, the effect cannot be clearly defined. The potential effectiveness of the reforms may stem from the reinforced accountability and monitoring system, a focus on changing teachers’ practices, and coherence between assessment and the national curriculum.	Empirical model based on the dataset of over 2 million students in 59 countries observed over six waves in the international PISA student achievement test 2000-2015 by (Bergbauer, Hanushek, & Woessmann, 2018).
				Stakeholder consultations (interviews conducted in this study)
Equity and inclusion				
EE	Introduction of ‘Rajaleidja’ centres (2014)	Potential positive effect on equity	The introduction of Rajaleidja centres to support SEN students, their parents and schools is perceived by stakeholders as having contributed to greater inclusion in the education system (though this effect is not yet traceable in PISA). Bearing in mind the activities needed to support for students with SEN or students experiencing learning difficulties, analysis of these activities and their outcomes is scarce, and the effectiveness of such activities is questionable. In theory, such measures should result in an improvement in low achievers’ PISA scores. This improvement should also be greater than the improvement in the PISA scores of high achievers. However, this improvement is not observed in the PISA data. In 2015 and 2018, the scores of low	Stakeholder consultations (interviews conducted in this study)

			<p>achievers in all three domains were even lower or not significantly higher than in the previous PISA cycles, when the Rajaleidja centres did not exist. However, the percentage of SEN students participating in PISA is very low (LeRoy, Samuel, Deluca, & Evans, 2019). Consequently, it is possible that the effect of introduction of Rajaleidja centres is not visible in PISA as the target group of the centres is highly underrepresented in it.</p>	
LV	Introduction of Latvian as a language of instruction in minority schools (2004)	Lack of effect on equity and student outcomes	<p>Gradual transitioning to Latvian as the main language of instruction in ethnic minority schools has had mixed effects on student performance. While the initial flexibility offered to schools in choosing models of bilingual education seemed to positively affect the academic performance of Russian-speaking students (as measured by PISA), the requirement to take final exams in Latvian has negatively impacted exam results, and the subsequent reinforcement of Latvian instruction did not yield achievement gains among ethnic minority students (Ivlevs & King, 2014). The implementation of this reform was hindered by strong resistance from public (due to insufficient public buy-in and consultations), as well as limited support to the professional community in ethnic minority schools for the implementation of such a shift (lack of necessary teaching materials, professional development and language proficiency of educators). Minority schools remain formally separate from Latvian schools.</p>	<p>Analysis of data on 2002–2011 centralised exam results by (Ivlevs & King, 2014).</p> <p>Stakeholder consultations (interviews conducted in this study)</p>
				PT

Source: authors.

4.1. What interventions can help to improve the quality and inclusiveness of education systems?

Analysis of the PISA journeys and accompanying reform processes in the seven selected countries demonstrates that policy-makers have made, or continue to make, significant attempts in their quest to improve educational outcomes and school-level inequalities by implementing various sets of reforms. Generally, such reforms target:

- Structural changes to education system;
- Competence development, mainly through curricular reforms and accompanying assessment policies;
- Improvements to the equity of education provision;
- The strengthening of monitoring and evidence-based decision-making.

Assessing the effectiveness of these reforms and the direct causal links between interventions and student outcomes (and equity) proves to be a challenging endeavour, as further explained below. Table 9 demonstrates that it was only possible to test the effect of a few of the reforms using statistical models (in Bulgaria, Poland and Portugal), while the impact of other interventions could be only estimated on the basis of qualitative analysis and research conducted on similar reforms in other countries, which limits the plausibility of the conclusions, due to the highly contextual nature of reform success.

Structural changes to the education system

Given the various ways in which rigid school structures shape educational trajectories and consolidate educational inequality (see Chapter 2.2 and Chapter 3), some countries implemented fundamental reforms aimed at changing the structure and organisation of their education system. These included extending the length of compulsory education (e.g. Poland, Slovenia); investing in early childhood education and care (Bulgaria); reorganisation of the school network (Portugal); as well as the diversification of educational pathways (Slovenia, Sweden). The effects such reforms have led to are discussed below.

Over the last three decades, several structural education reforms have been implemented in Slovenia. **Moving from an eight-year to a nine-year compulsory education system**, education was divided into three education cycles. The introduction of a new structure for the education system further resulted in a greater focus on the inclusion of SEN students in regular schools, as well as greater focus on reducing grade repetition, assessment, curricula, and school autonomy. Since the early 2000s, Slovenian policy-makers have also defined specific strategic goals for the development of VET in the country (Republika Slovenija, 2004). Slovenia aimed to create a VET system that is in line with the needs of the society and of students, improving the quality of Slovenian VET education, providing greater flexibility for VET students, and facilitating transition between different types of schools (VET and general education schools), among others. The reform sought to minimise the differences between general and vocational education, and to increase the flow through upper-secondary education. This led to better educational progression and potentially resulted in the improved PISA performance of VET students, an increase in achieved vocational competences and a better employment rate among VET graduates (CEDEFOP, 2021). The case of Slovenia demonstrates that **the effect (positive or negative) on students' performance (as measured by PISA) of following the vocational track strongly depends on the context and attractiveness of the VET system in a country**. If VET devotes very little time to general education and academic competences, lower PISA scores are likely among VET students. But if the country's

education system is flexible, if there are bridges between the different educational pathways, students can easily change their educational trajectories (which was the focus of VET reforms in Slovenia). Segregation tends to occur when VET tends to attract students with lower SES, rather than students with a propensity for practice.

The **Polish education reform, with its transition to nine-year compulsory comprehensive schooling**, in which all expenses are covered and streaming is delayed, has been perceived as **a good way to keep educational inequalities to a low level** (Wojniak & Majorek, 2018) (Jakubowski, Patrinos, Porta, & Wiśniewski, 2016). The evidence shows large gains for low-achieving students and a large decline in between-school differences after the 1999 reform. However, the overwhelming evidence in support of the 1999 reform was not widely discussed until the current conservative government decided to change the system. Teacher trade unions drove large protests against the reversal of the 1999 reform, and were supported by groups of parents, researchers, and education experts. These succeeded in changing the views of some people. Surveys of public opinion showed that positive or negative views were closely related to political preferences and sentiment (Jakubowski, 2021). This demonstrates the way in which **education reforms can be highly politicised**, and may contradict the available evidence.

Bulgaria saw a substantial expansion of ECEC to mitigate the development of educational inequalities at early ages. Bulgaria introduced mandatory enrolment in kindergarten from the age of 6 in 2002, and from the age of 5 in 2010. Mandatory enrolment for 4-year-olds is planned for the 2023/2024 school year. Even though the general rate of participation in ECEC in Bulgaria has increased, Yosifor et al. (2018) note that parents often face challenges in enrolling their children in ECEC institutions, due to a limited number of available places in ECEC institutions, particularly in the capital region and in villages (the study is based on a survey of parents), as well as due to the associated costs, which families from vulnerable backgrounds cannot afford. **Despite the legal entitlement of families, municipalities often cannot ensure the provision of ECEC due to a lack of fiscal resources** (World Bank, 2013).

A large decentralisation of schooling which began in 1992 in Sweden, transferring decision-making powers over the allocation of funds to municipalities, and implementing a large-scale school voucher programme that led to the development of publicly funded but privately operated schools, also shows inconclusive results. Several studies have tried to assess the effect of the reform on school segregation and students' outcomes, finding moderate negative effects on segregation and limited effects on students' outcomes, (Tyrefors & Vlachos, 2017). **These results show that in certain contexts, school autonomy combined with school choice can have adverse effects on students' performance and equity.**

Operating fragmented school networks containing a large number of small schools, or facilities with significant over-capacities, can place a financial burden on education systems. Portugal responded to this challenge in the early 2000s by closing selected schools and transferring their students to nearby sites and forming school clusters. This reorganisation of the school network should, at least in theory, have focused on combating school failure, on closing underperforming schools. However, it appears that the main criteria used to decide whether a school should be closed was its size. Existing studies argue that despite a lack of clear and quantifiable evidence of a relationship between the reform and observed improvements, Portugal's school reorganisation reform has been very important and influential. While other countries in the EU have discussed a possibility of a similar reforms, only Portugal has managed to implement it on such a scale. The reform created conditions that could facilitate other measures, which focus on improving the quality of the education system (Rodrigues, Ramos, Félix, & Perdigão, 2017). **While the**

reorganisation of the school network is usually evaluated positively, it is important to note that evidence of its effect is scarce. For example, the national stakeholders consulted questioned its effect on the academic achievements of students.

Education policy has an important role to play in ensuring that school networks are sufficiently adaptable to guarantee their long-term efficiency and sustainability. Regardless of whether this goal is pursued through greater school collaboration, consolidation, or the expansion of capacity, advancing educational quality, equity and student well-being should be the guiding principle for any network reforms (OECD, 2018, c).

Curriculum and assessment reforms

Countries consider curriculum reform to be an important and necessary measure to enable schools to enter the 21st century and respond to a fast-changing world. Over the past two decades, many **EU countries have engaged in curriculum reform as a way to equip children with the knowledge, skills and competences needed for tomorrow.** However, how to initiate and implement such change in the most suitable and effective way remains somewhat of a challenge. **Curriculum reform** has long been considered from a 'top-down' perspective, but **has progressively shifted towards a more 'bottom-up' approach, emphasising the central role of teachers in the process** (Gouedard, Pont, & Huang, 2020).

The curriculum reforms reviewed in this study (in Estonia, Latvia and Poland) included some similar patterns, such as an emphasis on well-being, learner agency, the ability to solve problems and to navigate an uncertain world, accompanied by school and teacher autonomy in enacting and mediating the policy change. Greater school autonomy has been proven to be associated with improved student achievement (Hanushek, Link, & Woessmann, 2013), which is also observed in all three countries. Furthermore, as PISA studies focus on knowledge application and higher-order thinking skills, **reforms introducing competence-based curricula are also likely to improve student achievements (as measured by PISA), if they are implemented effectively and translated into classroom practices.** Jakubowski (2021), for instance, argues that the improvement of Polish PISA results between 2009 and 2012 can be attributed to the introduction of the new curriculum in 2008. Closer analysis of the responses shows that the higher scores of students in 2012 resulted from the better responses to the items measuring complex analytical thinking.

What can be also observed from the countries studied is that **curriculum reforms are demanding in terms of their implementation**, since they require changes in many aspects that may challenge existing beliefs and subjective realities deeply embedded in individual and organisational contexts. Factors such as **cost, uncertainty of outcomes, the risk aversion of stakeholders** (which triggered the reversal of the curricular reform in Poland) also **create additional obstacles** to initiating and materialising changes in the curriculum. **Buy-in and active engagement from teachers and schools as enactors and mediators of the reform**, as well as system level monitoring to support the national education strategy (as Estonian example shows), are important for the reform's success (Gouedard, Pont, & Huang, 2020). In addition, this requires high investments in training and capacity building for the teaching workforce and in schools to take up the new curriculum, as well as the development of new approaches to teaching and learning, and new material resources.

As the new curriculum aims to change what students should learn and what should be taught through the education system, it also calls for **review and alignment of the**

whole evaluation and assessment framework to bring coherence around the curriculum reform. However, as practice shows, not all countries manage to adapt their national assessment frameworks to new visions of competence and skill development, as can be seen in Bulgaria and Latvia.

In order to achieve better outcomes (including better higher-order thinking skills), examinations and national assessment must include assessment criteria measuring such skills, which the assessment reforms in Estonia and Poland managed to introduce. As seen above, decentralisation is important in improving the quality of education, but **decentralisation can be most effective when there are educational indicators (relevant assessment data) that guide teachers, schools and municipalities as to how well they are doing.** The main questions that can be raised in this regard are:

- Can teachers, schools and municipalities in EU countries receive quality feedback on their success in meeting PISA-type targets?
- Do national assessments or exams currently assess student achievement against PISA criteria?
- Is the culture of testing and education research in all EU countries sufficiently well developed to measure student achievement against PISA criteria, and to analyse country PISA data in depth, considering the specific needs of the country?

Where national assessment systems fail to consider these questions, it is less likely that ongoing educational reforms can be expected to lead to significantly better PISA outcomes.

Interventions targeting the equity of education provision

Education and training play an important role in making European societies fairer and more inclusive. Even though its effect may differ when interacting with other variables such as school factors, ethnic background or residence area, socio-economic-related inequality, and especially the family socio-economic background of students remains one of the critical determinants of academic achievement. The COVID-19 crisis has further emphasised the urgency of improving equity in education, as the shift to distance learning is likely to exacerbate existing inequalities. It must be emphasised that family background affects students' learning outcomes not only directly, but also through school choice policies. This is confirmed by the results of multi-level regression. These effects vary from country to country, due to both their different contexts and the quality of ongoing reforms. As a result, reforms must also take into account that families tend to increase social and academic segregation in early and general education, and that policy-makers need to mitigate this.

The policies captured by this study focus on a specific set of measures aiming to improve equity: delaying streaming (in Poland); introducing support networks for schools (Estonia); priority education policies and preventing grade repetition (Portugal) and addressing linguistic school segregation (Latvia).

Evidence on the effect of such interventions is inconclusive, due to limited monitoring of their implementation; however, insights from this study and the broader literature suggest that:

- **Delaying streaming into vocational education by one year could have a positive impact on student outcomes, as the Polish case shows.** Late tracking and streaming policies are proven to be more favourable for equity in student outcomes. Poland significantly improved its mean PISA score between 2000 and

2006. The performance improvement for such students was around 100 points between 2000 and 2003, and 116 points between 2000 and 2006. However, the benefits for students in the academic track or mixed schools were rather limited, but in any case not detrimental (Jakubowski, Patrinos, Porta, & Wiśniewski, 2016). This is in line with other research on the benefits of later streaming (Strietholt, et al., 2019).

- **Evidence regarding the impact of priority education policies** (such as the TEIP programme in Portugal), which provide disadvantaged students in a specific school or area with additional resources, **is mixed, in terms of both students' outcomes and equity**. The national studies attempting to assess the effect of the TEIP programme in Portugal found no positive results (Ferraz, Neves, & Nata, 2019), despite stakeholders' positive perceptions of the programme's effect on education equity. The same study also raised concerns about the programme prompting further school segregation and stigmatisation. In such cases, **projects such as the Rajaleidja support centres for Estonian schools**, which aim to address inequalities based on the individual, and provide guidance and coaching on tackling disadvantage at the request of schools, **might be more promising**, as they prevent the creation of negative school stigma. However, no hard evidence is available to prove a causal link between the introduction of these centres in Estonia and a decrease in school segregation.
- **Measures targeting language policies and ethnic desegregation can be very politicised** (as the Latvian case demonstrates), and need to be carefully planned and resourced. Gradual transitioning to Latvian as the main language of instruction in ethnic minority schools has had mixed effects on student performance. While the initial flexibility offered to schools in choosing models of bilingual education appears to have positively affected the academic performance of Russian-speaking students, the requirement to take final exams in Latvian has negatively impacted exam results, and the subsequent reinforcement of Latvian instruction has not yielded achievement gains among ethnic minority students (Ivlevs & King, 2014).

Strengthening monitoring and evidence-based decision-making

The education reforms discussed above are often accompanied by an increased understanding of the need for an evidence base and monitoring data to enable further educational improvements. Subsequent reforms attempt to **strengthen education monitoring and national assessment frameworks**. However, while the movement toward the use of evidence in education across Europe appears to be gradually asserting itself through political intent and initiative, it is yet to be systematically incorporated into the practices of the various Member States. To date, a large body of robust evidence comes from the US and UK, and less from European countries. The practice of 'evidence-based education' is even more rare (Pellegrini & Vivaret, 2021).

As a result, rigorously assessing the extent to which reforms and interventions work and achieve their intended outcomes proves challenging, due to **specificities of reform design** (e.g. a lack of built-in monitoring and evidence collection mechanisms in the reform process based on experimental research). They are also hampered by **limited available data on student achievements** (mostly of a cross-sectional nature), the analysis of which would allow causal inferences to be made as to the policy's impact.

Several countries across the world have started initiatives with the aim of enhancing the quality of educational research, and improving the relevance of research to practice. This has typically involved investment in:

- agencies for the coordination of educational research and innovation and the use of evidence in practice (e.g. the Swedish Institute for Educational Research in Sweden and INNOVE in Estonia, which was integrated into Education and Youth Authority in 2020)
- large-scale national research programmes to investigate issues pertinent to practitioners and decision-makers, including experimental and longitudinal studies (e.g. the Teaching and Learning Research Programme in the UK and the Life as Learning research programme in Finland); and
- research centres that conduct studies on priority issues at national level (e.g. Leading Houses for research into vocational training in Switzerland, and Learning Lab Denmark) (see, for example, Pellegrini & Vivanet (2021)).

Such investments are necessary in all countries, as the effects and design of education reforms are context-sensitive, which raises the issue of the external validity of evidence (Slavin, 2019).

4.2. Lessons for policy design and implementation

Reflecting on the available evidence from quantitative and qualitative research on the possible impact of educational interventions (depicted in Table 9 and discussed in Chapter 4.1), we can distil that reforms are likely to be more influential when they include:

- Interventions that focus on **both equity and quality** (e.g. ensuring access and the capacity of professionals to deal with vulnerable groups)
 - The cases of Estonia and Portugal demonstrate the importance of a long-term holistic vision on inclusion, integrated with accompanying measures targeting vulnerable groups
 - The case of Sweden demonstrates an important lesson on the oversight of equity when focusing on efficiency and innovation (the development of publicly funded but privately operated schools)
 - The cases of Bulgaria and Latvia demonstrate the oversight of quality when equity is prioritised only on paper (increasing access to ECEC for vulnerable children in Bulgaria, and the linguistic policy in minority schools in Latvia).
- Interventions that promote **competence development** accompanied by the alignment of national assessment frameworks to inform the translation of curricula into practice
 - The cases of Portugal, Poland and Estonia demonstrate how a comprehensive package of measures focusing on the holistic development of competences (both knowledge and skills) leads to long-term improvements in students' educational outcomes.
- **Measures to improve teachers'** and school leaders' competences to facilitate changes in pedagogy and innovation.
 - The cases of Estonia and Sweden demonstrate that timely support and the capacity development of education professionals facilitate policy design and implementation on the ground.

However, as qualitative analysis of the reform implementation processes across seven countries demonstrates, the way in which reforms are initiated and translated into practice defines the extent to which they can achieve their intended impacts. This section reveals the lessons that can be distilled for future education policy design and implementation.

Contemporary research, reflecting on the complexities of policy design and implementation in recent decades, emphasises the importance of re-examining our knowledge and understanding of which policies get implemented, and how to determine which policies do in fact work (Honig, 2006, p. 1). A growing number of scholars have pointed out that policy-makers should look beyond the simple implementation of policies, and should also be mindful of the conditions and contexts in which education policies are most likely to succeed (ibid.). Given that policy design and implementation are most critical aspects of the policy process, it is imperative to understand what general determinants lead to the highest success. Based on the analysis of education reforms in the seven countries and the broader literature, we have identified several such areas: 1) context-sensitivity; 2) inclusive design; 3) adequate time for planning and implementation; 4) coordination of on-going reforms and 5) ensuring an adequate delivery system.

Context-sensitivity

The national context must be considered as the broader field of design and implementation of any public policy, and especially education policies. Such factors may include the political climate, economic conditions, social and cultural factors, public opinion and many others.

For example, the case of Bulgaria highlights the importance of cultural factors: allegedly, “every social change meets resistance due to the specifics of the Bulgarian culture, which has a strong avoidance of differences” (Totseva, 2014, p. 131), and hence **at the stage of planning education reforms, policy-makers should anticipate some degree of public objection**. Indeed, the perception of the public regarding newly implemented education policy should not be underestimated.

Political structures have a demonstrable effect on how effectively policies are designed and implemented (Wales, Magee, & Nicolai, 2016). The Slovenian example shows that **political stability creates a climate conducive to successful education policies**, or having different political players with similar vision regarding educational goals. For example, according to the national stakeholders consulted, one of the important factors that contributed to the success of the 1996 education reform in Slovenia was the fact that there was no change of government before and after the reform, which allowed its **smooth planning and implementation**. In addition, the political leadership must rally public support to the vision for the education system promoted at a national level, in order to gain public approval. Several examples demonstrate the importance of public support. In Estonia, for instance, where education and higher educational attainment are perceived as very important among the population, reforms attempting to improve the education system are welcomed, creating an environment that facilitates the reforms and ensures better outcomes. Therefore, mechanisms to support the planning of educational reforms need to reflect a system’s governance structure; the roles it assigns to local, regional and system-level entities; as well as their respective capacity to carry out these responsibilities effectively (OECD, 2018, c).

Previous studies suggest that **reforms are more easily undertaken in ‘crisis’ conditions**. The exogenous shock involved is likely to be something that radically and abruptly alters perceptions of the system rather than an event that suddenly affects its ability to function. For example, the release of a highly publicised report on disappointing education outcomes or performance may engender a sense of crisis, not because educational outcomes have suddenly changed, but because assessments of those outcomes have. For instance, many studies often refer to PISA shock as a popular reform trigger in education (Wurzberg, 2010). This was indeed the case in Portugal. When Portugal’s results in PISA in 2000 were disappointingly low, it started a discussion about the Portuguese education system and the potential need for new education measures

(Crato, 2020). Low PISA results were used to legitimise some controversial reforms, such as the introduction of high-stakes exams, which to some extent shifted the focus from practical knowledge back to theoretical knowledge (Afonso & Costa, 2009). However, a continuous monitoring system showing less striking results (variations) but deeper insights is imperative.

Inclusive policy design

Changing pedagogical practices and the culture of education are demanding, long-term processes. Efforts to change teachers' practices might not yield the expected results if there is no involvement of teachers and representatives of schools in the phase of policy design, with the goal of creating a platform for the exchange of opinions and experiences. Openness to public discussion of the content of reforms, and a willingness to incorporate those voices into the final language of reforms, may prevent resistance such as the teachers' strikes in Bulgaria due to the education legislation in the 1991-2013 period (Totseva 2014). In other words, **it is imperative to create conditions for broad discussion about the education reform**, in order to incorporate the concerns and needs of teachers, as well as to understand the realities "on the ground".

There may be cases in which **liaising with certain stakeholders or groups may be challenging, despite efforts at open and inclusive policy-making that is responsive to the target groups of the policy**. This was the case in Latvia, when in 2004 Latvian was introduced as a language of instruction in minority schools. On the one hand, representatives of the Russian community claim that they were not properly consulted when planning the reform. On the other hand, international observers suggest that there were sufficient opportunities for consultation (European Commission for Democracy through Law (Venice Commission), 2020). This case is further complicated by the political and cultural context of the Russian-speaking community in Latvia, who felt discriminated against, and their identities threatened through this law (NPR, 2018, also see Hogan-Brun, 2006). Consequently, when amendments were introduced into education to further restrict or fully discontinue all Russian-language schooling, it sparked even greater opposition, manifested in protest rallies and growing tensions.

Inclusive policy design can usually be achieved through a series of consultations and discussions; including relevant stakeholders into policy design not only helps policy-makers to better understand the needs of the target groups, but it is also crucial to making informed decisions. The ESF project 'Natural Sciences and Mathematics' in Latvia is a prime example of inclusive policy design. Throughout the project's implementation, relevant stakeholders and experts were consulted not only on the activities of the ESF project, but also on the project's value and potential ways to improve the national curriculum introduced in 2006. We learnt from the national stakeholders interviewed that when pilot schools were chosen to implement this project and improve teaching practices in mathematics and natural sciences, teachers benefitted from intensive support and participated in frequent consultations to express their feedback and opinions.

The example of the ESF project in Latvia is also indicative of **the importance of support given to teachers, accompanied with autonomy and trust**, through which educators recognise their role as constructive for policy-making and feel included into the process of policy design. The experience of Estonian teachers in 2002 was the contrary: in Estonia, the curriculum reform in 2002 left less autonomy for teachers than the previous curriculum (Erss, et al., 2014), and resulted in teachers being less supportive of the reform and less motivated to contribute to its implementation, which in turn reflected negatively on the results of the reform. The subsequent curriculum revisions introduced greater autonomy for schools and teachers.

A multi-stakeholder approach is key to ensuring an inclusive policy design and the subsequent buy-in of the key actors implementing the reform. Given the variety of stakeholder groups that are crucial for inclusive and quality education, there is a need to understand the possible mechanisms and channels that allow relevant groups to meaningfully participate in different stages of education provision and the planning of education reforms. A great example of how sufficient inclusion of different stakeholders can benefit the implementation of new change (and education system in general) is the assessment reform in Estonia in the late 1990s and early 2000s. Several relevant stakeholders, including teachers, schools and universities, were involved in the development of exams. This helped to ensure that new assessment practices were in line with the needs of the different stakeholders and with the needs of the education system itself. These are especially key for curricular reforms, where teachers play a central role both as enactors and mediators of the policy (Gouedard, Pont, & Huang, 2020).

The literature discusses various typologies of engagement and participation: e.g. Pretty's "typologies of participation" (Pretty, 1995); Karl's "levels of participation" (Karl, 2002); Fung's "democracy cube" (Fung, 2006); and the OECD's "levels of engagement" (OECD, 2015). Most of these distinguish the following levels of stakeholder engagement, depending on the processes and intentions pursued: i) communication; ii) consultation; iii) participation; iv) representation; v) partnership; and vi) co-decision and co-production. However, as is visible from existing reviews and analysis of the reforms in all selected countries, **stakeholders are not often involved, and when they are, this usually happens on the first two levels of communication/public discussions and consultations.** Policy-makers need to build consensus regarding the aims of education reform, and actively engage stakeholders – especially teachers – in formulating and implementing policy responses. All political players and stakeholders need to develop more realistic expectations about the pace and nature of reforms to improve outcomes.

Adequate time for planning and implementation

Short political time horizons have been recognised as an inherent flaw of democratic systems, leading to myopic policy-making famously referred to as the "political business cycle" by William D. Nordhaus in 1975. Indeed, even today it is all too common for national governments to engage in planning for the duration of their time in office, sacrificing or altogether ignoring long-term perspectives and goals. In policy-making, this leads to a **hasty phase of policy planning, speedy implementation and a clear bias favouring short-term results.** Recognising this shortcoming, the European Commission issued a Toolbox (European Commission, 2017) for public policy practitioners, emphasising the importance of forward thinking, over horizons of at least 10-20 years. While practising foresight necessitates adequate time, it is necessary for the successful implementation of policies:

Foresight uses the latest scientific evidence and futures analysis to address complex issues and provide strategic options for policy. The need for anticipatory functions in governments comes from an increased awareness of the complexity of issues that policy must deal with, which requires a holistic and systemic approach and broader policy horizons. (European Commission, 2017, p. 34)

On the one hand, the planning and preparation phase allows the careful examination of education reform precedents, both within the country and beyond, as well as learning from previous experience and anticipating challenges, while also considering the existing contextual factors in the given country. On the other hand, long-term vision also enables the continuity of reforms, preventing abrupt modifications and assuring smooth change. For example, when education reforms took place in Poland in 1999, they were preceded

by an **assessment of similar good practices from other countries**. As a result, foreign expertise was adapted to the national context with some adjustments, and policy-makers were able to learn from the challenges faced by other countries, and anticipate these. This reform was followed by another set of reforms in 2008 that focused on curricular changes. These built upon the curriculum introduced in the framework of the 1999 reform to assure continuity, yet also introduced changes to improve and modernise the curriculum. The example of Poland also demonstrates that **reforms may generate positive results only after some time**, and it is key to plan monitoring over several years. The case of Portugal (and specifically the TEIP programme) demonstrates how an **intervention can evolve based on the principle of 'trial and error'**, learning lessons for further iterations of the programme. The TEIP programme in Portugal was mainly inspired by a similar French programme, "Zones d'Éducation Prioritaires". Initially, the effect of the programme appeared to be limited, and it was discontinued in 1999. However, in 2006 the programme was reinstated (TEIP2). Portuguese policy-makers attempted to learn from the challenges of the first reform, and promoted gradual implementation in three separate stages, with additional schools joining at each subsequent stage. While the TEIP programme is not without its critics and inconsistencies, it is positively perceived by the majority of stakeholders. .

Another example that illustrates the importance of leaving adequate preparation time is the 1996 reform of the structure of education in Slovenia. While the changes to the education system were announced in 1996, they were implemented between 1999 and 2003, **leaving time for schools, teachers and other relevant stakeholders to prepare for the changes**. The reform was substantial, increasing the length of obligatory education from eight years to nine, and introducing changes to the structure of education, necessitating time to prepare for an increased number of students, to teach them within a new system, and to prepare new educational materials in line with the new educational structure. Furthermore, the reform relied on international good practices, inspired by experiences from Sweden and the UK. Analysis of good practices allowed the policy-makers and stakeholders to better understand the enabling factors and possible challenges. Moreover, key stakeholders were consulted during the conceptualisation and design of the reform. While this resulted in a lengthy process, it also ensured that the reform had a strong evidence base, was well developed, and properly took into account the opinions of various stakeholders.

Lastly, the case of Estonia illustrates the **importance of contextualising new educational reforms within the existing landscape of educational policies, creating synergies and mutually strengthening the effects** of these policies, as well as, importantly, assuring a long-term vision. To this end, time needs to be set aside to evaluate and understand the policy context into which new reforms are to be introduced. The education reforms in Estonia are a great example of the compatibility of reforms with the general direction of education policies – namely, that of forward-looking, evidence-based and innovative teaching with a focus on digital skills. Since regaining independence, Estonia has focused on creating a modern and efficient education system that prepares pupils to succeed in the modern world. All the education reforms introduced have strengthened this vision, delineating and strengthening an overall goal that defines the education system, and prioritising long-term thinking in education policy.

Along with this continuity, **political leadership, and stability in vision across political cycles** is important in advancing a reform. For instance, a critical element in the foundation of the successful VET reform in Slovenia was the strong role that education authorities played in setting the direction of the reform and creating incentives and means for various stakeholders to support it. Nesting the reforms within a coherent long-term strategy for institutional development that was in turn synchronised with the trajectory of the country's economic development was a key success factor. The reverse effect of a lack of leadership

and of effective management, which impedes smooth reform implementation, can be observed in Portugal at the outset of its initiative to reorganise the country's school network focusing on the clustering of schools in 1997. The legislative framework introduced envisaged the aggregation of schools as an initiative led by the schools themselves. Consequently, there was no clear timeframe for the reorganisation of schools into clusters, which resulted in very slow progress.

Overall, ensuring adequate time for the planning and implementation of policies should thus serve at least three goals: 1) conducting thorough research about similar educational reforms (in other countries or in the local context) to learn from their experiences and anticipate challenges, as well as possible short-term and long-term outcomes; 2) ensuring some continuity and synergies between the newly introduced policy and past policies; 3) understanding the national context, which may alter the implementation of the policy. When any of these elements is overlooked or rushed, it may negatively affect the success of the policy.

- Timing and planning are relevant to education reform in at least two senses: there is a substantial gap between the initial cost of the newly implemented reform and the point at which the possible outcomes of the reform materialise, which must be taken into account when planning the implementation of the reform. The sequencing of different components of reform can be important, if one element – curriculum reform, for example – requires prior reforms in pre-service and in-service training in order to be effective (Wurzberg, 2010).

Coordination of reforms

The multi-level governance of education systems makes coordination of reforms particularly important. As can be seen from earlier examples, **co-ordinated reforms in different parts of a system have proven to be mutually reinforcing**. This was the case in Poland when introducing comprehensive education system reform in 1999. Several specific measures, including changes to the education system's structure, as well as curriculum reform, the introduction of new assessment system, and improvements in teacher training, were introduced simultaneously. This consequently resulted in a complex chain of transformations in the Polish education system (Jakubowski, 2021).

However, as education systems involve multiple levels of government, implementation of a 'comprehensive reform' may be **difficult to co-ordinate across different levels** of the administration, and **across multiple regional and local jurisdictions**. This problem was encountered in Sweden when introducing the new assessment system in 2011. After the decentralisation reform in the 1990s, Swedish central authorities discontinued any monitoring and evaluation efforts at a central level, and did not offer specific guidance to local authorities in managing and organising the education system. This resulted in different municipalities developing different educational practices, and widening discrepancies between regions. Consequently, it was very challenging to introduce a new assessment system, as it suited education practices in some regions but not in others. This **lack of cooperation between the municipalities themselves and with central authorities complicated the implementation** of the new assessment system at the beginning. In the case of Bulgaria, it also proved challenging to synchronise national measures regarding compulsory ECEC with the municipal practices of ECEC financing, which resulted in infrastructure shortages and the needs of the most vulnerable children being overlooked. Similarly, in Latvia, national reform of language policy in minority schools (Latvian gradually becoming the principal language of instruction in all schools in Latvia) was not coordinated with both national and municipal efforts to equip pre-service and in-service teachers with the necessary tools and competences to shift their classes to

the Latvian language, which *de facto* resulted in lower educational outcomes of students in language minority schools. Obviously, the reform also has been perceived rather controversially in Latvia, and has met with significant resistance from minority communities, due to the sensitive relationship between language and identity in Latvia, stemming from the Soviet period.

In the light of these examples, existing research highlights that overcoming resistance to reform can be ineffective if systems do not have the know-how and adequate institutional arrangements to support the integration of the new tasks and the responsibilities inherent in the reforms (Wurzberg, 2010), as happened in Latvia. Another example of stakeholder capacity is the implementation of *matura* exams and national assessments in Bulgaria. Even though policy-makers assessed foreign good practices and consulted with the public when designing and planning the new system, the current assessment system is widely criticised and is seen as inefficient. According to the national stakeholders consulted, some of the main reasons for the ineffectiveness of the assessment system is the lack of a culture of testing in Bulgaria; the inexperience of policy makers and education practitioners with assessments; and a lack of available resources. This shows that for **reforms to yield results, they require significant investment in staff development, or the clustering of reforms to build up capacity in related institutions.**

It is evident that the responsibilities of institutions and different levels of government vary between countries, as do the relative importance and independence of non-public providers. **Reforms need to take into account the respective responsibilities of different actors, and ensure their effective involvement.** The 'Rajaleidja' (Pathfinder) nationwide specialist support network for schools is a good example of such efforts to coordinate between expertise and support centres, schools, and municipalities. On the other hand, during the first reiteration of the TEIP programme in Portugal, the lack of such a coordinated effort resulted in fragmented and inefficient implementation. The vision of the programme was for the central education administration to reduce its role, and for local actors to become responsible for identifying and addressing the various problems relating to social and educational inequalities. It was also hoped that the programme would facilitate the establishment of local partnerships (Barbieri, 2003). In practice, this resulted in school clusters becoming responsible for addressing issues relating to social and education inclusion, and other local actors having limited space and capacity to intervene and support.

Effective implementation of reforms also depends **on the consistency of the reforms' objectives, and their relevance to overall education policy.** Firstly, while recent reforms have shifted the focus from expanding access to education to raising quality, the planned measures may not always suit the purpose. Even though the Latvian language was partly introduced into minority schools as a language of instruction to ensure greater inclusion for students from ethnic minorities, language-based school segregation still remains an important problem (Kalniņš, 2004), possibly due to a lack of additional measures necessary to tackle segregation in education. Moreover, **there is a growing focus on assessment systems as tools for monitoring and competence development, though in practice they are still often used as instruments of rating and control.** For instance, as a result of assessment reform in Bulgaria, regular assessment studies are now conducted. However, the interviews with national stakeholders demonstrate that the assessment data are not adequately used for educational monitoring and improvement. This can be explained by a lack of pre-conditions relating to the reliability and relevance of the information provided, as well as to the financial and technical capacities of education policymakers.

Assessment practices are important in shaping teaching and learning. Therefore, a particular assessment policy at national and school level can indicate what type of learning

is important, and which aspects of learning require more time and effort to be devoted to them. Changes in assessment can therefore structure teaching priorities and methods, and in turn, impact what and how learners learn. Therefore, **it is key that curricular reforms are accompanied by reforms in assessment, to ensure that competence development is implemented consistently as foreseen in the comprehensive reform package.** Great examples of this are the changes in the assessment systems in Sweden and Estonia, which were implemented together with curricular reforms. These curricular reforms introduced several important changes to the education system, and implementing changes to the assessment system at the same time ensured that the new system could properly assess the objectives of the new curriculum. This allowed teachers to better understand what was expected of them, and to receive more accurate information from the assessments on how well the new education objectives were being achieved.

Building a culture of assessment that supports student learning is a powerful tool to encourage innovation within the system and the development of competences (European Commission, 2018). In such a culture, assessment is seen as an integral part of any teacher training process or instruction activity in schools, not as a tool for control. **A performative culture that emphasises standardised learning outcomes and accountability pressures tends to create incentives for schools and teachers to focus on those areas of curriculum that are measured by high-stake tests,** and to pay less attention to the development of other skills and alternative assessments (Bonner, Torres Rivera, & Chen, 2018) (Hipkins & Cameron, 2018). A positive lesson can be learnt from Estonia, where external national assessments, besides measuring a set of traditional competences, also focus on the development of life skills and the well-being of students. Since 2018, a survey assessing the well-being of students has been administered annually to students in grades 4, 8 and 11. Such assessments are seen as very useful for providing the necessary data for school improvement (Doumet, 2021). They can help to ensure that the education system not only focuses on testing theoretical knowledge, but also on other important aspects of the education system, such as the well-being of students.

To be able to use them to inform learning, it is key to understand a country's national assessment measures. For instance, the international PISA, TIMSS and PIRLS surveys address different aspects of the curriculum. The TIMSS scores for Bulgaria and Portugal are much better than those in the PISA survey, as the curriculum in these countries is more traditional and focuses less on competence development. Therefore, if the aim is to improve a country's PISA scores, **curricular and assessment reforms focusing on competence development are detrimental** (as can be seen in Poland and Estonia).

Lastly, there appears to be continuing **tension in education systems between a focus on quality and a focus on equity.** While some countries (e.g. Portugal and Estonia) have managed to effectively unite these objectives into a comprehensive set of complementary measures, in others one may suffer at the expense of the other. For instance, the increased support for independent schools in Sweden, while to some extent promoting innovation and raising educational standards, is also likely to have resulted in increased school segregation.

Ensuring an adequate delivery system

Given that reforms are often accompanied by measures designed to ensure compliance, such as tests, inspections and financial penalties, they tend to promote a culture of punishment and lead to unintended consequences (Bolden & Tymms, 2020). A more constructive approach may instead be to **promote a culture of experimentation and learning, motivating, incentivising and supporting stakeholders** to implement

policies to the best of their abilities, and rewarding high performers and worthy results rather than punishing low performers. Such incentives and support measures may take various forms, such as the provision of professional development and guidance materials, ensuring adequate funding mechanisms, and building effective monitoring systems.

Support for teachers and schools

It is important to recognise that the implementation of education reforms rests on schools and teachers, who have to introduce the changes in their daily practices (Adey, 2004). Existing evidence shows that **focusing on changing teachers' daily practices by, for example, providing teachers with new knowledge and new tools, will have an effect on student learning**. If the measures introduced ensure support for teachers through training and the provision of the necessary educational materials, the impact on students' learning is likely to remain even after the support is no longer available (Timperley, Wilson, Barrar, & Fung, 2007). US education research suggests that **education reforms often fail due to teacher burnout** caused by poorly planned and implemented policy interventions (see, for example (Cottongim, 2012)). With pressure being placed on schools by the COVID-19 pandemic and an aging teacher population in most EU countries, the risks of burnout are increasing.

Consequently, it is crucial to ensure that schools and teachers are supported and motivated through the provision of necessary resources, materials and training, as the examples of Slovenia and Latvia demonstrate.

In the first phase of the education reform in Slovenia that began in 1996 and involved a transition to nine-year education system, schools were comprehensively supported by the national authority, through the provision of training for teachers, assistance in the preparation of educational materials, as well as ensuring the resources and funding necessary for the reform's implementation. At the same time, progress towards implementation within schools was closely monitored by the authorities. Overall, implementation was deemed efficient and tangible improvements were made to the quality of education as a result of the reform. In comparison, those schools that implemented the reform at later stages did not benefit from a similar support system, and their progress was not closely monitored, resulting in greater pressure on schools and teachers and poorer outcomes, according to the national stakeholders consulted.

In **Latvia**, the 2006 curriculum reform foresaw support measures to schools and teachers. For instance, new textbooks were developed, and guidance and support was provided to schools. Initial teacher training integrated information on modern student-centred pedagogical approaches as well as the development of transversal skills and competences. In-service teachers were able to attend continuous professional development that focused on modern pedagogical approaches and the development of skills and competences.

Investing in teachers and their capacity to innovate and support quality and equity in their classrooms and schools should be an integral element of every comprehensive reform package. In light of this, **cultivating a culture of innovation, evidence-based practice and networks to support expertise is an important enabling factor** for the success of education reforms. The **Swedish** National Agency for Education plays a key role in providing professional support – resources, systematic training opportunities, improving the research capacity of teachers. In an evolving understanding of the role of teachers – from mere consumers of research to producers or mediators of knowledge – recent efforts have been made to stimulate multidimensional interactions between educational research and practice (Pareja Roblin & al, 2014). One way to facilitate collaboration between teachers and researchers is via teacher communities ('professional learning communities', or 'teacher learning communities') (Vieluf & al., 2012). **Estonia** prioritised teacher

development as an important determinant of educational innovation, and encouraged the development of such professional learning communities. The overall vision of the strategy is for teachers to use analytical thinking and empirical problem-solving methods, so that they become familiar with and make use of the most recent research on teaching and learning, enabling them to evaluate the efficiency of their working methods and participate in research. To make the strategy work, the Estonian Ministry of Education and Research launched programmes financed by EU structural funds, including **a programme to support teachers' professional networks**, Eduko (2008-2015)²¹⁷, which aimed to support education sciences in Estonia and to train a new generation of education researchers and teacher educators. The country has implemented various initiatives aiming to facilitate digitalisation of education system and improve digital skills of students and teachers (Hariduse Infotehnoloogia Sihtasutus, n.d.). In the view of education stakeholders, good IT infrastructure, digital curricula and a high level digital literacy among teachers are undoubtedly important factors in Estonia's success. This has also been demonstrated by the fairly smoothly managed transition to remote learning during the COVID-19 pandemic in Estonia.

Ensuring adequate funding

Sufficient investment is necessary in the key policy areas underpinning national reforms and modified education strategies in order to strengthen the process of their implementation. A lack of adequate resource allocation for ECEC reform in Bulgaria was the key obstacle to the achievement of greater intended impact. Bulgaria introduced compulsory pre-school education gradually. Yet, adequate funding was not provided to municipalities to address logistical and infrastructural challenges. As a result of this lack of resources, preparation of ECEC teachers and institutions was inadequate, and ECEC attendance in Bulgaria remains relatively low (European Commission, 2020). Furthermore, despite the compulsory nature of the pre-school year, low municipal education budgets meant that access to ECEC was not ensured for children from poorer families (e.g. by means of targeted financial support or ECEC fee waivers) (Bulgaria Ministry of Education and Science, 2015). (RECI+, 2020).

Monitoring and evaluation mechanisms

The monitoring and evaluation of education policies and practices helps to regulate the desired levels of quality in educational outcomes, to hold educational service providers accountable, to support ongoing improvements in education (Glas, Scheerens, & Thomas, 2006), and to maximise the effectiveness of public investments in education. Monitoring and evaluation generally help to generate evidence for collective stakeholder reflection on past performance and for the agreement of new, potentially innovative initiatives that can address the weaknesses identified.

Monitoring and evaluation should be both external and internal – these are complementary and mutually reinforcing. External procedures mostly help to ensure quality and make schools more accountable (Brečko & al., 2014). At the same time, research evidence shows that thorough and systematic self-evaluations help schools to improve (Glas, Scheerens, & Thomas, 2006). While there is a broad consensus that monitoring and evaluation of school performance is needed, existing systems vary considerably.

In **Estonia**, since the introduction of the external assessment system, the development and implementation of assessment have been coordinated by the National Examinations

²¹⁷ See: <https://www.eksperimenta.net/eduko-2/>. Accessed 7.12.2021.

and Qualifications Centre under the Ministry of Education and Research. The National Examinations and Qualifications Centre was merged with Foundation INNOVE in 2012 and later became a part of Education and Youth Authority of Estonia in 2020. Consequently, the coordination of the exams is now the responsibility of the Education and Youth Authority of Estonia. Internal self-evaluation of schools has been compulsory since 2006 to ensure that the quality assurance system is in good balance with the autonomy provided to schools and minimised control or inspection by central government. Schools are required to draw up a self-development plan, which is a benchmark that sets the development goals and plans of the school for a period of three years (Tire, 2021).

In **Poland**, a new curriculum focusing on learning results was introduced in 2008, and in 2009 a new data-driven system of school evaluation replaced the old system of school inspections. These two changes appear to be crucial to further improvements in the results of Polish students. The new school evaluation system has been gradually introduced since 2009, and replaces the old overly bureaucratic system of inspections. The new system provides reports that are made publicly available, although its main goal is not accountability but the improvement of teaching and learning. The system is based on visits by assessors, but is supported by self-evaluation tools. It is also data-driven, as the assessors, teachers and school principals can benefit from numerous research tools that provide quantitative and qualitative information about students, teachers and parents. Although the system is still changing, it already provides the feedback necessary to improve the quality of teaching. Together with the national system for professional development, it provides strong support for teachers (Jakubowski, 2015).

Generally, some data are collected on the inputs, institutions, processes and outcomes of education systems across Europe. This includes, for example, education statistics, monitoring data on European education systems collected at EU level, international assessments of students' learning outcomes, and standardised testing at national and international level. However, evidence from the country analyses shows that, apart from a few examples, there is a **lack of policy evaluation and evidence-based research across European school education systems**.

Analysis of the selected reforms demonstrates that education systems often lack the capacity to effectively use and interpret monitoring data. Only a few countries have introduced policy initiatives with built-in monitoring and evaluation systems based on hard evidence. The examples of the TEIP and National Programme to Promote Educational Success (Plano Nacional de Promoção do Sucesso Escolar, PNPSE) in Portugal demonstrate the efforts of the government to use piloting before scaling up the interventions nationally; however, even in these cases, no rigorous evaluation based on experimental research was foreseen. Pilot evaluations are largely based on perception studies.

These criticisms are sometimes accompanied by a call for more rigorous, scientifically based evidence to lead to so-called 'evidence-based policy-making'. Partly in response to this debate, some countries are introducing large-scale randomised control trials (RCTs) as a way to evaluate educational interventions (Bolden & Tymms, 2020). Specialised evaluation and research agencies such as the INNOVE Foundation in Estonia (integrated in to Education and Youth Authority in 2020) and the Institute for Evaluation of Labour Market and Education Policy in Sweden are moving in this direction.

Furthermore, most of the countries analysed introduced a number of assessment reforms with a view to improving their evidence base and education monitoring data to inform policies. However, as seen from the analysis, **the relevance and reliability of newly introduced assessments differs, and the capacity of education systems to interpret and use these data for policy planning and design is still limited**. Muskin

(2015) shows that education stakeholders still tend to treat assessments primarily as an 'alarm bell' triggering media headlines by signalling general success or failure rather than as a rich and comprehensive diagnostic tool that can point to precise challenges and gaps and thereby, to precise policy solutions. This can be explained by a number of barriers relating to **the reliability and relevance of the information provided, financial and technical capacities, dissemination channels, and political and institutional factors** (Raudonyte, 2019).

5. Conclusions and implications for future policy and research

The existing evidence shows that mastering basic skills is a prerequisite for thriving in life, finding a fulfilling job and becoming an engaged citizen. The average EU underachievement rate – the proportion of pupils who fail to complete basic mathematics, science and reading tasks, according to the OECD’s Programme for International Student Assessment (PISA) (i.e. those who do not reach level 2 knowledge in PISA assessment) – stood at 22.5% in reading, 22.9% in mathematics, and 22.3% in science (European Commission, 2019). Furthermore, students’ performance has gradually deteriorated at EU level between 2009 and 2018 (European Commission, 2019). The COVID-19 pandemic, which has caused school closures and learning disruption, is expected to further exacerbate educational inequalities and learning achievements in the long term.

Under the current *Strategic framework for European cooperation in education and training towards the European Education Area and beyond (2021-2030)*, COVID-19 and the green recovery are reflected in education priorities at EU level and in the Member States. On the one hand, COVID-19 aggravated socio-economic disparities in education, especially for those experiencing multiple disadvantages. On the other hand, it has lent impetus to the acute need to foster the acquisition of basic skills by students, in addition to digital and green skills, to leave no one behind in education systems and labour markets across Europe in the future ‘recovered’ green economy. COVID-19 has highlighted the challenge of creating education systems that are both flexible enough to account for changes in skills needs and ways of learning during a crisis, and at the same time robust enough to provide equal opportunities for all.

In such a context, understanding which education reforms and interventions ‘work’ and lead to actual improvements in quality and equity is imperative to be able to maximise the returns from educational investments planned to support the recovery from the crisis and ensure just, green and digital transitions. To contribute to this understanding, the present study aimed to explore which countries have been able to improve their PISA results (in terms of student achievement and equity indicators) over time, what factors can be associated with the positive trends, and which policy reforms may have contributed to these improvements. Below, we present our conclusions and policy implications.

Key findings of the study: finding a successful PISA story is challenging

EU Member States aim to enhance the quality and equity of their education systems, and PISA has been one of the tools used to measure progress towards this goal. However, existing studies show that few countries manage to achieve this. **Between the latest two PISA cycles (2015 and 2018), no EU Member State significantly improved its mean performance in reading; only Latvia, Poland and Slovakia did so in mathematics; and only Poland significantly increased its mean performance in science** (OECD, 2019, a).

In terms of longer-term change across the EU, **several Member States have managed to improve their results in at least one domain since 2009**. However, only in a few countries has this increase been statistically significant.

Remarkable stability in academic achievement across the EU is accompanied by **persistent trends of inequality and exclusion in education systems**. Equity indicators have improved unevenly among Member States over the last decade. While more countries have

managed to narrow the gender performance gap, significant differences still exist in academic success that depend on students' socio-economic and cultural background.

These observations lead us to highlight **the first important finding of this study: explaining the 'PISA success story' is, by definition, challenging when the success (observed improvement) is rather limited.**

Based on trends in PISA performance between 2009 and 2018, seven countries were selected for analysis: Bulgaria, Estonia, Latvia, Poland, Portugal, Slovenia and Sweden.

Factors associated with improvements in PISA performance

The statistical analyses (descriptive statistics and multivariate regression modelling) carried out in this study confirmed the findings from the broader literature on key determinants of students' academic success. These are as follows:

- **Individual and family background:** gender, socio-economic status of the family, ethnic, cultural, linguistic, and migrant background – explain a great share of differences in students' performance.
- **Academic path of students** is associated with performance results. These include the academic abilities of the students, a lack of which may result in **attending vocational educational track, and grade repetition.**
- **School or instructional factors:** because between-school variance in the EU is on average equal to 35%, it is evident that, on average, school factors play an important role in determining students' performance across the EU. Existing studies show that students' performance is likely to depend on a school's socio-economic composition. Multi-level regressions run on the seven selected countries show that several school-level variables are important for academic performance of students. More specifically, **having more than four periods of mathematics per week** had a significant positive effect on students' performance in mathematics in Estonia, Latvia and Portugal. Moreover, in every country except Portugal, the **disciplinary climate variable at individual or school (or both) levels had an effect on the academic performance of students.** Lastly, **perceived cooperation between students** at school level influenced the academic performance of students in Bulgaria, Estonia, Slovenia and Sweden. Multi-level regression analyses conducted for individual countries additionally highlighted **the importance of support from teachers** (in Sweden), **interest in the course from teachers** (in Sweden), **lack of peer victimisation** (in Portugal and Slovenia), and a **higher sense of school belonging** (in Estonia).

The results of the quantitative analyses lead to a **finding that highlights the constraints of the available data and statistical methods.** On the one hand, the influential factors common to the seven countries are already well documented in the existing literature. Most of these, particularly the background factors, are not amenable to change, and consequently are not relevant for informing educational policies *per se*. The analysis of less well explored school factors, on the other hand, does not lead to rigorous conclusions: their effects are either limited to one or two countries, or they appear to state the obvious (e.g. an increased number of math hours per week leads to better achievement in maths). In other cases, the established relationships are of a circular nature (e.g. does better disciplinary climate lead to better performance, or is it the other way round?).

To overcome these constraints, at least to some extent, a mixed approach was applied:

- Sophisticated statistical approaches in order to properly measure the effects of specific reforms (namely difference-in-difference and propensity score matching methods);
- Iterative stakeholder consultations to contextualise quantitative findings and better understand the reform implementation process.

Effective and promising reforms: conclusive evidence is not yet there

The analysis of PISA journeys and the accompanying reform processes in seven selected countries demonstrates that policy-makers have made, or are making, significant attempts in their quest to improve education outcomes and address school-level inequalities by implementing various sets of reforms. Generally, such reforms target:

- **Structural changes to education system.** Given the various ways in which rigid school structures shape educational trajectories and consolidate educational inequality, some countries have implemented fundamental reforms that change the structure and organisation of the education system. This includes extending the length of compulsory education (e.g. in Poland and Slovenia); investing in early childhood education and care (Bulgaria); reorganisation of the school network (Portugal); as well as the diversification of educational pathways (Slovenia, Sweden).
- **Competence development,** mainly through curricular reforms and accompanying assessment policies. The curricular reforms reviewed in this study (Estonia, Latvia, and Poland) included some similar patterns, such as an emphasis on well-being, learner agency, the ability to solve problems and to navigate an uncertain world, accompanied by school and teacher autonomy in enacting and mediating the policy change. Greater school autonomy has been proven to be associated with improved student achievement (Hanushek, Link, & Woessmann, 2013). However, decentralisation is only effective when there are educational indicators that guide teachers, schools and municipalities as to how well they are doing. This condition calls for the review and alignment of the whole evaluation and assessment framework, to bring coherence around the curriculum reform. However, as practice shows, not all the countries manage to adapt their national assessment frameworks to the new visions of competence and skill development (as was observed in Bulgaria or Latvia).
- **Policies focusing on equity and quality.** The policies captured by this study focus on specific sets of measures that aim to improve equity: delaying streaming (in Poland); introducing support networks for schools (Estonia); priority education policies and preventing grade repetition (Portugal); and addressing linguistic school segregation (Latvia).

These reforms were often accompanied by increased awareness of the need for an evidence base and monitoring data to enable further educational improvements and subsequent reforms to **strengthen education monitoring and national assessment frameworks.** However, while the tendency toward the use of evidence in education appears to be gradually asserting itself across Europe through political intent and initiative, it is yet to be systematically incorporated into the practices of the various Member States. To date, a large body of robust evidence comes from the US and UK, but less from European countries. The practice of 'evidence-based education' remains rare.

As a result, rigorously assessing the extent to which the reforms and interventions 'work' and achieve their intended outcomes proves challenging, due to:

- **Lack of an evidence-based education policy tradition**, resulting in **specificities of reform design** (which rarely includes building monitoring and evidence collection mechanisms based on experimental research into the reform process)
- **Limitations of available cross-sectional data on student achievements** (most international and national student assessments), analysis of which does not allow causal inferences to be made about specific policy impacts.

These limitations led some countries across the world to launch initiatives with the aim of enhancing the quality of educational research and the available evidence base. These include:

- Agencies for the coordination of educational research and innovation and the use of evidence in practice (e.g. the Swedish Institute for Educational Research in Sweden and INNOVE (which is now part of Education and Youth Authority) in Estonia)
- Large-scale national research programmes to investigate issues pertinent to practitioners and decision-makers, including experimental and longitudinal studies (e.g. the Teaching and Learning Research Programme in the UK and the Life as Learning research programme in Finland); and
- Research centres that conduct studies on priority issues at national level (e.g. Leading Houses for research in vocational training in Switzerland, and Learning Lab Denmark).

However, these measures have not yet been introduced in all Member States.

New evidence on the effectiveness of education reforms

The complex statistical models used in this study allow the limitations of cross-sectional data to be overcome (with at least partially fulfilled assumptions), although sound causal conclusions about the impact of reforms could only be drawn regarding three education systems: in Bulgaria, Poland, and Portugal.

- In Bulgaria, the Difference-in-difference (DiD) regression model showed that **the introduction of a compulsory year of pre-school education had a positive effect on students who attended ECEC as a direct result of the reform**. Even though the effect may be seen as relatively small (8 points on the PISA scale), the fact that it remains visible after a decade – since it is measured on 15-year-old-students – shows its importance and significance. In addition, the statistical analysis showed that the reform has, to some extent, succeeded in targeting socio-economically disadvantaged students, although it has not yet ensured access to ECEC for all vulnerable students.
- In Poland, Jakubowski, Patrinos, Porta and Wiśniewski (2016) ran PSM and DiD analysis, and found evidence that **delaying vocational education by one year in Poland significantly improved the country's mean PISA score between 2000 and 2006; students who would have attended the VET track if the reform had not taken place have benefitted most from the reform**.
- In Portugal, a difference-in-difference (DiD) regression model²¹⁸ was constructed to assess the effect of the PNPSE programme, one of the main aims of which was to reduce grade repetition rates. The results of the DiD regression model showed that the **PNPSE programme had a positive effect on the academic performance of those students who benefitted from it – in this case, students who, according to their profile, would have repeated a grade before the implementation of the programme, but who, thanks to the existence of the programme, did not**.

²¹⁸ For more information, see Annex 1. Country Profiles, Portugal.

5.1. Lessons for policy design and implementation

Even though the available evidence does not allow causal inferences to be made about the impact of most of these reforms on student outcomes (as measured by PISA), the stakeholder consultations and qualitative analysis conducted in this study brings valuable insights regarding the ways in which reforms in the selected countries have been initiated and translated into practice, which can either facilitate or impede the achievement of the intended outcomes.

The study finds that **reforms are likely to be perceived more positively and translated into practice more smoothly when:**

- they are implemented as part of a **comprehensive, complementary, well-sequenced set of measures**. This also includes building the capacity of relevant actors to implement the change. Curricular and assessment reforms in Estonia and Sweden demonstrate that timely support and the capacity development of education professionals facilitated policy design and implementation on the ground. On the other hand, the ECEC reform in Bulgaria and language reform in Latvia show how the lack of an appropriate delivery system (such as funding, infrastructure shortages, and no teacher support) can impede the smooth implementation of educational interventions.

Pointers for policy

- Understanding and committing to the complex follow-through of reform priorities is important. It depends on the right sequencing and on the existence of appropriate institutions that are capable of supporting reforms from decision to implementation. Capacity bottlenecks tend to constrain the ability of policy-makers to implement reforms effectively and to reap the full benefits of specific policy initiatives. The need to address such constraints when implementing reforms should be a priority.
- Policies are not designed in a vacuum, and must be articulated within an existing policy framework. Sometimes, a reform contradicts or competes with existing policies, which may create obstacles to its effective implementation. For instance, increasing teachers' workload or forcing teachers to invest in one policy at the expense of another, are potential barriers to curriculum implementation.

- they are **well-planned and consistent with long-term educational objectives**. The importance of leaving adequate preparation time is illustrated by the 1996 education structural reform in Slovenia. While the changes to the education system were announced in 1996, they were implemented between 1999 and 2003, leaving time for schools, teachers and other relevant stakeholders to prepare for the changes. The case of Estonia illustrates the importance of contextualising new educational reforms within existing landscape of educational policies, creating synergies and mutually strengthening the effects of these policies, and, importantly, ensuring a long-term vision. The Slovenian example shows that **political stability** or having different political players with a similar vision regarding educational goals **creates a climate conducive to successful education policies**. For example, according to the national stakeholders consulted, one of the important factors that contributed to the success of the 1996 education reform in Slovenia was the fact that there was no change of government before or after the reform, which allowed for **smooth planning and implementation**.

Pointers for policy

- It is important to restructure the mechanisms of national policy-making to overcome the cyclical nature of reform processes. Government needs to set a general direction, but educational decisions relating to matters such as curriculum content and national testing should be allocated to a non-political body that is set up for a long duration. Prerequisites for the successful functioning of such a body are:
 - experience in managing similar institutions in the country;
 - well-developed educational discourse in the country;
 - sufficient potential for educational research and development has been accumulated;
 - sufficient implementation capacity of the body and a degree of autonomy.
- In advancing on the path of reforms and looking at the long-term, policy-makers need to confront short-term adjustment costs: often, the benefits of better structural policies may take time to materialise. This should not be a deterrent to implementation. On the contrary: reformers need to act decisively, as the cost of the status quo is even greater.

- They **focus on both equity and quality**, rather than prioritising one at the expense of the other. The cases of Estonia and Portugal demonstrate the importance of a long-term holistic vision for inclusion being integrated with accompanying measures that target vulnerable groups. Contrastingly, the decentralisation and voucher reform in Sweden provides an important lesson in the oversight of equity when focusing on efficiency and innovation.

Pointers for policy

- Equity and quality of education should be prioritised equally. Education systems and the pathways through them need to be designed in a way that both enhances equity and increases students' success, yet a wide range of policies which hinder equity remain common.
- Policies that eliminate grade repetition, delay streaming and reduce school segregation help to both improve equity and enhance quality. The factor of family background affects students' learning outcomes not only directly, but also through school choice policies. Therefore, reforms must also consider that family background tends to increase social and academic segregation in early and general education, and the policymakers need to mitigate this.

- They **build on consensus between the range of actors** including students, parents, teachers, employers, and trade unions), who also take an active role in enacting and mediating policy changes. **Inclusive policy design can usually be achieved through a series of consultations and discussions.** Including relevant stakeholders into policy design not only helps policy-makers to better understand the needs of the target groups, but is also crucial to making informed decisions. The reform processes in Latvia and Estonia are good illustrations of both resistance from stakeholders when they are left in the background during the policy process (e.g. language reform in Latvia), and their active support (assessment reform in Estonia).

Pointers for policy

- The effective communication of long-term objectives is of great importance in making reform happen. Making the case for a reform also needs to be based on evidence and achieved public consensus. This is particularly important in education, where professionals – if they are not engaged – tend to block reforms.
- Engaging stakeholders can take time, is complex, and can lead to a lack of results if it is not well organised. For effective implementation, the main issue is how stakeholders can be engaged in ways that will support the educational change. Several factors have been found to be important in engaging stakeholders, such as higher levels of involvement (partnership and co-decision-making), transparency, and communication.

▪ They are **monitored and adjusted** to address the evolving needs of students and schools, and are context-sensitive. **Analysis of the selected reforms demonstrates that education systems often lack the capacity to effectively use and interpret monitoring data.** Only a few countries have introduced policy initiatives with built-in monitoring and evaluation systems based on hard evidence. The examples of the TEIP and the National Programme to Promote Educational Success (Plano Nacional de Promoção do Sucesso Escolar, PNPSE) in Portugal demonstrate the efforts of the government to use piloting before scaling up the interventions nationally; however, even in these cases, no rigorous evaluation based on experimental research is foreseen. Pilot evaluations are largely based on perception studies. These criticisms are sometimes accompanied by a call for more rigorous, scientifically based evidence to lead to so-called 'evidence-based policy-making'. Partly in response to this debate, some countries are introducing large-scale randomised control trials (RCTs) as a way to evaluate educational interventions (Bolden & Tymms, 2020). Specialised evaluation and research agencies such as the INNOVE Foundation (which is now part of Education and Youth Authority) in Estonia and the Institute for Evaluation of Labour Market and Education Policy in Sweden are moving in this direction.

Pointers for policy

- Strengthening the education evidence base is imperative. This can be achieved through improved monitoring and evaluation practices; ensuring policy designs that allow for experimentation and evaluation; and the collection and analysis of national longitudinal student assessment data and investment in research, e.g. through the creation and supporting of a permanent advisory research-based unit that can be called upon to provide evidenced-based advice on ongoing issues.
- Reinforcing the culture and tradition of evidence-based education policy-making in EU Member States. The best design for educational research to identify causality between a reform and its effects is a comparative design. This implies that the most reliable studies to answer a question on an anticipated effect are (quasi)experimental studies, in which a group benefitting from a reform is compared with a group of students or schools that do not benefit from the reform. This also implies that reform implementation should be planned in several stages: piloting and assessment of its results, scaling up, monitoring and adjustment. Designing and assessing an education reform according to the best available evidence has been popularised by the Evidence-Based Education (EBE) movement. According to Slavin (2017, 2019), providing educator-friendly reviews, making available a broad range of proven education programmes, and

providing resources to help schools to implement proven programmes are the three most important levers for implementing evidence-based reform. In the United States and the United Kingdom, efforts have been made to provide these resources through Evidence for ESSA, What Works Clearinghouse, and the Education Endowment Foundation.

5.2. Key learnings from the study for future research

The main aim of this study was undeniably ambitious: to analyse the factors that may have contributed to improving the quality and equity of education in the seven EU countries selected and, on that basis, to deliver policy recommendations for raising educational achievements and improving the equity and inclusiveness of education systems in the selected countries and across the EU.

Achieving this goal in practice proved more challenging than expected, in several respects:

- **PISA 'Success stories'** that the present study was intended to explain **were rather modest** in the seven countries (with the exception of Poland), as well as more generally across the EU.
- The first set of statistical analyses carried out with the aim of identifying explaining factors in achievement in the seven countries confirmed the findings of the vast body of existing evidence on that topic, namely that the **most influential factors** mentioned in the country analyses **were non-malleable factors** such as socio-economic status, migration background and gender. Other factors that might seem influential at first sight were **reciprocal relationships** such as disciplinary climate or sense of belonging: it is impossible in a cross-sectional design to rule out which of these is the cause and which the consequence. Does a better disciplinary climate enhance performance? Or do better-performing students lead to a better disciplinary climate?
- Another major limitation lies in the fact that **specific national reforms that are potentially beneficial are not captured by any variable in the PISA database or by national cross-sectional data**. This is typically true for the curricular reforms, and even more so for the details of their implementation. **This limitation of the quantitative approach has been partially overcome or compensated for by the qualitative, iterative collection of data from national stakeholders**. Existing evidence available at national level largely originates from qualitative studies. This approach is not free from bias, as it relies on the qualitative perceptions of selected education stakeholders and is not representative. Even where data is triangulated as far as possible, the extent of evidence provided by these consultations is not as strong as statistical evidence established using the most rigorous approaches. This is why some of the reforms have been labelled as "promising" or "having potential".
- The main limitation of PISA and similar assessment surveys is the cross-sectional nature of their design. Obviously, it is possible to correlate or use regression analyses to link contextual variables and achievement. But correlations do not allow causal conclusions to be drawn; they might be overestimated; in some cases, the relationship between a contextual variable (such as disciplinary climate or sense of belonging) is possibly reciprocal, while in other cases reverse causality is at play. Analysis of national assessment data does not allow these limitations to be overcome, as most of the national datasets are also of cross-sectional design. The very few EU countries in which national assessment data allow trends to be measured, or in which longitudinal data are available, are the wealthiest EU countries in which research into education is considered a priority

to inform educational policies, and accordingly benefits from important resources (i.e. Germany and Nordic countries such as Denmark and Finland).

Each of these aspects separately reduces the likelihood of finding strong evidence of the positive effects of a single reform, and the combination of this set of caveats makes this likelihood even smaller. In a nutshell, rigorously assessing the extent to which these reforms and interventions worked and achieved their intended outcomes proved extremely challenging, due to specificities in the design of reforms (lack of in-built monitoring and evidence collection mechanisms into reform process); lack of evaluation data on reform implementation; lack or non-suitability of the available data (lack of variables capturing some of the reforms in the PISA database); and lastly, the cross-sectional nature of PISA and the difficulty of meeting the specific conditions required to implement the only statistical models (DiD and PSM) appropriate to draw valid causal conclusions.

It is common knowledge that to study the impact of innovation or change in education, **the best conditions are longitudinal studies and pilot measures in which only a proportion of schools and/or students are targeted by a reform, before it is generalised to the whole educational system**²¹⁹. Implementing huge longitudinal studies covering the entire span of education – from kindergarten to upper-secondary or even tertiary education – comes with high costs that many education systems cannot afford. It is not by chance that the countries whose education systems regularly collect longitudinal data are among the wealthiest. Even though collecting longitudinal data at national level is highly recommended, one might fear that many countries will not be able to bear the costs.

Illustration of the potential of longitudinal data

A good illustration of this is the relationship between support from teachers and achievement. One might expect a positive relationship between the teacher being supportive and the student's achievement. Often, the opposite (a negative correlation) is observed, simply because teachers tend to be more supportive of low performers or struggling students. In this case, one understands how problematic it would be to conclude that being supportive has negative effects on achievement, while experimental studies conclude that it is one of the most positive teaching practices. In a longitudinal design in which the same students are tested again after a certain time period, one can control for students' prior achievement, and estimate the effect of teaching practice (i.e. teacher support) on students that have the same level of achievement. Under these conditions, it has been demonstrated that teacher support does indeed have a very positive effect when controlled for by prior achievement and other student characteristics (Hattie, 2009).

Some general recommendations can, however, be made to increase the capacity of PISA to inform educational policies in a more fine-grained or relevant manner at a reasonable cost (OECD, 2010):

- **A longitudinal component** could be added to PISA, or longitudinal data collection can be merged with PISA data at national level. This would mean testing the same sample of students again, or possibly a subsample of them, and estimating which variables explain any gains in achievement (under what conditions did some students improve more than others?), or investigating how the students' level of achievement explains their transition into tertiary education or the workplace. As the OECD has highlighted (OECD, 2010), "The integration of PISA with longitudinal surveys in order to link the competencies students acquire as young adults with their subsequent educational, labour market and social outcomes offers significant new policy insights. By surveying the

²¹⁹ An example of such conditions is the Hanushek & Raymond (2005) study. The authors studied the impact of accountability in the US by taking advantage of the fact that this policy was implemented first in some states, and later in others. Using the NAEP data available for grades 4 and 8, they could compare achievement in grade 8 in those states that had implemented the accountability policy with states that had not, subject to students' achievement in grade 4 and other control variables.

students that participated in PISA repeatedly over time, it is possible to monitor how early performance affects their later outcomes in life within the context of the choices they make and their major life events". In 2010, only a limited number of OECD countries had developed some form of follow-up of PISA-sampled students, transforming PISA data as a baseline for national longitudinal study. Among these countries, one can find Australia, the Czech Republic, Denmark, Germany, Switzerland and Uruguay. In most cases, PISA-sampled students were followed up over several years, with the main topic of interest being their transition from upper secondary to tertiary education.

Example of a longitudinal component in Germany

Germany introduced a longitudinal component into PISA 2012, in the so-called 'PISA 2012-2013 plus study'. The sample was enhanced by: a) adding students from entire 9th grade classrooms; and b) repeated measurement, re-testing all participants one year later in the 10th grade. A special issue of the journal *Zeitschrift für Erziehungswissenschaft* was dedicated to the analysis of this longitudinal extension. Several topics were investigated, comparing the effect sizes resulting from cross-sectional analyses of PISA and from this longitudinal component, among which were the effect of having repeated a grade on improvements in mathematics and the effects of teaching quality indicators. Kuger, Klieme, Lüdtke, Schiepe-Tiska & Reiss (2017) emphasised that "for several reasons, ILSA²²⁰ data is limited in its scope, and conclusions on educational effectiveness are restricted. This study specifically intends to evaluate the potential danger of overestimating the effectiveness of indicators of teaching and learning based on ILSA data" (p. 61).

Some countries oversample during international studies. In Switzerland (and more precisely, in the canton of Geneva), in addition to the age-based sample students, students from the modal grade (grade 10) were oversampled to allow for specific research questions. Students in this grade-based sample were followed up to the end of upper-secondary education. This oversampling and follow-up allowed comparisons to be made, in terms of performance and equity, of the long-term effect of having attended a streamed system or a comprehensive one in lower-secondary education, as in Geneva both systems coexist. Felouzis, Charmillot and Fouquet-Chauprade (2010) provided strong evidence that the students who had attended comprehensive schools from the age of 12 (grade 7) to 15 (grade 10) on average achieve higher performance, and are more likely to attend the highly academic selective track at grade 12 than those students who had attended the early-streamed system beginning in grade 7. The impact of students' socio-economic status was also systematically lower in the comprehensive system, making this latter form of organisation more equitable.

²²⁰ International Large-Scale Assessment

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