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DEC: Websites, patents filing, press & media actions, videos, etc.
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PU: Public, fully open, e.g. web
CO: Confidential, restricted under conditions set out in the Model Grant Agreement
CI: Classified, information as referred to in Commission Decision 2001/844/EC

³ For a detailed list of contributions to this report, and their respective authors, please see Annex A.

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Highlights

- The present report summarizes the findings of three scientific working papers: one on the consequences of school segregation, one on the interplay between formal and non-formal education, and one on intersectional inequalities.
- Early tracking (the allocation of students into different types of schools from a young age) was consistently found to influence long-term pathways of pupils, increasing inequalities between children from lower and higher status families. This effect is larger than that of school composition (i.e., the ratio of students from different backgrounds).
- Learning processes that happen outside the formal education system are associated with children's outcomes within the formal system, and under some circumstances play a compensatory role.
- The sense of belonging to school, which is associated with study progress, is markedly lower among vulnerable students. Policies that aim to reduce educational inequalities should tackle not only lower school achievement, but also school disengagement.
- Policies aiming to promote inclusion and equality in education should enhance more comprehensive education systems, consider the possibilities of non-formal learning in reducing inequality, and address every aspect of vulnerability in the education system for different student groups at risk.

1 Introduction

The Horizon 2020 research project PIONEERED aims to carry out research on how to **tackle educational inequalities in Europe by policy and practice** in nine countries (Finland, Germany, Hungary, Ireland, Lithuania, Luxemburg, Norway, Spain, and Switzerland) and to inform evidence-based policy measures. The project applies a life-course perspective and takes into consideration both formal and non-formal education, the levels where educational inequality manifests from the individual to the structure, and the different axes of inequality and their intersections. The comprehensive research strategy of PIONEERED involves several steps: mapping the existing literature on educational inequality; researching responses to these inequalities both in terms of policy and practice; and identifying the tools that possess a potential to tackle inequalities on a larger scale (PIONEERED, 2020b).

The present report has the role of summarizing scientific results of the three previous tasks (T4.2-T4.4) of Work Package 4 (WP4). The detailed findings are to be found in the scientific working papers prepared (see Annex A for a complete list). In this paper, first the analytical framework and the goals of WP4 are explained. Following this Introduction, Chapters 2, 3, and 4 are concerned with results of the three working papers D4.2, D4.3, and D4.4, respectively. We report in detail on the specific vulnerable groups⁴ that are at risk of intersectional inequalities in the participating countries. While

⁴ In PIONEERED, the term 'vulnerable groups' refers to those students who do not have the same access to quality education, do not receive the same treatment, and/or do not possess the same opportunities in the education system, as the general student population, let alone their more privileged peers. Such vulnerability may be based

results (on the origins, consequences, and processes of educational inequality) are presented in a country-specific manner, the report also aims to provide an internationally comparative perspective as well. The conclusion provides a short summary and points out the most important lessons.

1.1 MILC: an analytical framework

In order to accomplish data analysis in a complex manner, an analytical framework has been developed for PIONEERED in WP2: MILC, based on Multi-level, Intersectional and Life-Course perspectives. Throughout the stages of the research, **MILC is a reference point to structure our analysis of, and findings on, education systems and educational inequalities** in a way that captures the interrelated conditions that shape these. What MILC means in practice is set out below based on the Methodological guidelines of the project (PIONEERED, 2021).

‘M’ stands for a **multilevel approach**. In order to comprehend the network of inequalities that determine individual experiences, it must be considered how the macro, meso and micro levels influence each other. Most importantly, education systems and welfare regimes (the macro level) shape institutional settings and communities such as schools and families (the meso level), which in turn have a direct impact on individuals’ learning processes, emotional and cognitive development, experiences, and decisions (the micro level). Without exploring the context of large structures (such as regional, national, or even supra-national policies), it is impossible to understand how the lives of individual students are shaped.

‘I’ stands for **intersectionality**. Experiences and effects of inequality are unique in every individual case, and may be described as intersectional, that is, characterized by multiple different forms and sources (axes) of inequality. In PIONEERED, the focus is on multidimensionality: several intersecting axes, such as socio-economic status (SES), ethnicity, gender or place of residence, are necessary to capture the exact forms of inequality. Moreover, throughout time and space, the relevant axes differ in accordance with a changing context.

‘LC’ stands for a **life-course perspective**. This is inspired by the understanding that events, opportunities, and points of decision that appear in the life of an individual are most often consequences of past circumstances. These circumstances are in large part determined by macro and meso-level factors (the system and the institutions). Inequality is a cumulative process that manifests itself throughout the life-course on multiple occasions, each connected to the one before. Different elements of PIONEERED cover stages from kindergarten (ISCED 0) to tertiary education (ISCED 6).

Moreover, the analytical framework of PIONEERED puts great emphasis on the interplay between **formal, non-formal and informal** educational settings. Education policy often focuses on the formal system, which is characterized by a set curriculum, defined stages and transitions as well as standardized assessment. However, the less institutionalized non-formal and informal settings also play a part in both increasing and decreasing educational inequality. While non-formal education refers to organized and systematic learning with a more selected target group (such as day-care or afterschool settings), informal education happens in different environments of pupils where learning

on several different characteristics, such as low socioeconomic status or ethnic minority background, which often intersect (PIONEERED, 2020a). See the definition of intersectionality applied by PIONEERED below, in Section 1.1

takes place, such as families, peer groups or museums (PIONEERED, 2021). PIONEERED seeks to capture the dynamic relation between them.

1.2 WP4: What and how did we want to research?

Following the development of MILC⁵, a review of the literature and the analysis of the most significant policies of the field in the past decade, researchers of PIONEERED turned to **quantitative data** in WP4. Setting complex objectives – to be achieved with the help of the MILC perspective – WP4 has aimed:

- 1) to **explore the existing data** on *intersectional* inequalities (different disadvantaged groups) across the *stages* (trajectories and transitions) of education in *formal and non-formal/informal settings* in participating countries (O4.1).
- 2) to identify the **mechanisms of inequalities** and understand how they come about and remain in place (O4.2).
- 3) to conduct a **cross-national comparison**, which helps understand the similarities and differences in the processes of intersectional educational inequalities in different contexts (O4.3) (PIONEERED, 2020a: 22).

1.3 WP4: What did we do?

For the sake of international comparison, WP4 began with the harmonization of country-specific and international datasets (Kroezen & Alieva, 2022). Following this task, three scientific working papers were produced, attempting to fulfil all objectives of the work package.

Consequences of school segregation on achievement and attainment (D4.2)

Task 4.2 focused on the **individual countries and their national data** on *intersectional* educational inequalities. Applying the MILC framework, researchers aimed to study how these inequalities evolve **throughout the educational careers** of individuals; which are the most vulnerable periods and transitions in their *life-course*? The most significant explanatory factor considered was **segregation** based on several different characteristics – a *multilevel* phenomenon in the sense that it is an institutional condition affecting individuals. To fulfil this task, researchers from Finland, Germany, Hungary, Ireland, Lithuania, Luxembourg, and Switzerland contributed to the first scientific working paper (D4.2), which is a collection of country-specific studies on the consequences of school segregation based on SES, migration background, and ethnicity / mother tongue. Studies cover stages of education from pre-school through primary, lower and upper secondary to higher education.

Informal/shadow education, its interplay with formal education and intersectional inequalities (D4.3)

Task 4.3 took a closer look at the **interplay between informal and formal education and its impact** on academic achievement. Out-of-school learning opportunities and participation in non-formal/informal education may be compensatory (for vulnerable groups) and enriching (for the more privileged). The main goal of the task was the study of the **variation of the above between different countries and different groups of students**. The second scientific working paper (D4.3), written by members of the Irish, Swiss and German teams, compared the education systems in Ireland and Germany and

⁵ In sections 1.3 and 1.4, references to the MILC perspective are indicated by *italics*.

participation in ‘enhancing’ and ‘supplementary’ shadow education in the two countries. Moreover, it analysed the significance of SES, gender and migration background in participation and outcomes in a multidimensional manner.

Cross-national differences in intersectional inequalities along educational trajectories (D4.4)

Task 4.4 set to take an **international perspective** to complement the findings from the previous tasks. The complex comparison was aiming to take both an **intersectional** perspective (identifying the most significant axes of inequality) and a **multi-level approach** (considering protective and risk factors from micro to macro levels). The goal of this task was gathering information on individually designed interventions for specific groups. The third scientific working paper (D4.4) was written by researchers from three countries. It focuses on the intersections of migration background, gender, and SES and how they impact reading and maths skills, as well as the sense of belonging in school throughout different stages of education (*life-course*). The study is based on the analysis of international data sets, shedding light on the contextual (macro- and meso-level) aspects that influence intersectional inequalities on the micro level.

2 Consequences of school segregation on achievement and attainment

The scientific working paper (D4.2) with the above title, edited by Simon Seiler, Robin Benz, and Andrea B. Erzinger (University of Bern), is a collection of seven country-specific studies. The focus of the paper is **school segregation, defined as “the degree to which children and adolescents from different socioeconomic, ethnic, migration or cultural backgrounds are unevenly distributed across different schools”** (Seiler, Benz, & Erzinger, 2022: 1). The paper applies the MILC framework primarily with regard to a multilevel life-course perspective, aiming to answer the question **whether the composition of their school matters for students’ outcomes at later stages of the educational trajectory** (Coleman *et al.*, 1966). Furthermore, several studies of D4.2 take an intersectional approach, examining the consequences of school segregation for students with multiple disadvantages/special characteristics.

2.1 General lessons

The causes of school segregation are intertwined and historically rooted. Three main drivers of school segregation are identified: contextual and societal factors (such as the general level of inequality or residential segregation), institutional factors in the education system (such as school choice or tracking), and psycho-social factors (such as parental SES, attitudes, and interests). **School segregation is widely associated with educational inequality, operating through a number of interrelated mechanisms** (Reardon & Owens, 2014). These include the effects of peer interactions (such as the development of norms), the quality of teaching in segregated schools, and the uneven and insufficient allocation of resources to schools with different needs. Literature on the consequences of school segregation suggest that it is low-SES children studying in schools with a predominantly low-SES student body who suffer the most as a result of the school composition. However, the effects of school segregation are difficult to measure.

There are multiple methodological challenges to the statistical research of school segregation. First, it has to be defined what is measured: the proportion of different students in schools, the exposure

between groups, or the unevenness of distribution of these groups between institutions (Frankel & Volij, 2011). In the studies of D4.2, researchers followed the first approach and chose to include schools with certain (high) ratios of certain (disadvantaged) groups of students in their analyses. Second, due to the numerous factors affecting individual students' outcomes, it is hard to include enough data in the analysis, in particular when it comes to longitudinal data, that would allow for conclusions on causality. That is, factors such as residential segregation (neighbourhood effects), individual motivation, prior achievement or family background all contribute to the students' outcomes. Moreover, these factors influence each other simultaneously. Therefore, it is challenging to disentangle what are the consequences of school segregation itself.

2.2 The overview of results across countries and intersectional groups

The PIONEERED project is conducted in nine European countries. This is a heterogenous sample, representing different education systems and welfare state regimes. In large part, although not always, **the level of educational inequality in each country correlates with the type of the prevalent welfare system and the level of stratification.**

Country	Welfare state regime	Educational inequality			Level of stratification		
		high	medium	low	high	medium	low
Germany	conservative	x			x		
Switzerland	conservative	x			x		
Luxembourg	conservative	x				x	
Hungary	post-socialist	x				x	
Lithuania	post-socialist		x				x
Ireland	liberal		x			x	
Spain	Southern / family-oriented		x			x	
Norway	social-democratic			x			x
Finland	social-democratic			x			x

Table 1: Countries of PIONEERED and their respective welfare state regimes, levels of educational inequality and levels of stratification. Based on PIONEERED 2020b: 17.

Countries with a conservative welfare state regime (Germany, Switzerland, both with high stratification, and Luxembourg, with medium stratification) possess highly unequal education systems, but so does Hungary, which is categorised as a post-socialist system and medium stratified. The other post-socialist country, Lithuania has a medium level of educational inequality, but a low level of stratification, similarly to other Northern European countries, social-democratic Norway and Finland. The latter two countries have the most equal education systems in the sample. Ireland, with a liberal welfare system, and Spain, with a “family-oriented” approach to welfare are characterised by a medium level of both inequality and stratification. For the working paper D4.2, data, and literature from seven of these nine countries were analysed, Norway and Spain were not included due to data limitations.

Studies conducted for D4.2 focused primarily on the segregation of students with a disadvantaged family background. While welfare regimes differ, **it is an international trend that low-SES children are at risk of multiple inequalities in the education system and often cluster in schools with a**

disadvantaged student composition (OECD, 2019). In addition to socially disadvantaged children, in some country-specific axes of vulnerabilities were observable. In the German, Swiss and Luxembourgish context, data on children with a migration background were analysed; in Hungary, it was pointed out that low SES correlates with Roma ethnicity to a large extent. Lithuania was the only country in the sample where the primary focus was not on the social background but the mother-tongue of students: researchers analysed the results of pupils in linguistically segregated schools.

2.2.1 Overview across countries

Countries with high levels of educational inequality

Four of the seven country-specific studies analysed data from countries with a high level of educational inequality. Chapter 2⁶, Chapter 3⁷, Chapter 4⁸, and Chapter 5⁹ provide the reader with an insight into the impact of school segregation in two highly stratified education systems (Germany and Switzerland) and two systems with a medium level of stratification (Luxembourg and Hungary). Authors of the studies describe **all four education systems as highly segregated, mostly in terms of socio-economic status**. This phenomenon is connected to a number of factors:

- **residential segregation** (emphasized in Germany and Switzerland),
- **free school choice**, which enables families with larger financial and cultural capital to separate their children from their less privileged peers (emphasized in Germany and Hungary),
- and **early tracking** (in all four countries). The practice of directing children to different tracks is another way in which higher status families can secure their children's places in prestigious schools, while lower status pupils tend to access and take tracks that are less academically focused.
- In particular in Luxembourg, which has the highest ratio of migrant population in Europe, and in Hungary, which has a substantial minority of Roma ethnicity, **SES-based segregation often goes hand-in-hand with ethnic segregation or the segregation of non-native speakers**, but this also stands for Germany and Switzerland.
- In these countries, where the education system is not able to assist vulnerable children overcome their disadvantages, said system **keeps reproducing social stratification and inequality**.

Germany and Switzerland

The two studies concerned with Germany analysed data from the National Educational Panel Survey (NEPS), while Swiss data came from the DAB Panel Study. In Chapter 2, the research question was concerned with **the effect of school social composition at earlier phases of education on later achievement** (maths competence scores) in Germany. Longitudinal data from NEPS were analysed with samples from different levels of education from kindergarten to upper secondary school. While a higher share of low-SES students in the school clearly correlates with lower competences, this does not mean that segregation is the direct cause of lower scores. The authors found that **most importantly, individual sociodemographic characteristics and prior achievement determine later**

⁶ 'Effects of school segregation on educational achievement along the educational trajectory in Germany', authored by Robin Benz, Simon Seiler, and Andrea B. Erzingler.

⁷ 'The impact of school composition on students' achievement in Luxembourg: a longitudinal perspective', authored by Juliette E. Torabian, Andreas Hadjar, Martha Ottenbacher, Taylor Kroezen, Frederick de Moll, Aigul Alieva, Ines M. Pit-ten Cate, and Antoine Fischbach.

⁸ 'School segregation, student achievement, and educational attainment in Hungary', authored by Zoltán Hermann and Dorottya Kisfalusi.

⁹ 'Consequences of ethnic and social segregation on educational attainment at upper secondary level in Germany and Switzerland', authored by David Glauser, Robin Busse, and Katja Scharenberg.

achievement. However, the data also show a stronger effect of school composition at the beginning of both primary and secondary levels. This suggests that **during periods of transition, students are more sensitive to the impact of their (learning) environment.**

The research question of Chapter 5 focused on Germany and Switzerland, and **how migration- and social status-based segregation in lower secondary school affect educational attainment**, specifically whether pupils start upper secondary education and in which track. In line with findings of Chapter 2, researchers concluded that while school composition does not have a significant effect on later attainment, lower secondary school track is indeed a strong predictor of the upper secondary track, and therefore attainment as well. **The only transition that is determined by class composition is the one that leads into the top academic track on the upper secondary level:** in Germany, the social status, in Switzerland, the migration background of peers in lower secondary seems to play a part in the successful transition to this upper secondary track. **Students with a migration background appear to be particularly disadvantaged in both systems because of their likelihood to end up in lower tracks at earlier stages, rather than due to the segregation of their classes.**

Luxembourg

Researchers in Luxembourg took a longitudinal perspective and asked **whether primary school composition** (a high ratio of low-SES and 1st generation migrant children) **has an impact on students' achievement** (maths and German reading competences) **and track placement in upper secondary education.** They analysed data of ÉpStan (the local School Monitoring Program) on 3585 students at two points in their educational careers, in Grades 3 and 9. In contrast with results from Germany and Switzerland, in Luxembourg it was found that **the socio-economic composition of the primary school has a long-lasting effect on both the achievement and the track placement of students, even after controlling for their individual characteristics and prior achievement.** On the other hand, the ratio of children with a migration background does not seem to influence track placement. In fact, a high ratio of 1st generation migrant students in Grade 3 correlates with higher maths competences in Grade 9.

Hungary

The Hungarian analysis was based on linked administrative panel data, covering half of the population in three cohorts between the end of lower secondary education and the beginning of higher education. The research question was **whether attending a socially segregated lower secondary school is associated with lower achievement** (maths and reading scores in Grade 8) **and attainment** (whether and what type of upper secondary school is completed and admission to higher education). The analysis suggests that **segregation has a negative effect in some aspects, while in others no association was found between school composition and educational outcomes.** Although Grade 8 maths scores and admission to higher education do not correlate with school composition, those attending segregated, especially 'extreme poverty schools' (with more than 35% low-SES student body) obtain slightly lower reading scores, and fewer of them complete upper secondary school. Nevertheless, the authors warn that **even these effects may be overestimated, due to the numerous unobservable characteristics that might play a part in the weaker performance of students studying in segregated institutions.**

Countries with medium level educational inequality

While Ireland and Lithuania differ regarding their geopolitical character, historical development, and social composition, the education systems of both countries are characterised as having a medium-level of inequality. The analyses of them both – Chapter 6¹⁰ on Ireland and Chapter 7¹¹ on Lithuania – focused in large part on different questions, although they both considered different axes of educational inequalities, which are further discussed in Section 2.2.

Ireland

Chapter 6 was the only study in D4.2 which explored the effect of the local community of children on their educational pathways. In particular, the research focused on **the influence of the social mix of the school and the neighbourhood on students' performance at the upper secondary level, over and above individual factors**. The results suggest that due to the active practice of free school choice in Ireland, **children living in the same neighbourhood often attend different schools**; therefore the question on the impact of the environment is highly relevant. The researchers used longitudinal data from the Growing Up in Ireland dataset on the cohort of 4500 students as reported in four waves, when they were 9, 13, 17/18 and 20 years of age, respectively. In line with the findings from Luxembourg, the Irish team concluded that **the social mix of schools, and to a lesser extent that of neighbourhoods, does have an impact on students' performance**. This is true even after controlling for their individual characteristics – such as parental education and occupational group, family structure or migration background – and the type of school they attend, although the effect seems weaker. As a lesson of the study the authors emphasize that equalizing policies should simultaneously target vulnerable individuals and families, schools, and neighbourhoods in order to be effective.

Lithuania

The study about Lithuania, Chapter 7 was also exceptional within D4.2 due to its focus on a language minority, Polish- and Russian-speakers. The authors noted that the experiences of non-Lithuanian speakers in the Lithuanian education system differ from that of their Lithuanian-speaking peers. Tuition is provided in their mother-tongue (mostly Russian or Polish), and Lithuanian classes are available for them from kindergarten age. However, the teaching of the Lithuanian language and other subjects in Lithuanian is not always satisfactory, leading to inequalities. **Poor proficiency in the language of the majority population has a detrimental effect for children who already experience other types of disadvantage** due to their SES or place of residence (in rural areas). The research question asked **whether students' academic achievement is influenced by the language of instruction (Lithuanian vs. Polish- and Russian-medium schools)**. The results of an international assessment (PISA 2018) indicated that controlling for other forms of disadvantages, **pupils attending Russian-speaking schools actually perform better than their peers in Lithuanian-speaking schools**. Although one explanation of this is that most Russian-speaking schools operate in urban areas, therefore are better equipped and staffed, the difference in performance remains even taking this into consideration. This finding suggests that **students' linguistic disadvantages may be compensated if they can learn in their language spoken at home**.

¹⁰ 'The impact of school social composition and neighbourhood social mix on upper secondary exam performance in Ireland', authored by Emer Smyth and Merike Darmody.

¹¹ 'Equal education and PISA scores: the case of Russian-Medium Schools in Lithuania', authored by Jekatyerina Dunajeva, Taylor Kroezen, and Greta Skubiejūtė.

A country with a low level of educational inequality

Authors of Chapter 8¹² acknowledge that the **Finnish** education system is exceptionally equal in international comparison but point out that even in this context **some phases of the educational trajectory may provide possibilities of segregation**. They conducted a literature review of publications from the past decade to collect **information on the consequences of segregation**. Based on this, they identified ‘emphasized classes’ (offering supplementary teaching in certain subjects) at the lower secondary level as more selective and attractive for higher status families, therefore often having a disproportionately privileged composition. Although tracking starts only from the upper secondary level in Finland, the international trend is visible here as well that track choice, and later the preferred type of higher education reflects the social background of students. In line with Luxembourgian findings, migration status does not seem to have an influence on track choice, but the rural/urban division plays a part especially during the transition to higher education. All in all, **although the separation of young people from different social backgrounds in the education system is observable in Finland, too, it starts at a later stage than in other researched countries. Moreover, no causal relationship is discernible between segregation itself and educational choices made at later stages.**

2.2.2 Overview across intersectional groups

In accordance with the literature, the overwhelming majority of studies in D4.2 focused on the high-risk group of socially disadvantaged children when analysing the effects of school segregation. All of the studies confirmed the international trend that children with a lower socioeconomic status are less likely or unlikely to access the best possibilities in education systems. **To varying degrees, every analysis concerned found evidence that SES-based segregation** (attending a school with a high ratio of socially disadvantaged pupils) **has a negative impact on future educational achievement and/or attainment**. Findings from Germany, Switzerland and Hungary suggest that this effect is observable only either *a*) at certain points of the educational trajectory, and/or *b*) in certain aspects of educational outcomes. The Luxembourgian and Irish studies stated more confidently that the social composition of schools impacted future performance regardless of the individual characteristics of pupils.

Taking the MILC approach, it is important to assess whether the consequences of segregation are any different at the intersections of different vulnerabilities. The majority of studies introduced an intersectional perspective in some form, and in several cases their findings confirmed each other. While first- and second-generation migrants are experiencing different forms of deprivation in several countries, the present studies suggest that their disadvantages in education are primarily consequences of low SES, rather than migration background. **Once other characteristics (social status, earlier achievement, parental education) are controlled for, segregation based on migration background in itself does not seem to have a negative impact on students’ performance**, as shown in Chapters 3, 5 and 6. Nevertheless, migrant children in the observed countries Germany, Switzerland, Luxembourg and Ireland, just like children of Roma ethnicity in Hungary, are overrepresented among those suffering from consequences of SES-based segregation and other forms of educational inequality.

¹² ‘A review on literature on school segregation and its consequences in Finland’, authored by Katri Kleemola, Heidi Hyyntinen, Tarja Tuononen, and Auli Toom.

The spatial axis of educational inequality is another, somewhat understated theme that was explored by multiple studies of D4.2. **Place of residence** is not only an individual characteristic that **determines access to quality education to a large extent**. Chapters 6 and 7 on Ireland and Lithuania indicate that both the social composition of the neighbourhood (peer effects) and the rural/urban divide (difference in the availability of resources and services) are **strong influential factors at the systemic level**. When an underprivileged location of residence intersects with other forms of disadvantage, such as a language spoken at home that is different from the official language of education, these vulnerabilities mutually intensify each other's impact.

2.3 Results and implications

Findings of D4.2 on whether the consequences of school segregation accumulate across the educational trajectory are inconclusive. While some studies found that segregation at the beginning of the educational career has long-lasting impact, others found no evidence of that. **More than the social composition of schools, early tracking seems to have a decisive effect on the educational careers of pupils**. Studies on the highly stratified German and Swiss, as well as the similarly unequal Luxembourgian system confirmed that tracking reinforces and increases educational gaps, and the earlier it happens, the harder it is for children to change tracks throughout their life-course. **Tracking strongly correlates with the socioeconomic status of students' families** (their parents' education and profession and their financial possibilities), as shown in Hungary, Ireland, and even in Finland. Therefore, the earlier it happens, the more it contributes to keeping children in the social position of their parents.

The novel results presented in D4.2 confirm findings of earlier studies about the **overall association between school segregation and educational outcomes**. It is not always possible to scientifically prove that it is the composition of the school that leads to certain outcomes among its students, for example, a high ratio of low-SES students leading to worse performance among pupils. However, **the association between composition and outcomes is strong enough to be considered by policy makers**. Authors of D4.2 recommend extra support for schools with a large ratio of vulnerable students and attention to schools that succeed despite their disadvantaged student body, in order to learn from them. Moreover, they point out that **segregation is harder to challenge in highly stratified education systems**, in which children are separated into different tracks from an early age according to prior achievement. Early tracking leaves no time for the education system to compensate for factors such as neighbourhood or family background effects, and thus contributes to a wider and more persistent social divide in the societies affected.

3 Informal/shadow education, its interplay with formal education and intersectional inequalities

The scientific working paper (D4.3) about informal/shadow education (SE) is authored by Merike Darmody and Emer Smyth (Economic and Social Research Institute, Dublin), Robin Benz (University of Bern) and Irem Karacay and Irena Kogan (University of Mannheim). **The deliverable examines the issue of education outside the formal system, which closely reflects educational inequalities**. On the one hand, participation in informal and non-formal/shadow education is unequal and affected by pupils'

social background. On the other hand, such participation can contribute to educational inequalities in two opposite ways: it can reduce or reinforce them (Enrich, 2021). Consequently, the first research question sounds: **how do individual background characteristics relate to participation in SE?** That is, who is involved in SE? The second research question is: **to what extent does SE / non-formal learning relate to educational performance?** This refers to the alternate outcomes of participation in non-formal/shadow education. Does SE help reduce the gap between pupils coming from advantaged or disadvantaged families in terms of academic achievement and enrolment in higher education? Or, on the contrary, does it provide additional gains in a successful school career for the more advantaged (Matthew effect)? The MILC framework is applied by the paper in (a) the examination of the relation between formal education and SE; (b) the multi-level analysis of factors (individual, institutional, systemic); (c) following the impact of SE through the life-course and different dimensions of inequality.

3.1 General lessons

Educational activities taking place outside the formal system include non-formal and informal education (see Section 1.1). Non-formal education includes extra-curricular activities offered by schools, but also other forms of learning: through sports, arts, or day-care centres. Within this category, the term shadow education generally refers to fee-based (private) out-of-school tuition, which is not part of the formal education system, but covers the same curriculum, aiming to support children through their formal educational careers. Notwithstanding its specific form in terms of the type of activity, or whether participation is free of charge or paid by the parents, **extra-curricular activities are considered as investment into the students' human (in some cases cultural or social) capital**. Consequently, parents anticipate returns, i.e., expect such activities to positively affect learning outcomes. At the individual level, parental involvement is an important driving force of participation in extra-curricular activities, particularly in the case of shadow education, which parents are required to pay for. This means that SE does not necessarily compensates for socioeconomic or ethnic disadvantages. In fact, **children from families with more affluent backgrounds are more likely to use SE in order to enhance their school performance and prepare for higher education entry**. On the one hand, school choice in these families is usually a rather conscious decision; they tend to choose schools with more extra-curricular options. On the other hand, high-status families can afford to pay for more fee-based extra-curricular activities, courses, private tutoring even outside of the school system. Non-academic extra-curricular activities, aiming less at catching-up in formal school subjects but at investing in students' self-development, health, or culture are also more widely used by higher-status families. Thus, **non-formal extra-curricular activities can easily be the way of accumulating advantages rather than reducing inequalities in education**.

At meso level of the school system, participation in SE is likely to be driven by the competitive nature of the educational system. Moreover, SE courses in subjects that align with the formal curriculum have stronger impact if the school system is more regulated and standardized, i.e., if uniform school leaving exams and admission rules set out access to higher levels of schooling. At the same time, participation in arts, culture, and sports, connected more loosely to the formal curriculum, can also support students' performance through cultural capital. To some extent, some kind of **segregation may develop in the field of non-formal education, as well**. Apparently, there is an intersection of participation in SE in terms of the subject-specific selection of activities, the quality of instruction, and socio-economic as well as ethnic background of the families.

Empirical analyses of research of extra-curricular activities face difficulties for several reasons. First, non-formal education is a broad notion: it includes extra-curricular classes offered by the school where pupils study, but also special courses outside of the formal school system. The previous type of classes is usually offered free of charge, while parents have to pay for the latter type of extra tutoring. Inequalities emerge at family level, whether or not parents can afford extra paid lessons but also at school level: what kind of extra-curricular classes are offered by the school. Moreover, non-formal classes and courses may cover shadow education in subjects that are part of the regular school curriculum (e.g., maths) but also other activities, like sports. Second, when comparing how SE operates in the case of advantaged and disadvantaged pupils, definition and operationalisation of disadvantaged position can make a difference: it can be based, for instance, on ethnicity, migration or socioeconomic status, disability. Depending on the type of non-formal activities investigated, they can be beneficial for certain groups of disadvantaged students but not for others. Third, features of the school system (such as the degree of standardisation for curriculum, tracking, or the extent of private schooling) also influence how participation in non-formal education affects students' learning outcomes. SE contributes to school success more in certain school systems but is less beneficial in other school systems.

3.2 The overview of results across countries and intersectional groups

Although the PIONEERED consortium includes nine countries, the interplay between non-formal/shadow education and formal education and intersectional inequalities was examined empirically only in two countries due to data constraints. These countries, **Ireland and Germany, however, represent two different schooling systems, and the results from these two countries provide important and relevant insight into the mechanisms how SE operates under different individual and institutional conditions.** For this purpose, longitudinal datasets were used: the German National Educational Panel Study (NEPS) and the Growing Up in Ireland (GUI) study. Both datasets include a large set of control variables: family background, gender, migrant status, and prior educational achievement, etc. The numbers of cases are around 4600 students (GUI) and around 5500 students (NEPS), respectively.

In terms of institutional features, the German school system is characterized by a high degree of stratification, early tracking, and a historical importance of the vocational sector. In the German schools, good grades are important throughout the educational career to avoid track demotion or grade retention. The Irish school system, however, is predominantly comprehensive, with successive levels building on each other rather than parallel tracks. A crucial point in the educational career is the transition to higher education, the success of this transition is highly dependent on results in the Leaving Certificate exam. Participating in SE is one strategy that aims to improve results in this exam in Ireland. **The two systems represent two different ways of progression up the school ladder through the life-course.** The interplay between individual and institutional levels diverges with different interests and goal-oriented practices. This way the empirical analysis of the informal education/SE in the two countries is in accordance with the MILC approach.

Ireland	Germany
<ul style="list-style-type: none"> • Young women are significantly more likely to take part in SE than young men • Higher parental occupational status and higher level of income increase participation • Migration status decreases participation • Engagement in structured non-academic activities (sports and cultural activities) is positively related with participation in SE 	<ul style="list-style-type: none"> • Sociodemographic characteristics are of surprisingly little importance (no significant effect of parental socioeconomic status, tertiary education, or income) • Participation in SE seems to be driven predominantly by school-related factors (students in the academically less demanding track are less likely to take up SE compared to students in the more demanding track)

Table 2: Individual and institutional factors influencing participation in shadow education

Ireland (Leaving Certificate exam grades)	Germany (Maths & German grades combined)
<ul style="list-style-type: none"> • Participation in SE increases educational achievement and “returns” to SE are higher for those with lower prior achievement. Prior achievement increases exam grades but SE contributes to better educational outcome more if prior achievement is weaker. • In addition to SE, sport activities and cultural participation also increase achievement • Higher level of parental background (parental tertiary education, higher level of income) increases exam grades 	<ul style="list-style-type: none"> • Effect of SE is less straightforward: students participating in SE are less likely to achieve high grades, while prior achievement is a much stronger predictor of high grades. Combining these two effects reveals that SE positively affects the grades of low achievers, i.e. SE helps students with low prior achievement to improve their grade or at least prevents them from achieving lower grades • Grades are strongly dependent on students’ social origin (parental ISEI, tertiary education or high income) • Females have significantly higher grades while students with a migration background have lower grades

Table 3: The effect of shadow education on educational achievement

3.3 Results and implications

The major policy expectation is that non-formal/shadow education (1) positively affects educational performance, and (2) this effect is stronger for the disadvantaged students and works in the direction of reducing educational inequalities, i.e., SE does not follow a Matthew effect rule. Two country cases may provide limited evidence but it seems that country differences are consistent with the expected differences in the educational system of these countries. **Results confirm that participation in shadow education affects educational achievement positively.** The presence of some Matthew effect cannot be ruled out because social origin affects how students select into SE (in Ireland) and students with more advantageous family background perform better in school. While families of higher social status intend to maintain their advantage by using SE to improve their children’s educational outcomes, after controlling for parental social status it seems that participation in SE is more beneficial for low achievers. Thus, **SE has some compensatory effect** – in particular in Germany, where students are motivated to participate in SE in order to keep up with their studies. As the German data reveal, students can, indeed, recover from poor grades and are able to catch up and improve to sufficient

grades. This mechanism is present in Ireland as well, with the difference that participation in SE varies by social background, with those from more advantaged families more likely to participate.

An important further lesson from these studies is that **the positive impact of non-formal education cannot be restricted to courses in classic school subjects**, participation in sports, arts, and culture also improves educational performance. At the same time, while low achieving students can benefit from SE, it is **difficult to make strong statements about the success of SE in tackling educational inequalities**. As the analyses presented here show, disadvantage based on migration background is not compensated. Gender differences persist, for participation in Ireland and for educational achievement in Germany. It is also questionable whether poor children, whose families lack the financial resources to invest in SE have any means to improve their educational outcomes. D4.3 confirms earlier literature underlining the problem of such “mixed” results connected to SE. **In addition to “mixed” results, the situation of policy makers is further complicated by the large variation in the institutional contexts in different countries, which makes any uniform policy solution and suggestion questionable.**

4 Cross-national differences in intersectional inequalities along educational trajectories

The scientific working paper D4.4 is written by Irena Kogan and Irem Karacay (University of Mannheim), Aigul Alieva and Taylor Kroezen (Luxembourg Institute of Socioeconomic Research) and Auli Toom and Katri Kleemola (University of Helsinki). The aim of the deliverable is to **explain country variation in intersectional inequalities through examining the country-level structural and institutional characteristics relevant for individual or intersecting dimensions of inequality**. Outcomes are investigated in terms of two key scholastic competences (reading and mathematics) and a subjective indicator, the perception of school belonging. The whole analysis is fully in line with the MILC approach of the PIONEERED project: it follows (a) a life-course approach (addressing all stages of the education system, the primary, secondary and tertiary levels) and (b) an intersectional approach (involving the dimensions of gender, SES and migration background).

4.1 General lessons

Educational inequalities in terms of academic performance and other educational outcomes seem to be persistent. At individual (micro) level, this is due to primary effects, namely that differences in scholastic achievement are affected by students’ social origin, and secondary effects, namely that educational decision-making at certain educational transitions (based on prior performance and preferences) is also dependent on social background (Boudon, 1974). At the meso and macro levels, features of the school system, efforts aiming for immigrants’ integration, as well as tackling gender-based inequalities influence educational inequalities. **Highly stratified educational systems are detrimental for disadvantaged, lower-achieving groups** due to the unequal and segregated learning environments, and tend to sort low-SES, ethnically disfavoured students into dead-end or less advantageous educational tracks. **Early tracking is particularly associated with larger educational inequality**, e.g., the reading achievement gap between high- and low-SES students (Contini & Cugnata, 2020). At the macro (societal) level, gender norms influence the gendered character of

educational outcomes, such as decisions on entry to higher education or choice of field of studies (girls tend to avoid STEM fields). Inclusive immigrant integration policies can contribute to reducing the gap in educational outcomes between migrants and natives. Educational attainment is expected to be higher among students with an immigrant background if more developed integration policies are present.

4.2 The overview of results across countries and intersectional groups

This deliverable goes beyond the (limited) country composition of the PIONEERED project. **The analysis covered 40 countries covered by the PISA datasets.** (PIRLS, TIMSS and EUROSTUDENT datasets include fewer countries.) PIRLS and TIMSS data were used to analyse the primary level. In the case of PISA, waves between 2000 and 2018 were used to study the secondary level. EUROSTUDENT data, which focus on higher education, were used to examine students' sense of belonging in tertiary education. **Country variation was explored in a multilevel framework.** The individual (micro level) information from the above datasets was complemented with aggregated (macro) data on countries from three sources: (1) the female percentage of the graduation ratio from ISCED 6/7 in tertiary education (UNESCO-UIS, OECD, and EUROSTAT, 2020); (2) the tracking index from the Educational System Database, based on country level indicators, providing information on the degree of stratification of the school system in the various countries (Bol and van de Werfhorst, 2013); and (3) the Migrant Integration and Policy Index (MIPEX)¹³, reflecting the responsiveness of policies and education systems to the needs of immigrant children in different countries.

The analysis was carried out in two steps. First, at the micro level, the three outcome variables (maths and reading scores, sense of belonging in schools) were predicted for each country separately; the key independent variables were parental education (a proxy for SES), gender, and migration status; control variables included language spoken at home, degree of urbanisation and survey year dummy variables. This step estimated the gaps between students with different intersectional characteristics (SES, gender, migration background) for the three dependent variables (educational outcomes). For this purpose, a typology was generated on the ground of the combination of SES, gender, and migration status difference.¹⁴ **Second, at macro level,** the dependent variables stemmed from the regression estimates of the first step. To predict the outcome gaps, the key independent variables were the three macro indicators at country level (female percentage at graduation ratio, tracking index, MIPEX index). The aim was to present patterns of associations between the selected characteristics of the analysed countries and intersectional inequalities.

4.2.1 First step results: overview across intersectional groups

The aim of the first step of analysis was to identify which intersectional groups are particularly prone to lower school performance and higher levels of school estrangement. The seven intersectional groups were compared to the reference category of male, high-SES¹⁵, native-born students. Maths and reading performance could be investigated only at the primary and secondary levels, as no

¹³ <https://mipex.eu/>

¹⁴ The reference category (Male, High SES, Native students), and the seven other categories (Male, Low SES, Native; Male, High SES, Migrant; Male, Low SES, Migrant; Female, High SES, Native; Female, Low SES Native; Female, High SES, Migrant; and Female, Low SES, Migrant students).

¹⁵ High-SES meant parent with tertiary education.

measures were available at the tertiary level. However, sense of belonging was studied across all stages of the educational trajectory.

	Primary level	Secondary level
Maths performance	<ul style="list-style-type: none"> • All intersectional groups have lower test results in math compared to the high-SES native boys. • The largest gap appears for low-SES girls and boys with a migration background. 	<ul style="list-style-type: none"> • All intersectional groups have lower test results in math compared to the high-SES native boys. • The gap is the largest for low-SES non-native girls and boys, followed by low-SES native girls.
	The extent of intersectional inequalities in math is somewhat smaller at the secondary than the primary level of education, with some exceptions	
Reading performance	<ul style="list-style-type: none"> • The high-SES native boys do not represent the best performing group in the language domain but high-SES native girls have the highest reading scores. • Low-SES non-native male students have the lowest performance in the reading test, followed by low-SES non-native female students. 	<ul style="list-style-type: none"> • High-SES native girls perform the best in reading. • The worst performers in reading are low-SES boys with and without a migration background.
	For reading performance, significantly lower intersectional inequalities appear at the secondary level as compared to the primary level of education, with some exceptions	

Table 4: Results at scholastic competences across intersectional groups on primary and secondary level

	Primary level	Secondary level	Tertiary level
Sense of belonging	Female students express stronger identification with school than boys. Native-born girls with high-SES report the strongest belonging to school, followed by native girls with low SES and then followed by high-SES migrant girls. Low-SES migrant boys feel the lowest levels of school belonging, followed by high-SES migrant boys	High-SES native girls report the highest levels of school belonging. The lowest level of school belonging is observed for low-SES non-native boys.	High-SES native young women display the highest level of college/university identification. In contrast to the findings for primary and secondary levels, low-SES young women with a migration background feel the strongest estrangement from higher education.
	Level of school belonging across intersectional groups is most pronounced at the primary level, compared to the secondary and tertiary levels of education		

Table 5: Results at the sense of belonging across intersectional groups on three different levels of education

D4.4 includes a re-test of these findings with an alternate specification of SES. Instead of contrasting high-SES (=with a tertiary educated parent) students with the rest, the least educated were also compared to the rest in a repeated analysis. Based on this sensitivity test, intersectional inequalities

seem to be largely similar, except for reading competences at the secondary level, where the disadvantages of low-SES students turned out to be more pronounced. E.g., low-SES native girls, who seemed to demonstrate similar reading competences as high-SES native boys, appeared to have larger gaps to the benchmark group in the re-test. The intersectional differences in the sense of belonging at the primary level of education look smaller by the alternate specification of SES. At the same time, data reveal stronger estrangement from higher education for low-SES girls.

4.2.2 First step results: overview across countries

According to the first-step analysis, country differences mostly stem from variance between education systems and in policies regarding gender equality and the integration of minority groups (in this case, individuals with migration background).

As regards maths competencies, intersectional inequalities were typically higher at the primary stage than the secondary stage in most countries. Nevertheless, in some exceptional cases, the most vulnerable groups (low-SES with migration background) experience higher inequalities at secondary level. A typical example is Germany with its highly stratified secondary education system where early tracking explains disadvantage at later stages of the school career, too. Interestingly, data revealed similar tendencies in Finland and Norway as well. In these countries, the explanation is less straightforward, the reasons are probably to be found in the (different) migrant population backgrounds.

In terms of reading competencies, gender is the most important dimension of intersectional inequalities: while inequalities related to SES and migration tend to decrease from primary to secondary level in the majority of countries, gender-related inequalities tend to be larger at the secondary than the primary level. This result holds particularly for countries with more stratified education systems, such as Germany, Belgium, the Netherlands, or Denmark. Another variation to note between countries: inequalities between native and non-native groups are less pronounced in Eastern European countries, where the number of immigrants, particularly low-SES immigrants, is considerably lower.

The patterns in students' sense of belonging also vary cross-nationally but without a clear tendency. While girls tend to feel stronger belonging to school in some countries, the opposite is true in others (e.g., Australia, Denmark, Finland, Ireland, Norway, UK, US). Results are contradictory for students with a migration background, as well. In several countries, students with a migration background report a strong sense of belonging to school, while in others the situation is reversed. Interesting country differences, underlined in the deliverable, include the cases of Finland vs. Denmark, where high gaps appear across the vulnerable groups of 'girls with migration background' and 'low-SES male and female students'. In Ireland, it mostly males with a migration background who appear estranged from schools, particularly at the primary level.

4.2.3 Second step results: further cross-country differences in intersectional inequalities

The second-step analysis aimed to uncover country variation on the basis of country-level characteristics, i.e., the female percentage at graduation ratio from ISCED 6/7 to tertiary education; the tracking index, based on country level indicators; and the MIPEX index on the responsiveness of policies and education systems to the needs of immigrant children. The relationship between

intersectional inequalities and the three macro-level indicators were examined in bivariate and multivariate manner.

The bivariate analysis confirmed that **the disadvantages of more vulnerable groups (low-SES, migration background) are more pronounced in countries with more stratified education systems.** Tracking seems to be strongly associated with intersectional inequalities at the secondary level of education (as compared to the primary level) and when applying the second SES specification (= contrasting students with low educated parent and the rest).

The indicator of female representation in tertiary education (**more openness in access to studies at tertiary level for women**) plays a significant role in reducing gender-related inequalities in scholastic achievements, particularly in maths and at secondary level. However, the indicator provides mixed patterns in the association with the sense of belonging to school.

The third indicator related to the responsiveness of education systems towards the needs of immigrant students produced mixed results, too. For example, immigrant status-related intersectional inequalities are smaller in maths at the primary level in countries with more responsive education systems – as expected. This association is, however, less present at the secondary level. Results also raise questions about the sense of belonging: intersectional inequalities seem bigger in countries with more responsive education systems, (i.e., students with a migration background report lower level of belonging to school in countries with higher scores at the MIPEx index).

Turning to the results of the multivariate models, the main observations (partly confirming, partly completing the findings above) are the below:

- The gap between low-SES migrant males and the benchmark of high-SES native males tends to narrow in countries with more developed policies targeting ethnic minority inclusion at school. In countries with more pronounced tracking, maths score gaps of low-SES young men and women with a migration background become even larger, increasing further the disadvantage of these groups. In countries with female-inclusive tertiary education, girls from high-SES families seem to perform better in mathematics.
- The results for maths score gaps persist in the case of the alternate SES specification. The stronger the tracking at secondary level, the more marked the disadvantage.
- For reading performance, no significant association with the macro-level variables could be observed at primary level. At secondary level, tracking plays a significant role in increasing disadvantages of low-SES male migrants. In countries with higher female graduation rates, high-SES native and migrant girls increase their advantages in reading competences, as well.
- Results on the sense of belonging to college/university at higher education level remain rather surprising. For instance, as mentioned earlier, in countries with more inclusive policies towards immigrant children, high-SES female immigrants express a lower sense of belonging at the secondary and tertiary levels of education.

4.3 Results and implications

According to this deliverable, **the major policy goal is to diminish educational inequalities in terms of educational achievement as well as a sense of belonging in school. For this purpose, it is crucial**

to develop successful practices to reduce the negative consequences of SES-, gender-, migration-, ethnicity- or disability-based disadvantages. D4.4 fills the gap in the existing research by providing a systematic assessment of (a) intersectionality between gender, SES, and migration background, (b) along various stages within the education system, (c) in various educational outcomes (competences and sense of belonging to school) and (d) across countries.

4.3.1 Results of the macro-level analysis

The study of sense of belonging to school

While academic performance has frequently been studied earlier, the investigation of students' perceptions of school offers more novelty, also for policy makers. **Although the causal direction is unclear, the sense of belonging to school is associated with study progress and success, overall educational attainment and well-being in the broader sense, as well.** The sense of belonging (a subjective attitude) is constructed through various experiences at school, interactions with other students and teachers as well as individual identity development. Nevertheless, the process underlying the development of school belonging in various countries is still unclear: in addition to the individual processes, it is related to the countries' institutional characteristics (such as the set-up of the school system or the treatment of ethnic minorities). **Results presented in this deliverable are conclusive in the sense that school estrangement is markedly present among vulnerable intersectional groups.** Other results, however, remain inconclusive, particularly about the impact of responsive policies and educational systems to the needs of immigrant children. **When organizing supporting programmes for such vulnerable groups as immigrants (or other minority groups), policy makers should be very careful to avoid unintended consequences that could lead to stigmatisation.** Inappropriate policy programs can do more harm than good.

Reasons for inequalities increasing/decreasing with time: stratification vs. inclusivity

The relationship between intersectional inequalities and academic achievement (maths and reading performance) is more straightforward – even if it seems contradictory, at first sight. Contradiction lies in the fact that intersectional inequalities are larger at the primary level in some countries and at secondary level in others. However, intersectional inequalities are larger at the secondary level particularly in countries where tracking and stratification are stronger at the secondary level. This means that the macro-level tracking system (**the tracking index**) is a strong predictor of intersectional inequalities and explains, at least in part, country differences in inequalities in academic achievement. In other words: early tracking is highly responsible for the disadvantages that vulnerable (low-SES, migrant) students experience later in their school career.

In this respect, more inclusive education policies also matter. In countries with inclusive policies, low-SES boys with a migration background manage to narrow their disadvantage compared to high-SES native boys in maths competences. This means that **policies aiming to reduce inequalities in educational outcomes seem to be more efficient at improving scholastic achievement, but less successful at addressing school disengagement.**

A next important conclusion is **that a larger representation of female students at the tertiary level is associated with a better performance at maths among female students with and without migration background, narrowing the gap between them and their male counterparts.**

4.3.2 Some limitations of the macro-level analysis

It is also clear from the analysis that the above-described macro-level indicators are less powerful at explaining the intersectional inequalities in reading than in mathematics competences. It should be kept in mind that the analysis on these two competences, as well as the comparison between primary and secondary levels, are based on data from various datasets, sometimes with a selection of different countries and different time ranges. Thus, it is advisable to be cautious with the results.

While D4.4 presents a powerful analysis at the macro level, due to the lack of adequate information in the datasets utilised here, relevant aspects of the reduction of intersectional inequalities are still missing at the meso level. Communication with members of vulnerable groups, and pedagogical practices of teachers play an important role both in reducing academic disadvantages and in constructing a stronger sense of belonging to school (Hattie, 2009; Razer *et al.*, 2013). These aspects could be explored in further analyses.

While the analysis focused on intersectional disadvantages, not all dimensions of vulnerability could, unfortunately, be covered by the data. Ethnicity is one of these - it could not always be fully considered when examining the role of migration background. Various forms of disability could also be included in further studies. Even though the negative consequences of migration background was successfully analysed in the deliverable, further research is required to uncover the composition effects in migration background.

5 Conclusion

Educational inequality in academic performance and other educational outcomes seems to be persistent. Among the factors behind it, our research identifies three major categories:

- i.) contextual and societal factors (such as the general level of inequality or residential segregation),
- ii.) institutional factors in the education system (such as school choice or tracking),
- and iii.) psycho-social and socio-economic factors (such as attitudes or parental SES).

Although all three categories of factors have an effect on educational achievement and attainment patterns as well, for education policies *per se* and for social policies to back inclusive (and efficient) schooling practices, it is the institutional setting that is the most significant. Contextual and psycho-social factors must be fully understood when designing policies. Nevertheless, **a realistic policy reform starts with understanding the operation of institutions and continues with suggestions for reforms in the operations of the institutions**, while never losing sight of path dependencies and stakeholder interests.

The educational trajectory is shaped by parents (selecting schools and extracurricular activities for their children), pupils (selecting friendships and attention given to various courses and activities) and schools (selecting strategies for inclusion or segregation). The interplay of these choices determines the final success in schools, both in average achievement and attainment of their pupils. This may or may not align with the more general public good of building a cohesive and prosperous society. Should the latter be an aim of the polity, supportive policies can be built up to influence schools towards directions considered beneficial for the society as a whole.

Research on the performance of various education systems has already shown that highly stratified educational systems are hindering the chances of disadvantaged groups due to the unequal and segregated learning environments, and tend to sort low-SES, ethnically disfavoured students into dead-end or less advantageous educational tracks (OECD, 2019). Early tracking is particularly associated with larger educational inequality, e.g., the reading achievement gap between high- and low-SES students. While the results of WP4 on whether the consequences of school segregation accumulate across the educational trajectory depend on country context and referred educational outcome, **early tracking was consistently found to influence the long-term pathways of pupils to a larger extent than the social composition of schools**. The first policy conclusion, therefore, is that **education policies should concentrate on reducing early tracking in education systems**. The more comprehensive the education, the better for tackling educational inequalities.

It is also clear that children facing education disadvantages (such as children of migration and ethnic minority backgrounds or low SES) require special attention and additional resources in the various schooling systems, stratified and comprehensive as well. **Extra support is recommended for schools with a high ratio of vulnerable students**, and it is important to pay attention to the practices of schools that succeed despite their disadvantaged student body, in order to learn from them. While policies targeting inequalities in educational attainment have succeeded, **more attention should be paid to improving a sense of belonging to school**. School disengagement is widely associated with lower academic achievement, and affect vulnerable students to a disproportionate extent.

Finally, it is confirmed that **learning processes that happen outside the formal education system are related to children's outcomes in formal education, and under some circumstances play a compensatory role**. Therefore, the potential of informal/non-formal learning should be acknowledged and facilitated. Whether or not SE contributes to, or reduces educational inequality is contingent upon many local parameters.

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7 Annexes

7.1 Annex A – Contributions to this report

Seiler, S., Benz, R., and Erzinger, A.B. (2022). *Working paper (scientific). Consequences of school segregation on achievement and attainment*. Bern: University of Bern. [Unpublished].

- Chapter 1, Introduction: Simon Seiler, Robin Benz, and Andrea B. Erzinger
- Chapter 2, Effects of school segregation on educational achievement along the educational trajectory in Germany: Robin Benz, Simon Seiler, and Andrea B. Erzinger
- Chapter 3, The impact of school composition on students' achievement in Luxembourg: a longitudinal perspective: Juliette E. Torabian, Andreas Hadjar, Martha Ottenbacher, Taylor Kroezen, Frederick de Moll, Aigul Alieva, Ines M. Pit-ten Cate, and Antoine Fischbach
- Chapter 4, School segregation, student achievement, and educational attainment in Hungary: Zoltán Hermann and Dorottya Kisfalusi

- Chapter 5, Consequences of ethnic and social segregation on educational attainment at upper secondary level in Germany and Switzerland: David Glauser, Robin Busse, and Katja Scharenberg
- Chapter 6, The impact of school social composition and neighbourhood social mix on upper secondary exam performance in Ireland: Emer Smyth and Merike Darmody
- Chapter 7, Equal education and PISA scores: the case of Russian-Medium Schools in Lithuania: Jekatyerina Dunajeva, Taylor Kroezen, and Greta Skubiejūtė
- Chapter 8, A review on literature on school segregation and its consequences in Finland: Katri Kleemola, Heidi M. Hyytinen, Tarja Tuononen, and Auli Toom

Darmody, M., Smyth, E., Benz, R., Karacay, I., and Kogan, I. (2022). *Working paper (scientific). Informal/shadow education, its interplay with formal education and intersectional inequalities*. Dublin: Economic and Social Research Institute [Unpublished].

Kogan, I., Karacay, I., Alieva, A., Kroezen, T., Toom, A., and Kleemola, K. (2022). *Working paper (scientific). Intersectional inequalities along the dimensions of social origin, gender, and migration background in primary, secondary, and tertiary education from a cross-country perspective*. Mannheim: University of Mannheim [Unpublished].

7.2 Annex B – List of Tables

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