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Addressing Learning deficits and Student Well-being: International Insights for the Evaluation of the Dutch National Education Programme

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Samenvatting

De COVID-19-pandemie heeft wereldwijd het onderwijs zwaar ontwricht. Om de verspreiding van het virus tegen te gaan, besloten overheden scholen te sluiten. Daardoor moesten onderwijsinstellingen in korte tijd en vaak zonder voldoende voorbereiding overschakelen naar afstandsonderwijs. Deze plotselinge omslag had verstrekkende gevolgen, onder meer in de vorm van leervertragingen en negatieve psychosociale effecten. Vooral leerlingen uit sociaal-economisch kwetsbare gezinnen werden onevenredig hard getroffen, zowel in hun leerprestaties als in hun welzijn. Overheden reageerden met uiteenlopende herstelprogramma's. In Nederland werd in 2021 het Nationaal Programma Onderwijs (NP Onderwijs) gelanceerd, een grootschalig programma om door Covid ontstane leervertragingen en verslechteringen in het welbevinden van leerlingen weg te werken. Nu dit programma in schooljaar 2024-2025 afloopt, **biedt deze studie een internationaal vergelijkend perspectief dat kan bijdragen aan de evaluatie. We analyseren hiervoor de beleidsreacties van tien landen.** Dit zijn België, Frankrijk, Duitsland, Italië, Zweden, Engeland, Canada, Japan, de Verenigde Staten en Nederland. De analyse is gebaseerd op wetenschappelijke literatuur, beleidsdocumenten en internationale onderzoeken zoals PISA en PIRLS.

De eerste onderzoeksvraag gaat in op de manier waarop schoolsluitingen in verschillende landen zijn doorgevoerd en vergelijkt deze met de Nederlandse aanpak. In Nederland waren de sluitingen in het primair onderwijs relatief kort (11,5 weken), maar in het voortgezet onderwijs duurden ze aanzienlijk langer, tot wel 16 weken. Daarmee behoren Nederlandse middelbare scholieren internationaal tot de meest getroffen groepen. Ter vergelijking: in Frankrijk duurden de sluitingen maximaal 9 weken, en in Japan slechts 0 tot 6 weken. In Engeland en delen van Canada waren scholen daarentegen, net als in Nederland, tot 16 weken gesloten. Deze verschillen zijn vooral te verklaren door drie factoren: de mate van autonomie in de besluitvorming, de beleidsprioriteiten tijdens de pandemie, en de ernst van de gezondheidscrisis. In landen met een sterk gecentraliseerd onderwijssysteem, zoals Frankrijk, werden uniforme maatregelen genomen, wat de uitvoering en monitoring vergemakkelijkte. In landen met meer lokale autonomie (zoals Zweden en Japan) of een federale structuur (zoals Duitsland, Italië en de Verenigde Staten) ontstonden juist grote regionale verschillen in de duur van de sluitingen. Daarnaast speelden politieke keuzes een belangrijke rol: Frankrijk en Zweden stelden het zo snel mogelijk heropenen van scholen voorop, terwijl in Engeland publieke weerstand juist leidde tot uitstel. Ook binnen landen kwamen verschillen naar voren tussen onderwijsniveaus. Zo sloot Nederland het primair onderwijs korter dan het voortgezet onderwijs. Ten slotte hielden landen die zwaarder door de pandemie werden getroffen, zoals Canada en Engeland, hun scholen over het algemeen langer dicht.

De tweede onderzoeksvraag onderzoekt de invloed van de pandemie op leerresultaten en mentaal welzijn, met bijzondere aandacht voor verschillen tussen onderwijssystemen en groepen leerlingen. In alle onderzochte landen zijn leervertragingen vastgesteld, waarbij vooral reken/wiskundevaardigheid zwaarder werd getroffen dan leesvaardigheid. Gemeten per week schoolsluiting waren de vertragingen kleiner in Italië en Nederland, wat wijst op relatief veerkrachtige onderwijssystemen. Drie factoren speelden hierbij een rol: het prestatieniveau vóór de pandemie, de snelheid en gerichtheid van beleidsmaatregelen, en de mate waarin digitale technologie pre-COVID-19 al was ingebed in het onderwijs. Landen die al voor de crisis met structurele problemen kampten – zoals zwakker onderwijsbeleid, verouderde didactiek, dalende leerprestaties – bleken extra kwetsbaar. Tegelijkertijd konden vroege interventies, zoals zomerscholen die tijdens of kort na de pandemie van start gingen in België, Engeland, Nederland

en Frankrijk, de invloed op leerprestaties gedeeltelijk beperken. Ook bleek dat onderwijsstelsels die digitaal goed waren voorbereid, zoals Nederland en Japan, minder vertragingen opliepen. Dit bevestigt het belang van een goede digitale infrastructuur en voorbereiding bij het beperken van de gevolgen van verstoringen in het onderwijs.

De invloed van de pandemie deed zich ongelijk voor tussen verschillende groepen. In alle landen liepen leerlingen uit lagere sociaaleconomische milieus grotere vertragingen op. Leeftijd speelde eveneens een belangrijke rol. Waar sluitingen alle onderwijsniveaus in gelijke mate troffen, bleken juist de jongste leerlingen het meest kwetsbaar, zoals in Engeland. In landen waar oudere leerlingen langer met sluitingen te maken kregen – waaronder Duitsland, Nederland en Italië – waren hun vertragingen het grootst. Toch laat de Nederlandse situatie een gemengd beeld zien: sommige studies vinden grotere vertragingen naarmate leerlingen ouder zijn, ook bij gelijke sluitingsduur. Er zijn bovendien aanwijzingen dat overgangen tussen onderwijsniveaus (bijvoorbeeld van primair naar voortgezet onderwijs) de kwetsbaarheid hebben vergroot, al hebben maar weinig landen deze groep steun verleend. Daarnaast speelden geografische verschillen een rol, vaak samenhangend met de digitale infrastructuur in de regio. Zo vielen grotere leervertragingen op in Zuid-Italië, landelijke gebieden in Japan en bepaalde regio's in de VS. Ook de mentale gezondheid van leerlingen kwam onder druk te staan. In alle onderzochte landen werden meer gevallen gemeld van angst, verminderde motivatie en sociale isolatie. Deze effecten hingen vaak samen met de duur van de sluitingen en waren het sterkst bij leerlingen uit lage SES-milieus, meisjes en leerlingen met een migratieachtergrond.

De derde onderzoeksvraag gaat in op het ontwerp en de doelgroep van herstelprogramma's. In bijna alle landen lagen de interventies op drie terreinen: leerherstel, digitalisering en mentale gezondheid. De invulling daarvan verschilde echter sterk in duur, omvang en diepgang. Zo investeerden Engeland en België fors in gestructureerde bijlessen en zomerscholen, terwijl Italië en Duitsland vooral kozen voor investeringen in infrastructuur, met minder aandacht voor psychosociale ondersteuning. Opvallend is dat juist interventies rond mentale gezondheid vaak onderontwikkeld bleven, ondanks duidelijk bewijs dat emotioneel welzijn sterk samenhangt met leerprestaties.

Ook de manier waarop middelen werden verdeeld varieerde. Nederland en Engeland kozen voor een directe toewijzing op basis van het aandeel kansarme leerlingen per school. In Italië werd gewerkt met geografische indicatoren als proxy voor kwetsbaarheid. Slechts weinig landen besteedden expliciet aandacht aan leerlingen die zich in een overgangsfase tussen onderwijsniveaus bevonden, terwijl deze groep extra risico liep. Hoewel vrijwel alle programma's de toegenomen ongelijkheid erkenden, hield geen enkel land rekening met de feitelijke duur van schoolsluitingen bij de verdeling van middelen. Een uitzondering was Nederland: vanaf het tweede jaar van het NP Onderwijs ging meer geld richting het voortgezet onderwijs, in erkenning van de langere sluitingen en de grotere leervertragingen in die sector.

De vierde onderzoeksvraag richt zich op het beschikbare bewijs over de kosten en effecten van herstelprogramma's. Slechts een beperkt aantal landen nam systematische monitoring op in het beleid. Nederland combineerde autonomie op schoolniveau met een nationaal keuzemenu van evidence-informed interventies ('menukaart')met voortdurende evaluatie. Engeland volgde een vergelijkbare aanpak via het National Tutoring Programme. In landen als Italië, Duitsland en Zweden ontbraken echter uitgebreide monitoringsystemen, waardoor bijsturing op basis van harde data nauwelijks mogelijk was. Daar waar wel werd geëvalueerd, zijn duidelijke effecten zichtbaar. Bijlesprogramma's en zomerscholen leverden meetbare leerwinsten op: in Vlaanderen was er een gunstige invloed van zomerscholen, en in Engeland bleek vooral vroege bijles in het

basisonderwijs aanzienlijk effect te hebben. Tegelijk laat de ervaring in de Verenigde Staten zien dat hoge investeringen op zich geen garantie zijn: brede richtlijnen zonder gestructureerde implementatie resulteerden in zeer beperkte opbrengsten (0,002–0,009 standaarddeviatie per €1.000 per leerling). De hoogste kosteneffectiviteit werd bereikt wanneer interventies langdurig werden voortgezet, zich specifiek richtten op leerlingen uit lage SES-milieus, en ontworpen waren op basis van data en bewijs. Landen die bovendien mentale gezondheid nadrukkelijk integreerden in hun herstelbeleid – zoals Nederland en de Verenigde Staten – realiseren waarschijnlijk duurzamere en bredere verbeteringen in de leer- én welzijnsuitkomsten van leerlingen.

Deze studie laat zien dat succesvol onderwijsherstel niet alleen afhangt van hoeveel er wordt geïnvesteerd, maar vooral van hoe programma's worden ontworpen, uitgevoerd en geëvalueerd. Het Nederlandse NP Onderwijs onderscheidt zich internationaal door een combinatie van goede praktijken: een snelle start met concrete maatregelen, gerichte steun voor de meest kwetsbare leerlingen, nationale coördinatie en monitoring, ruimte voor scholen om binnen duidelijke kaders evidence-informed interventies te kiezen, en expliciete aandacht voor mentale gezondheid en welzijn. Toch blijven sociaaleconomische ongelijkheid en mentale gezondheidsproblemen hardnekkige uitdagingen die ook na schooljaar 2024-2025 blijvende aandacht vragen. Ervaringen uit andere landen benadrukken daarbij het belang van doelgerichte steun en politieke wil om veerkrachtige en eerlijke onderwijssystemen te bouwen. Voor Nederland geldt dat, naast de aanzienlijke investeringen in het primair onderwijs, ook versterking van de voorschoolse educatie kansen biedt. Engels onderzoek toont dat dit substantiële leerwinsten kan opleveren en de veerkracht van het systeem vergroot, vooral voor leerlingen uit lage SES-milieus. Ten slotte is het zinvol te kijken naar alternatieve manieren om kwetsbare leerlingen goed te bereiken, zeker bij vrijwillige interventies. Internationale ervaringen wijzen op positieve effecten van meer ouderbetrokkenheid en van sturende strategieën die verder gaan dan het louter overlaten van keuzes aan ouders.

Summary

The COVID-19 pandemic resulted in severe disruptions to education systems worldwide. In efforts to mitigate the spread of the virus, governments enforced school closures, leading to widespread adoption of remote learning with limited preparation. These disruptions had far-reaching consequences, particularly in the form of learning deficits and harmful psychosocial effects. Students from lower socioeconomic backgrounds were especially vulnerable, facing educational and well-being challenges. Governments responded by initiating various recovery programmes. In the Netherlands, the Nationaal Programma Onderwijs (NP Onderwijs) was launched in 2021 as a large-scale effort to mitigate the COVID-19 learning deficits and deteriorations of mental well-being. As the NP Onderwijs nears completion in school year 2024-2025, **this study provides a comparative perspective to support its evaluation by examining policy responses in ten countries.** The report addresses four research questions using qualitative desk research, focusing on Belgium, France, Germany, Italy, Sweden, England, Canada, Japan, the United States, and the Netherlands. Data were drawn from academic literature, government documents, and international assessments such as PISA and PIRLS.

The first research question investigates how school closures were implemented across countries and compares them with the Dutch approach. The Netherlands experienced relatively limited time of full closures in primary education (11.5 weeks), though secondary schools faced extended closures of up to 16 weeks. This placed Dutch secondary students among the most affected in terms of time spent in remote learning. By contrast, France and Japan limited closures respectively to 9 and from 0 to 6 weeks, while England and parts of Canada experienced closures of up to 16 weeks. These differences are primarily explained by three factors: the degree of autonomy in decision-making, national priorities during the pandemic, and the severity of the health crisis. Countries with centralised education systems, such as France, enforced more uniform closures, making policy implementation and monitoring easier. In contrast, countries leaving large decision-autonomy to local or school levels (e.g., Sweden and Japan) or federal organizations (e.g., Germany, Italy and the United States) exhibited wide local variation in the length of school closures. Moreover, government priorities played a key role: countries such as France and Sweden explicitly prioritised school reopening, whereas public opposition in England delayed returns to school. Government priorities have also translated into variations in school closure within countries across education sectors. For instance, the Netherlands implemented different school closure length between primary and secondary education. Finally, countries with more severe outbreaks, including Canada and England, tended to maintain longer closures.

The second research question concerns the academic and psychosocial effects of the pandemic, as well as variation across education systems and student groups. Learning deficits were observed in all countries, with mathematics typically more affected than reading. In general, deficits per week of closure were smaller in Italy and the Netherlands, suggesting relatively resilient systems. Three factors contributed to this resilience: the pre-pandemic performance of education systems, the timing and targeting of policy responses, and the integration of digital technologies. Countries with pre-existing challenges – including weak educational policies, outdated teaching methods, declining test scores, etc. – were further exposed to the pandemic. However, early policy implementation like summer school programmes launched in Belgium, England, the Netherlands and France during or shortly after the crisis mitigated some losses. Moreover, education systems with better digital preparedness, such as the Netherlands and Japan, observed smaller learning deficits, reinforcing the role of ICT readiness in reducing educational disruption.

The impact of the pandemic was not equally distributed. Across all evaluated countries, students from lower socioeconomic backgrounds experienced more severe learning losses. Age also played a critical role. In systems where closures were equally applied across education levels, younger students tended to fall further behind, as seen in England. Conversely, in contexts where older students faced longer closures – as in Germany, the Netherlands and Italy – those groups exhibited larger deficits. Yet, the Dutch context presents contrasting results as mixed evidence also report increasing learning deficits through student's age who experienced the same closure time. We observe limited but suggestive evidence that educational transitions (e.g., from primary to secondary school) may have increased student vulnerability, though few countries explicitly targeted this group. Geographic disparities, often linked to digital infrastructure, also emerged, particularly in southern Italy, rural Japan, and parts of the United States. Mental health deteriorated in all countries studied, with increased reports of anxiety, low motivation, and social isolation. These effects correlated with the duration of school closures and were especially pronounced among low-SES students, girls, and migrant populations.

The third research question examines the design and targeting of recovery programmes. Most countries implemented interventions in three key areas: learning recovery, digitalisation, and mental health. However, their length, scope and depth varied considerably. For example, England, and Belgium invested heavily in structured tutoring and summer schools. In contrast, Italy and Germany focused more on infrastructure, with limited emphasis on psychosocial support. Mental health interventions were often underdeveloped, despite robust evidence linking emotional well-being with academic outcomes. Targeting strategies also differed. Countries like the Netherlands and England directly allocated funding based on the proportion of disadvantaged students in each school. Others, like Italy, used geographic proxies. Few countries explicitly prioritised students at transitional stages between school levels. Although most programmes acknowledged socioeconomic disparities, none based funding allocations on the length of school closures – with the partial exception of the Netherlands, which in the second year adjusted its allocations to secondary education, recognising that these schools had faced longer closures and greater learning losses.

Finally, **the fourth research question assesses the available evidence on the costs and outcomes of recovery programmes.** Only a few countries included systematic monitoring into policy design. The Netherlands combined school-level flexibility with a national 'menu' (choice set) of evidence-based interventions and ongoing evaluation. England implemented similar structures through the National Tutoring Programme. In contrast, countries such as Italy, Germany, and Sweden lacked comprehensive monitoring systems, limiting their capacity for evidence-based adjustments. Among those that evaluated outcomes, findings suggest that tutoring and summer schools yielded measurable benefits. For instance, Flanders showed positive influence of summer schools, and England reported substantial gains from early childhood tutoring. However, the United States demonstrated that high investment alone is insufficient: broad guidelines without structured implementation yielded limited returns (0.002–0.009 SD per €1,000/student). Cost-effectiveness was highest when interventions were sustained over time, targeted at low-SES students, and grounded in data-driven design. Furthermore, countries that integrated mental health into academic recovery – such as the Netherlands and the U.S. – are likely to see more holistic improvements in student outcomes.

In conclusion, this study reveals that successful education recovery depends not only on the amount invested but also on how programmes are designed, implemented, and evaluated. The Dutch NP Onderwijs stands out internationally for its implementation of a combination of best

practices such as an early and fast execution of practical measures, targeted responses towards individuals in most needs, a national oversight for an effective monitoring as well as a school-level structured-autonomy granted to select evidence-based interventions, and the inclusion of mental health and well-being concerns. Nevertheless, remaining challenges in socioeconomic disparities and mental health warrant sustained attention beyond 2025. Lessons from other countries highlight the importance of targeted support and political will in building more resilient and equitable education systems. Specifically, despite the massive and promising investments in primary education, the Dutch education could also benefit from investing in early childhood education. Evidence from England indicates substantial learning gains and enhance long-term system resilience, especially among low-SES individuals. Ultimately, alternative method could be investigated to reach vulnerable students when implementing interventions on voluntary base. International analyses reveals positive effects of enhancing parental involvements as well as more directive strategies rather leaving complete autonomy to parents.

1 Introduction

The COVID-19 pandemic led to one of the most significant global disruptions in education systems in recent history. In an effort to reduce the spread of the virus, governments across the world enforced school closures and transitioned to remote learning with limited preparation. These measures, while necessary from a public health perspective, had considerable consequences for student learning and well-being (Betthäuser et al., 2023; Schnepf et al., 2024). Evidence has accumulated that school closures and associated disruptions led to measurable learning deficits (De Witte & François, 2023), as well as adverse psychosocial effects including increased anxiety, reduced motivation, and deteriorating mental health (Mazrekaj & De Witte, 2024; Iterbeke & De Witte, 2022). Importantly, these effects were not evenly distributed. Vulnerable student populations – especially those from lower socioeconomic backgrounds – experienced more pronounced issues. In response, governments initiated various recovery programmes to address these challenges, including tutoring, summer schools, and digital infrastructure investments. In the Netherlands, the Nationaal Programma Onderwijs (NP Onderwijs) was launched in 2021 as a large-scale national initiative to support educational recovery. As this programme nears its conclusion in 2025, a comprehensive evaluation is necessary. This report contributes to that evaluation by examining how other countries responded to similar challenges, and what lessons their experiences may hold for the Dutch context.

Despite the growing body of international evidence on the educational consequences of the COVID-19 pandemic, several critical policy questions remain unresolved. Understanding the nature and variation of school closures is essential for contextualising national responses. Therefore, the first research question (RQ1) asks: How were school closures implemented in other countries, and how do they compare to the Dutch context in terms of duration, scope, and decision-making? The second research question (RQ2) explores the effects of the crisis on student outcomes: What learning deficits and psychosocial effects have been observed internationally as a result of the pandemic, and how do these vary or converge across different education systems and student groups? Given the widespread implementation of recovery initiatives, the third research question (RQ3) investigates: What types of recovery programmes were introduced in other countries to mitigate these effects, and how were they designed and targeted? Finally, with a view to inform the evaluation of the Dutch Nationaal Programma Onderwijs (NP Onderwijs), the fourth research question (RQ4) examines: What are the reported results of these recovery programmes, including their costs, impact, and the evaluation methods used? While partial answers to these questions can be found in the existing literature, much of the available evidence is fragmented or context-specific, limiting the extent to which findings can be generalised. By systematically addressing these four questions through a cross-national comparative lens, this study aims to inform the upcoming evaluation of the NP Onderwijs and contribute to evidence-based policymaking in the Netherlands.

To answer these research questions, the study adopts a qualitative, comparative case study approach, primarily based on desk research. The selected countries –Belgium, France, Germany, Italy, Sweden, England, Canada, Japan, and the United States – represent a diversity of education systems, levels of centralisation, and recovery strategies. These cases were selected based on relevance to the Dutch context and the availability of reliable, standardised data. The analysis draws from a wide array of sources, including peer-reviewed academic literature, national education ministry documents, policy evaluations, and international assessments such as PISA, PIRLS, and TIMSS. The methodology is non-systematic, reflecting the exploratory and

comparative nature of the study, and aims to synthesise rather than exhaustively catalogue country-specific responses.

This report is structured in four sections. Section 2 provides a descriptive overview of school closures and their immediate implications across the selected countries, offering context for the Dutch experience. It concludes with a comparative synthesis addressing the first and second research questions. Section 3 presents the various educational recovery programmes implemented in each country, categorised by type of intervention, target group, and scope. This chapter addresses the third research question and sets the stage for subsequent impact analysis. Section 4 evaluates the effectiveness of these programmes, where evidence is available, focusing on learning outcomes, costs, and evaluation practices. This chapter directly responds to the fourth research question. The report includes multiple comparative tables and figures to support cross-national interpretation, and pays particular attention to the methodological limitations that accompany international comparisons. An executive summary in Dutch is provided to facilitate access for national stakeholders.

2 The school closures and their implications by country

This section provides an overview of how school closures were implemented across a selection of countries in response to the COVID-19 pandemic, and examines their educational and psychosocial implications. Drawing on policy documents, academic literature, and national and international data sources, it presents country-specific analyses for Belgium, France, Germany, Italy, the Netherlands, Sweden, England, Canada, the United States, and Japan. Each subsection outlines the governance structure of the education system, the timing and scope of school closures, and the observed effects on student learning and well-being.

The primary aim of this section is to contextualise the Dutch experience within a broader international framework. The section provides insights in the mechanisms behind learning deficits and educational inequality during the pandemic by systematically describing how closures were enacted and their short- term consequences. Related to the school closure length, the information provided in this report are **always focusing on full closure without taking into account national holidays**. As such, large variations may still exist behind our reported figures. The findings serve as the empirical foundation for answering the first two research questions: (1) How were school closures implemented in other countries, and how do they compare to the Dutch context? and (2) What learning deficits and psychosocial effects have been observed internationally, and how do these vary across systems and student groups? The concluding subsection 2.11 synthesises the comparative findings from Sections 2.1 to 2.10 to answer these questions.

References to age and level of education are made throughout this section. In order to facilitate international comparisons, Table 1 outlines the relationship between student age, level of education and the International Standard Classification of Education (ISCED scheme). This table was produced on the basis of the work of Kuschmierz et al. (2020) and the European Commission (2019). It is important to note that this table is a good guide, but variations exist between national education systems.

Table 1. Age-grade distribution by ISCED level (source: Kuschmierz et al., 2020)

Age	Grade	ISCED level	Detail
0-6	/	0	Early childhood education
6-7	1	1	Primary education
7-8	2	1	Primary education
8-9	3	1	Primary education
9-10	4	1	Primary education
10-11	5	1	Primary education
11-12	6	1	Primary education
12-13	7	2	Lower secondary education
13-14	8	2	Lower secondary education
14-15	9	2	Lower secondary education
15-16	10	3	Upper secondary education
16-17	11	3	Upper secondary education
17-18	12	3	Upper secondary education
18-19	13	3	Upper secondary education

2.1 Focus on Belgium

Belgium is a federal state where responsibility for compulsory education (ages 5 to 18)[1] is divided among three independent language communities: Dutch-speaking (58% of the student population), French-speaking (41%), and German-speaking (1%) (De Witte & Gambi, 2024; Gambi & De Witte, 2025). Despite this highly decentralized structure, school closures were implemented at the federal level. Belgium enacted a full school closure on 17 March 2020, lasting nine weeks following the first wave of the pandemic (Maldonado & De Witte, 2022). By mid-May, students in their final year of primary (6th grade) and secondary school (12th grade) were allowed to partially return to class. Other grades remained closed for twelve weeks, with schools fully reopening on 8 June. Additional closures during the 2020–2021 academic year, triggered by later pandemic waves, added two more weeks of disruption. In total, the Belgian education system operated remotely for between 11 and 14 weeks (De Witte & Gambi, 2024).

Although Belgium allocates a significant share of its budget to education, its performance in international assessments has continued to decline – a trend that accelerated during the COVID-19 pandemic (De Witte & François, 2023; Gambi & De Witte, 2025). In particular, Flemish students in Grade 6 experienced learning deficits of 0.17 standard deviations (SD) in mathematics and 0.19 SD in language subjects in the immediate aftermath of the health crisis (2020–2021). Due to limited data availability and the absence of standardized assessments, it is difficult to draw firm conclusions for the German- and French-speaking regions. However, 2022 PISA results for secondary education show similar patterns among 15-year-old students across all language communities. Specifically, reading scores declined by 14 points and mathematics scores by nearly 20 points – equivalent to roughly three-quarters of a year of learning compared to 2018 (Gambi & De Witte, 2025; OECD, 2023a).[2]

[1] The compulsory education age is among the remaining elements settled by the federal government (De Witte & Gambi, 2024).

[2] François & De Witte (2025) provide evidence on how COVID-19 influenced higher education outcomes. However, higher education outcomes are beyond the scope of the report at hand.

In terms of heterogeneity, socio-economic status (SES) emerges as the most significant source of variation, beyond differences between language communities. Among disadvantaged Flemish students, learning gaps reached as high as 0.6 SD. Similar disparities are also reflected in the PISA results (Gambi & De Witte, 2025). Lastly, the immediate effects of the pandemic on students' mental health have not yet been fully assessed; this issue will be addressed in Sections 3 and 4.

2.2 Focus on France

France has a centralized education system overseen by the Ministry of Education, which enabled a uniform national response to the health crisis. On 16 March 2020, the country transitioned to remote learning across all educational levels (Moulin & Maurya, 2025). Throughout the pandemic, France prioritized keeping schools open as much as possible. During the 2019–2020 academic year, schools were fully closed for seven weeks (until 10 May 2020), followed by an additional two-week closure in April 2021. In total, school closures lasted a maximum of nine weeks across all levels of education, reflecting a strong commitment to ensuring educational continuity – potentially at the expense of health-related precautions (Huillery, 2024).[3]

Learning deficits in France vary significantly between primary and secondary education level. The COVID-19 crisis appears to have accelerated an already existing downward trend in academic performance among 15-year-old students. Using 2018-2022 PISA data and a robust methodology, Moulin and Maurya (2025) estimated learning deficits of 0.23 SD in mathematics, 0.19 SD in reading, and 0.07 SD in science. In contrast, outcomes in primary education were less concerning. PIRLS data for 4th-grade students show that, following a decade-long decline in reading performance (2001–2016), reading scores slightly improved in 2021 (Huillery, 2024). Among the factors contributing to the more limited impact at the primary level, Huillery (2024) points to the shorter duration of school closures for younger students. Additionally, a 2017 policy reform that reduced class sizes for low-SES students in primary schools may have played a mitigating role.[4] The 2022 PISA report (OECD, 2023a) also highlights deteriorating mental health outcomes linked to the pandemic. Compared to 2018, the 2022 cohort reported increased feelings of loneliness (+7%) and awkwardness (+5%) (Moulin & Maurya, 2025).

Moulin and Maurya (2025) further examined the sources of heterogeneity in learning deficits. From a gender perspective, the crisis had a more negative influence on girls than boys in mathematics and science, whereas the opposite pattern was observed in reading, according to PISA data. Socio-economic status also played a significant role: low-SES students experienced learning deficits approximately 0.57 SD greater than those of their high-SES peers.

2.3 Focus on Germany

Germany is a federal state composed of 16 states, each independently responsible for its own education system. As a result, the country has 16 distinct educational legislations, with only a few

[3] Next to full closures, partial closures and hybrid classes were also much less likely in France (Huillery, 2024).

[4] The policy involved about 20% of the French pupils. Huillery (2024) indicates an effective policy with a switch from average class sizes around 22-21 in 2017 for respectively grade 1 and 2 to 13 and 14 in 2019. Evidence also show positive influence of the policy on students' grades.

shared elements – such as the school-leaving grade (9th or 10th) and a voluntary conference of education ministers that seeks to harmonize policies across states, though it holds no legislative power (Schult et al., 2025). This decentralized structure led to the absence of a unified school closure policy during the COVID-19 pandemic, making it difficult to determine a single, accurate national figure. Accordingly, the following paragraphs refer to national averages across states, while acknowledging the substantial variation that may exist between them.

School closures began on 18 March 2020 across all 16 German states and continued until June 2020. A second wave of closures took place between late 2020 and early 2021. Across these two periods, German states lost, on average, just under 13 weeks of in-person instruction in primary education and 17 weeks in secondary education (Schult et al., 2025). However, these averages conceal considerable variation across states and grade levels. For instance, during the first pandemic wave, Fuchs-Schündeln (2022) mentions a drop of schooling time from 25 to 50% in Saxony, from 50 to 75% in the center and southern regions as well as 75 to 100% in Saarland, North Rhine-Westphalia and Mecklenburg-West Pomerania. In terms of grade, while 4th-grade primary students and final-year secondary students (grades 9 or 10) were prioritized for an earlier return to in-person learning. This approach aimed to support those preparing for final examinations or transitioning to the next stage of education (Schult & Schneider, 2024).

Germany's extended school closures contributed to notable learning deficits. A large-scale standardized assessment conducted in 2021 revealed substantial setbacks among primary school students compared to the 2016 cohort. Specifically, average performance declined by 0.20 SD in mathematics and 0.22 SD in reading. Similar results emerged from the PIRLS international assessment, where reading scores fell by 0.19 SD between 2016 and 2021 (Schult & Schneider, 2024). In secondary education, Germany has experienced a steady decline in academic performance – particularly in mathematics and science since 2012, and in reading since 2015. The pandemic and the shift to remote learning appear to have accelerated this trend. Between 2018 and 2022, average performance dropped by 0.26 SD in mathematics, 0.11 SD in science, and 0.17 SD in reading (Schult et al., 2025). In terms of heterogeneity, most studies highlight disparities primarily linked to SES and immigration background. Students with an immigrant background generally score lower than their non-immigrant counterparts, although this seems to be mostly caused by the SES. High-SES students consistently outperform their low-SES peers across all grade levels (Schult & Schneider, 2024).

Germany also benefits from a standardized monitoring tool that tracks non-cognitive outcomes, notably students' well-being and school satisfaction. Compared to the 2018 cohort, 9th-grade students in 2022 reported increased levels of anxiety, emotional difficulties, and trouble concentrating. However, school satisfaction increased among 4th-grade students in 2022 compared to 2016, and remained stable for 9th-grade students. This may reflect a positive perception of the return to in-person learning (Schult et al., 2025).

2.4 Focus on Italy

The Italian education system operates under a hybrid governance model. While 67% of pedagogical decisions (e.g., schedules, textbooks) are made at the school level, staffing and budgetary matters (33%) fall under the authority of the Ministry of Education. In addition, regional governments oversee ancillary services such as school meals and transportation (Giancola & Salmieri, 2025).

During the COVID-19 crisis, decisions on school closures were made locally, resulting in significant regional variation in the impact of the pandemic. Closures began on 24 February 2020 in the northern regions and quickly extended nationwide. Remote learning lasted up to 15 weeks in the hardest-hit areas (Contini et al., 2021) and 13 weeks in less-affected southern regions (Agasisti & Soncin, 2024). School reopening in September 2021 was also staggered, depending on local infection rates and educational level. In total, Italy experienced 24 additional weeks of partial school closures. While primary and lower secondary education were prioritized for in-person learning, upper secondary students – particularly in the north – continued to learn predominantly online (Agasisti & Soncin, 2024). Due to the highly localized and, at times, school-specific nature of these decisions, calculating an average national duration for school closures is not feasible.

This localized approach resulted in heterogeneous learning deficits across educational levels. Agasisti and Soncin (2024) compile a range of studies on learning deficits in Italy during the pandemic, drawing on robust methodologies and standardized assessments. The evidence indicates that learning deficits increased with grade level, reflecting the longer duration of school closures for older students.

By comparing student performance in 2020/21 to the 2018/19 cohort, learning deficits in Grade 5 were estimated at approximately 0.13 SD in mathematics, while reading scores showed a slight improvement (+0.06 SD). Among Grade 8 students, mathematics performance declined by 0.14 to 0.29 SD, and reading by 0.02 to 0.08 SD between the 2020/21 and 2018/19 cohorts. The most pronounced deficits were observed among upper secondary students (Grade 13), with outcomes varying by educational track (academic, technical, or vocational). Mathematics scores declined by 0.27 to 0.39 SD, while reading scores fell by 0.32 to 0.41 SD by comparing the same cohorts.

Beyond grade level, other sources of heterogeneity are examined in Agasisti and Soncin (2024). Although the studies they reviewed are based on the same dataset, findings related to SES and gender vary considerably, largely due to differences in econometric modelling. In contrast, Giancola and Salmieri (2024, 2025), who conducted descriptive analyses using the same data, report significantly larger learning deficits among specific student groups. Their findings indicate that students with an immigrant background (even after controlling for SES), girls, low-SES students, and pupils in southern regions were disproportionately affected.

Finally, student mental health outcomes were closely linked to the duration of school closures. The most severe effects were observed in northern regions, where closures were longest. Teenagers reported reduced socio-emotional skills, increased difficulty with social integration, and a decline in overall life satisfaction (Giancola & Salmieri, 2025).

2.5 Focus on the Netherlands

The Dutch education system is predominantly centralized, although schools retain considerable autonomy over administrative and managerial tasks. While the government sets education policy and monitors compliance with national standards, the practical aspects of instruction are largely determined by individual schools (Patrinos, 2011).

During the early stages of the COVID-19 pandemic, the Netherlands was often regarded as a “best-case scenario” (Engzell et al., 2021). This position should be now more nuanced. The

country experienced a relatively short period of full school closures in primary education – just six weeks, from 16 March to 11 May 2020 – after which a partial reopening was implemented (Haelermans & Smeets, 2024). An additional 5.5 weeks of remote learning occurred during the following academic year (Haelermans & Smeets, 2024). Yet, the school closure time was longer among secondary education students, facing a total of 16 weeks of closure between the academic year 2019-2020 and 2020-2021. A third and final pandemic wave also led to one week of additional closure in the last week of December 2021.[5] Second, the Netherlands was among the most prepared nations for remote learning, supported by a broadband penetration rate of 96% and early government initiatives to provide students with laptops and internet access (Engzell et al., 2021; Haelermans & Smeets, 2024).[6]

National standardized assessments revealed significant learning deficits among primary school students (Grades 1 to 3) 0.5 years after the COVID-19 crisis. While reading scores declined only slightly (−0.06 SD), deficits in spelling and mathematics were more pronounced, at −0.15 and −0.16 SD, respectively. Notably, these effects persisted in mathematics, with deficits of −0.17 SD still observed 2.5 years later, whereas performance in reading and spelling had largely recovered (Haelermans & Havermans, 2025; Haelermans & Smeets, 2024).

In secondary education, Haelermans and Havermans (2025) cite the PISA 2022 results (OECD, 2023a), which show that 15-year-old students experienced a 26-point drop in both reading and mathematics scores compared to pre-pandemic levels. For context, between 2015 and 2018, mathematics scores had declined by 18 points, while reading scores had actually improved by 7 points during the same period. Likewise, focusing on the national standardised tests conducted right after all lockdown periods from Grade 7 to 9 indicate a decrease of 0.195 SD point difference in Dutch between the 2018-19 and 2020-21. The average drop in math is about 0.38 SD point over the same period across Grades 7 to 9. The learning deficits were increasing through the grades (Seton et al., 2022).

Learning deficits varied considerably across student subgroups. In primary education, students from low-SES backgrounds experienced learning deficits up to twice as large as those from high-SES groups. On the contrary, in secondary education, PISA data revealed greater learning deficits among high-SES students (Haelermans & Havermans, 2025). Gender disparities were also observed across both education levels. Boys generally experienced smaller learning deficits and demonstrated faster recovery than girls (Haelermans & Baumann, 2024; Haelermans & Havermans, 2025; Haelermans & Smeets, 2024).

Lastly, non-cognitive skills were examined through a survey conducted among all primary and secondary schools in the province of Limburg (i.e., Onderwijs Monitor Limburg, Haelermans & Havermans, 2025). Primary school students reported lower proficiency in non-cognitive competences compared to their pre-pandemic counterparts such as critical thinking, problem-solving, creativity, and curiosity. In contrast, among secondary students, only problem-solving ability showed a decline, while the remaining non-cognitive skills either remained stable or improved. Although not focusing exactly on the same indicators, the World Health Organization report of 2024 notices more similarities between secondary and primary school individuals (Bardura et al., 2024). Namely, the percentage of 11, 13 and 15-years old students feeling of high peer support seems to have felt across boys and girls in the Netherlands from 2018 to 2022.

[5] The Netherlands also implemented some exceptions depending on specific groups of students. For instance, Students in their final or pre-final year of secondary education were allowed to return to school.
[6] This later point will be further developed in Section 3.5.

Similarly, the same shares of students reporting feeling of school work pressure, although raising between 2014 and 2018, showed a rapid growth in 2022 (Bardura et al., 2024).

2.6 Focus on Sweden

Education in Sweden is highly centralized in terms of governance and curricula, which are determined by the Ministry of Education. However, schools retain considerable autonomy over resource management and pedagogical implementation. The national response to the COVID-19 crisis illustrates the balance of this structure. Early in the pandemic, the Swedish Parliament passed a law granting the government exceptional, temporary authority to close schools and preschools. At the same time, the legislation empowered school principals to make local closure decisions when deemed necessary.

In practice, most preschools, primary schools, and lower-secondary schools remained open, adhering to pre-pandemic norms, with only some local exceptions (Wikström & Wikström, 2025). In contrast, upper-secondary schools (Grades 10 to 12) were advised to shift to remote learning starting on 18 March 2020 – a measure that remained in place until the end of the academic year (mid-June). A similar pattern occurred during the 2020–2021 academic year, particularly in response to the second wave of infections in December 2020 (Björkegren et al., 2024).

Because school closures were largely determined at the local level, a comprehensive national estimate of remote learning duration is difficult to establish. However, a national survey conducted by Björkegren et al. (2024) found that during spring 2020, 60% of schools were fully closed for approximately 12 weeks, 20% for 3 to 9 weeks, and the remaining 20% remained open throughout.

Sweden represents an outlier in the international context due to its limited use of school closures. Efforts to shield students from remote learning appear to have been effective, particularly in primary education, where most studies do not report significant learning deficits (Wikström & Wikström, 2025). However, findings for lower-secondary education are more mixed. The 2023 PISA report (OECD, 2023a) shows a return to 2012-level performance, effectively erasing a decade of educational gains. This result is particularly striking, as students in this age group were not formally subjected to widespread online learning. In reality, the performance decline likely reflects a complex interplay of factors, including changes in teaching practices, education policy shifts, socio-economic challenges, and, to a lesser extent, the pandemic itself.[7] Additionally, although lower-secondary schools were not formally advised to adopt remote learning, school principals retained the discretion to implement it locally. Students were also encouraged to stay home when experiencing symptoms of illness, leading to high rates of absenteeism during key assessments – an issue that may have adversely affected academic outcomes. Similar concerns were noted in the PIRLS assessment results. In contrast, other studies paint a more optimistic picture. Data from the Swedish National Agency for Education and the TIMSS 2023 assessment indicate improvements in mathematics performance and stable

[7] A recent article conducted by Ludewig et al. (2025) further points to the influence of out-of-school changes such as policy reforms, immigration, etc. on the performance decline in the PIRLS data.

outcomes in science compared to TIMSS 2018 (Wikström & Wikström, 2025).[8] For upper-secondary education, Wikström & Wikström (2025) analyse performance on the SweSAT (Swedish Scholastic Aptitude Test) and report small but statistically significant positive effects (+0.034 SD) across all subjects for cohorts affected by the pandemic, compared to pre-pandemic cohorts.

According to PISA, SES accounts for a significant share of the performance decline observed in 2023, largely due to limited support at home – such as inadequate access to technology and a lack of learning assistance. In upper-secondary education, gender differences emerged as the only notable disparities identified through the SweSAT. However, since socio-economic data are not available for SweSAT test-takers, important explanatory factors may be missing, making it difficult to fully interpret these otherwise positive findings.

Findings related to student mental health are also mixed. On the positive side, individual-level studies largely report no significant changes in mental health when comparing COVID-19 cohorts with their predecessors (Chen et al., 2021). Some studies even document increased physical activity and decreased victimization (Kapetanovic et al., 2021; Nyberg et al., 2022). However, this trend is mainly observed among boys, while girls appear to have experienced more negative psychological impacts (Källmen & Hallgren, 2024). On the other hand, administrative data paint a more concerning picture (Wikström & Wikström, 2025). The number of children and adolescents receiving psychiatric care has been steadily increasing, and this trend continued throughout the pandemic. Interestingly, the increase was less pronounced among upper-secondary school students, despite their prolonged school closures, whereas the most significant rise was observed in grades 7 to 9, a somewhat unexpected outcome.

2.7 Focus on England

England operates under a decentralized educational system. The Department for Education (DfE) sets learning standards, allocates funding, and determines overarching education policies, while schools retain an important degree of autonomy. Depending on the type of institution (i.e., Local Authorities maintained schools versus academies and free schools) this autonomy varies. For instance, academies can develop entirely their own curriculum (Badunenko, 2025). The first transition to remote learning was mandated by the DfE on 20 March 2020. In total, England underwent three periods of school closures between 2020 and 2021, amounting to 16 weeks of full closure, one of the longest durations among the countries examined (Anders, 2024).[9]

The successive lockdowns over two academic years led to substantial learning deficits. In primary education, the Renaissance Learning assessment provides robust standardized data in mathematics and reading, covering approximately one-sixth of all primary schools. Following the health crisis and the three lockdowns, students in Spring 2021 showed average learning deficits of 0.11 SD in reading and 0.20 SD in mathematics (Anders, 2024). However, since participation in the test is voluntary, the results may underestimate the true impact, as more proactive - and likely more effective - schools were more inclined to administer the assessment. Encouragingly, a

[8] These contrasting results are puzzling. Wikström & Wikström (2025) mention the potential grade inflation following teacher's evaluation since the standardized national evaluation did not took place during the pandemic. Still, the contrasting findings from the international evaluation (TIMSS, PISA and PIRLS) evaluation stays unexplained.

[9] Such a large period of closure is also due to the aversion of parental organizations or teacher unions (OECD, 2021)

summer edition of the test already showed some signs of recovery, with learning deficits reduced to 0.045 SD in reading and 0.11 SD in mathematics.[10] In secondary education, the 2022 PISA results suggest learning deficits of -0.081 SD in mathematics, -0.044 SD in reading, and –0.16 SD in science compared to the 2018 cohort (Badunenko, 2025). Using national standardized tests in secondary education, Anders (2024) also identified a decline in mathematics achievement thresholds of 3 to 5.2%, while no significant effect was observed in reading. These figures are again likely to be lower-bound estimates due to the non-compulsory and formative nature of the assessments, as well as a delay in the 2021 test administration, which may have provided additional time for students to catch up.

Evidence of heterogeneity in the learning impact, particularly based on SES, has been reported at both primary and secondary levels. The PISA results highlight a 0.03 SD gap between the most and least socioeconomically advantaged students. Notably, high-SES students slightly improved their performance, whereas low-SES students experienced a decline. Anders (2024) corroborates these findings. Regional disparities were also evident, with students in southern England outperforming those in the north, but also experiencing bigger learning gaps. This is likely due to difficulty of accessing digital learning in the south of England, as well as a higher concentration of high-quality schools (Badunenko, 2025). In primary education, the SES-related gap in mathematics performance widened by 0.048 to 0.10 SD, while reading performance appeared relatively stable (Anders, 2024). Lastly, the PISA results do not indicate any widening of gender disparities in learning outcomes (Badunenko, 2025).[11]

2.8 Focus on Canada

Due to its vast geographic size and structural characteristics, Canada's education system is governed independently by its 10 provinces and 3 territories, resulting in a highly decentralized framework consisting of 13 autonomous systems. Despite this fragmentation, coordination is facilitated through the Council of Ministers of Education, Canada (CMEC), particularly in the administration of national and international assessments. The CMEC helps maintain a degree of consistency across jurisdictions. School governance and oversight are further decentralized, falling under the responsibility of local school districts (Merchant & Volante, 2025).

As a result, school closures during the COVID-19 pandemic varied significantly – not only across the 13 jurisdictions but also within them, at the individual school level. Broadly speaking, Canadian regions experienced three pandemic waves of differing intensity. In Quebec, the first two lockdowns led to a total of 16 weeks of remote learning in the Montréal metropolitan area and 9 weeks in the rest of the province. During the third wave, additional school closures were implemented locally in response to rising infection rates (Collet et al., 2025; Côté et al., 2024).[12]

Due to this heterogeneous policy response, learning deficits likely varied substantially across regions, correlating with the duration of school closures. In primary education, Côté et al. (2024) reported an 8.7% decline in average reading performance among Grade 4 students who

[10] This improvement is most likely due to the summer schools and intervention implemented early in England. More information on these policies will be discussed in Section 2.7.

[11] Evidence of mental health worsening exist in England, but their size effects and type of worsening were hard to accurately estimates in the English case (Badunenko, 2025).

[12] The heterogeneity in the response to the health crisis in Canada leads to scarce information considering the difficulty to report all the interventions. As such, most of this chapter will focus on the province of Quebec, for which multiple resources are publicly available.

had experienced an average of 14 weeks of remote learning, compared to the 2019 cohort. This assessment was based on standardized testing. In secondary education, the 2022 PISA results indicated an acceleration of the pre-existing downward trend in the three evaluated subjects compared to 2018: average scores declined by 15 points in mathematics, 13 in reading, and 3 in science, roughly aligning with the OECD average (Merchant & Volante, 2025). Merchant & Volante (2025) also summarized standardized test results from four provinces accounting for 86% of Canada's student population. Notably, in Ontario, learning deficits in mathematics were larger among Grade 9 students than those in Grades 3 or 6. In contrast, in Alberta, deficits were more pronounced in Grade 6 than in Grade 9.[13] In British Columbia, COVID-19 impacted numeracy more than literacy, particularly in Grades 4 and 7. Similarly, Grade 11 assessments in Quebec showed an 8% drop in writing pass rates and a 5% decline in reading and mathematics, when comparing the 2019 cohort to that of 2022. The 2024 cohort experienced a smaller drop, with 7% and 4% reductions, respectively. Overall, Quebec appears to be the best-performing province.

In addition to interprovincial variation, substantial intra-provincial disparities also exist. For instance, Côté et al. (2024) identified SES-based heterogeneity, with bottom-performing students experiencing a 20% drop in outcomes compared to a 10% decline among top performers. Similarly, Collet et al. (2025) found that students from disadvantaged families were more negatively affected by the health crisis. In British Columbia, this was reflected in greater learning deficits among Indigenous students. Côté et al. (2024) also reported a greater decline among boys (–1.3%).

Ultimately, mental health and well-being were also affected, with variations between demographic groups. Overall, students reported a negative perception of remote learning, although Asian students expressed relatively more positive attitudes, and a large proportion of students struggled with social interaction (Merchant & Volante, 2025). Boys were more likely to exhibit symptoms of hyperactivity, impulsivity, and inattention, while girls more frequently reported emotional distress (Collet et al., 2025). Finally, among high school students, Larose et al. (2024) found an increasing number reporting heightened stress levels and rising alcohol and drug use.

2.9 Focus on the United States (US)

The United States education system is highly decentralized, granting substantial autonomy to individual states and local counties. The first school closures began as early as 1 March 2020 in 11 states, followed by additional county-level closures implemented as spontaneous preventive measures. By 20 March 2020, school closures and the transition to distance learning had been enacted nationwide, either through state mandates or local decisions (Zviedrite et al., 2021). Taking into account state and county-level variation, Zviedrite et al. (2021) estimate that the first wave of the pandemic resulted in between 8 and 13 weeks of remote learning. School closures continued during the two subsequent academic years, though their frequency and duration were significantly reduced. According to Zviedrite et al. (2024), the median number of school closure days was two weeks, with durations ranging from as few as three days to over four weeks in seven states. Hence, school closures in the United States were relatively extensive compared to other

[13] These contrasting findings are not explained by Merchant & Volante (2025). However, such heterogeneity further emphasizes the disparities that exist in the Canadian education systems, and the way each of them dealt with the health crisis.

countries. However, the considerable heterogeneity across states and counties limits the ability to draw generalized national conclusions.

The repeated school closures translated into significant learning deficits. Nonetheless, drawing on PISA data and the National Assessment of Educational Progress (NAEP), Hanushek & Strauss (2024) were able to quantify learning deficits among secondary school students. For 15-year-olds, the COVID-19 cohort experienced a decline of 0.13 SD in mathematics compared to the 2018 cohort. National evaluations yielded even more concerning findings, indicating learning deficits ranging from 0.20 to 0.23 SD among 8th-grade students between 2019 and 2022.[14]

The heterogeneity in the duration of school closures naturally resulted in various learning outcomes. In particular, Jack & Oster (2024) report significantly longer durations of remote learning during the 2020–2021 academic year in counties with a higher share of Black and Hispanic students. Similarly, extended remote learning was more prevalent in counties with lower broadband access and higher unemployment rates, while no significant correlation was found between remote learning duration and local COVID-19 infection rates. Using the same dataset, Halloran et al. (2021) identified larger learning deficits in school districts that experienced longer closures.[15]

Lastly, a review of several studies by Jack & Oster (2024) concludes that youth mental health has experienced a steady decline, with the COVID-19 crisis serving as a major accelerant. More specifically, the proportion of high school students reporting persistent feelings of sadness increased by 7% between 2019 and 2021. Similarly, Lin et al. (2021) document a sharp rise in hospitalizations for eating disorders among high school students following the initial school shutdown. Conversely, Jack & Oster (2024) also report some positive mental health outcomes associated with school closures – most notably, a significant decrease in bullying, which has a well-established protective effect against youth suicide.

2.10 Focus on Japan

Japan is among the few countries considered in this report outside Europe, included for two noteworthy reasons: it is by far the most centralized country, and its government did not implement any recovery policy following the COVID-19 pandemic. In terms of centralization, the Ministry of Education (MOE) sets learning goals, determines textbooks and curricula, and is responsible for teacher allocation and salaries. Regarding school closures, the Ministry enforced a nationwide closure across all educational levels on 2 March 2020, just before the Japanese spring break. When schools reopened in June, regional heterogeneity emerged in how the pandemic was managed. Major cities either reduced in-class teaching or divided classes into groups to alternate attendance and minimize contact. In contrast, schools in rural areas most likely remained fully open (Iwabuchi, 2025). According to PISA data, the average duration of

[14] It is worth mentioning that the PISA report of 2023 may be biased as it suffers from a non-representative sample. The report specifically mention the bias in the US results and the impossibility to infer the sense of the bias (OECD, 2023c).

[15] The methodology and the dataset in this study suffers from multiple biases. First, the sample is not fully representative, as many schools did not participate because of the pandemic. Second, the econometric framework is subject to endogeneity issues: it is unclear whether longer period of online education is caused by COVID-19 or by the sociodemographic background of the district. Still, the presented results give further insights and highlights an essential heterogeneity source in the US.

school closures was approximately 6 weeks, which may represent an upper-bound estimate based on the discussion above (OECD, 2023b).

As remote learning was marginal, learning deficits in Japan were limited, as anticipated. Iwabuchi (2025) presents a comprehensive review of both national and international data across multiple educational levels. In primary education, students in Grades 6 and 9 did not exhibit any statistically significant change when comparing the 2021 cohorts to those from 2016 on standardized test questions. At the secondary level, results in science and literacy in 2022 did not differ significantly from those of 2015, and even improved relative to 2018.

However, panel data analyses and limited administrative datasets reveal contrasting findings across geographical areas. On one hand, Asakawa & Ohtake (2022) studied Grade 6 students in one Japanese city, comparing their mathematics performance to the 2019 cohort at different time points: during school closures, and 3, 7, and 10 months later. Learning deficits of approximately 0.14 SD were observed during the closure, but by 7 months later (i.e., December 2020), students had recovered, showing a learning gain of 0.24 SD. On the other hand, Asakawa et al. (2024) reported persistent learning deficits among elementary school students from another Japanese city. Seven months after the crisis, students still exhibited a 0.13 SD deficit in mathematics, which worsened to 0.25 SD after 19 months. Similar trends were reported for language skills. These findings highlight significant regional heterogeneity, with some areas more severely impacted by the pandemic and/or facing greater challenges in implementing effective recovery measures (Iwabuchi, 2025). Further sources of heterogeneity were also investigated. National-level data reveal a widening gap between low- and high-SES students at the primary level. However, both Asakawa et al. (2024) and Asakawa & Ohtake (2022) did not observe differences by SES or gender. That said, Asakawa et al. (2024) did identify greater negative effects in language learning for younger students, as well as for low-performing students in both math and language.

With regard to mental health, one particularly concerning trend is the rise in youth suicide in Japan, which accelerated during the pandemic. In 2020, 499 cases were reported, increasing to 514 in 2022. This rise may be associated with increased bullying and the cancellation of school events such as excursions, which are thought to contribute to a higher risk of depression, especially among girls and children without access to extracurricular activities. Moreover, remedial programs intended to address learning deficits (discussed in Section 2.10) may have exacerbated social isolation by reducing opportunities for peer interaction (Iwabuchi, 2025).

2.11 Conclusion

This section aims to synthesize the country-specific findings presented in the preceding analyses, placing them into comparative perspective to answer our first two research questions. The first was:

RQ1 :	How were school closures implemented in other countries, and how do they compare to the Dutch context in terms of duration, scope, and decision-making?

Table 2 **summarizes** key information from Sections 1.1 to 1.10. Due to the significant heterogeneity of school closures in Italy and, at times, contradictory data from Sweden, some values are missing for these countries. Focusing on the length of full school closures – excluding regular holiday periods – the Dutch primary school students experienced a relatively limited

duration of remote learning (11.5 weeks) between 2020 and 2021. This figure places the Netherlands just behind France (9 weeks), which actively limited online teaching, and Japan (6 weeks), which was only partially affected by the pandemic and so by remote learning. Nonetheless, the differentiated approach taken by the Netherlands also leads to significantly longer school closure for secondary school students (16 weeks), among the longest closures. Similarly, the autonomy granted to Japanese, German, Canadian or US schools implies large heterogeneity in terms of closure. Table 2 presents only a summary of our findings and is not an exhaustive report of each closure length and variation depending on levels or regions.

Table 2 reveals three key factors influencing the duration of school closures:

1. The degree of autonomy granted to schools or local authorities;
2. The primary policy objective pursued by the government during the crisis;
3. The severity of the health crisis itself.

Each of these factors is discussed in turn.

(1) School and local autonomy

It is important to distinguish between school-level autonomy and the broader concept of educational (de)centralization. Although related, these are not perfectly correlated. For example, despite having centralized education systems, both Sweden and Japan saw significant local variation in school closures, driven by bottom-up initiatives. This makes it difficult to reach definitive conclusions on national closure lengths. A similar challenge appears in decentralized systems such as Italy, Germany, and the United States, where closures varied widely across regions or counties. These variations demand significant effort to monitor accurately, and among the countries analysed, only the U.S. invested significant resources (both financial and human) to measure school closure durations (Zviedrite et al., 2021, 2024).[16] On the contrary, the evidence reported for Canada are not comparable between provinces since their standardized test differs from one province to the other.

By contrast, centralized systems with limited local autonomy –such as France, Belgium, and England – implemented more unified national responses. While potentially less flexible, these responses were easier to monitor. As Crato & Patrinos (2024, p. 9) note, "we cannot act on what we ignore." A centralized response makes it possible to gauge, measure and adjust. Sweden is a perfect counter-example, as section 1.6 describes a vague situation in the country. The same applies to the U.S., where we rely on national averages rather than precise local data. Such heterogeneity hampers targeted interventions, which is especially concerning given the established link between longer closures and greater learning deficits (De Witte & François, 2023; Ludewig et al., 2025; OECD, 2021).

[16] Furthermore, the methodology used in Zviedrite et al. (2021) and Zviedrite et al. (2024) gathers only online information publicly available from newspapers. Articles mentioning the beginning or the end of a school closure in a school/county were gathered to provide a general picture. One could argue that a lot of missing information are still uncovered by this method.

Table 2. Summary of the changes in learning by country in the aftermath of COVID-19

Country	Grade	Weeks of Full Closure	Averaged Short-Term Learning Deficits Post-COVID-19		Learning Deficits per Week	Data Source	IRDLL
			Mathematics	Languages			
Belgium	Grade 6	12	0.17	0.19	0.015	Domestic	21
France	Grade 9	9	0.23	0.19	0.023	PISA	18
Germany	Grade 6 Grade 9	13 17	0.2 0.26	0.22 0.17	0.016 0.013	Domestic PISA	27
Italy	Grade 5 Grade 8 Grade 13	14 28.7	0.13 0.4	+0.06 0.115 0.4	0.005 0.014	Domestic Domestic Domestic	26
The Netherlands	Grade 1-3	11.5	0.16	0.105	0.012	Domestic	2
	Grade 7 to 9	16	0.38	0.195	0.036	Domestic	
Sweden							7
England	Grade 1-6 Grade 9	16 16	0.2 0.081	0.11 0.044	0.010 0.004	Domestic PISA	
United States	Grade 8	13.5		0.21	0.008	Domestic	
Japan	Grade 6	0 to 6	0.135		0.011	Domestic	

Note : Table 2 presents the most reliable results reported from Sections 1.1 to 1.10 in terms of unbiasedness and standardization. As such, the information presented in the above table are incomplete and needs to be considered in the context of the additional data for other education levels detailed in the previous sections. Table 2 only reports results comparable between each other. The presented learning deficits were measure in the aftermath of the health crisis, i.e., in a very short-run after conclusion of the school closures. It leaves a few space for recovery policies to be actually efficient and to present significantly large positive effects in the above results. Hence, the learning deficits are presented in standard deviation (SD) terms. The "IRDLL" stands for the *Index of Readiness for Digital Lifelong Learning (Beblavý et al., 2019)*.

(2) Government objectives during the crisis

The duration of school closures also reflects governments' stated priorities during the pandemic. Countries like France and Sweden openly expressed the importance of resuming "normal" education as soon as possible. In contrast, England faced stronger public resistance to reopening schools. These differing paradigms influenced closure patterns – for instance, Germany kept their final–year primary classes open, the Netherlands kept their final-year secondary classes open, while Italy and Sweden closed upper-secondary schools. The absence of such targeted differentiation may explain more or less longer school closure (De Witte & François, 2023; Moscoviz & Evans, 2022).

Differences also exist depending on the education levels. For instance in the Netherlands, while primary education students experienced 11.5 weeks of closure, secondary ones stayed 16 weeks in remote learning. Such variations may also happened in other studied countries, but the localized decision to close or not schools covers the difference by level.

(3) Severity of the health crisis

Lastly, the extent of the school closures was shaped by the severity of the COVID-19 outbreak in each country. Nations with higher infection rates – such as England, Canada or secondary schools in the Netherlands, which experienced three successive lockdowns between 2020 and 2021 – naturally implemented longer closures. In contrast, Belgium, France, Japan and Sweden were relatively less affected and therefore saw shorter periods of remote learning.

Sections 1.1 to 1.10 also contribute to answering our second research question:

RQ2 :	What learning deficits and psychosocial effects have been observed internationally as a result of the pandemic, and how do these vary or converge across different education systems and student groups?

Regardless of the severity of the health crisis, the pandemic and the school closure is associated with learning deficits in all countries, albeit to varying degrees (Ludewig et al., 2025). Table 2 presents the average learning deficits computed shortly after the end of the health crisis. Only information presented in SD terms were included to allow a cross-country comparison. Additionally, as a proxy for the resilience of each school system the learning deficits per week of school closure are also presented. Grade 5 students in Italy experienced the smallest average reduction in learning (-0.005 SD per week), followed by students in England and the primary school students in the Netherlands. However, these averages conceal significant subject-specific differences – most notably, a general trend of greater deficits in mathematics (e.g., -0.13 SD in Italy) compared to gains or smaller shortages in reading (e.g., +0.06 SD in Italy). This pattern holds across most countries studied, with exceptions observed only in Belgium and in a specific case in Germany.

The underlying reasons for differences in resilience are multifaceted, country-specific, and often interrelated. Beyond the severity of the pandemic and the duration of school closures, three key factors emerge as critical determinants of system resilience:

1. The initial performance of the national education system;
2. The policy response during the health crisis;
3. ICT preparedness and pre-pandemic usage.

Each of these is again discussed in turn, before discussing heterogeneity sources within each country and some mental health outcomes.

(1) Initial performance of the education system

Many of the countries studied were already experiencing long-standing declines in educational outcomes, as indicated by international assessments. Belgium, Sweden, and France, for instance, had pre-existing systemic challenges – including weak educational policies, outdated teaching methods, declining test scores, etc. – that the pandemic further exposed. In this context, the observed learning deficits are not only pandemic-induced but also symptomatic of broader structural issues. France offers a notable counterexample: the class-size reduction policy implemented in 2017 for primary school students appears to have enhanced resilience against learning deficits during the crisis.

Lastly, Ludewig et al. (2025) recently examined the relationship between out-of-school conditions and student learning outcomes during the COVID-19 pandemic using PIRLS data. Specifically, they assessed the impact of school closures while controlling for changes in immigration patterns, the development of early childhood education and care, and the progression of digitalization between 2016 and 2021. These factors are treated as proxies for the broader "out-of-school" learning environment. Their findings confirm the negative effect of school closures on reading achievement, with an average decline of 0.11 standard deviation (SD) units. Furthermore, their analysis underscores how the latter changes in out-of-school learning conditions have contributed to increased educational poverty.

(2) Policy responses during the pandemic

While Table 2 reports learning outcomes in the aftermath of the pandemic, some countries – such as Belgium, England, the Netherlands and France – implemented early recovery initiatives during or shortly after the crisis. For example, all three countries launched summer school programmes, albeit with varying degrees of targeting and intensity: in 2020 for Belgium and France, and in 2021 for England. Given the timing of international assessments like PIRLS, TIMSS, and PISA, some learning deficit estimates may already reflect the impact of these interventions. A more detailed discussion of national recovery strategies is provided in the subsequent sections.

(3) ICT preparedness and prior usage

Although not yet extensively discussed, ICT access and its integration into education were critical in shaping student outcomes during the crisis. The final column of Table 2 presents the *Index of Readiness for Digital Lifelong Learning* (IRDLL), published by Beblavý et al. (2019) just prior to the pandemic. This composite index captures the extent to which digital infrastructure and practices were embedded in national education systems. Specifically, it ranks the EU-27 countries according to (i) their performance in learning participation and outcomes (i.e., life-long learning, educational attainment; 30%), (ii) institutions and policies for digital learning (i.e., digital policies' governance, implementation, regulations, fundings, etc.; 40%) as well as (iii) the availability of digital learning (i.e., attitudes towards digitalization and accessibility of digital learning; 30%). Higher index values (which indicate lower readiness) are positively correlated with larger learning deficits, suggesting that ICT preparedness played a protective role. The Netherlands stands out in this respect.[17]

Heterogeneity within countries

Learning deficits were not only unequal across countries but also varied within them. Previous literature (Betthäuser et al., 2023; De Witte & François, 2023; Moscoviz & Evans, 2022) has shown a negative correlation between student age and learning deficits when considering the length of school closures. These two factors must be examined separately. School closures remain the primary driver of learning deficits (Ludewig et al., 2025), especially given the wide variation in closure lengths across grade levels within certain countries. Table 2 illustrates this clearly,

[17] We computed a correlation of 0.34 and 0.20 respectively for mathematics and languages. These coefficients are naturally non-significant considering the few number of observation.

showing that secondary school students in Germany and Italy, who experienced significantly longer closures, also faced larger learning deficits.

However, when school closures affected both primary and secondary education equally, younger students tended to suffer more. England provides a strong example of this phenomenon, as shown in Table 2. De Witte & François (2023) also indicate that younger students experienced greater learning deficits despite facing the same duration of remote learning as older students. On the contrary, evidence is mixed in the Netherlands. Though Haelermans et al. (2022) and Haelermans & Baumann (2024) both present a positive correlation between the COVID-19's learning deficits and the students' age from Grade 1 to 5, Schuurman et al. (2021) and Haelermans & Havermans (2025) report the opposite over similar grades. These contradicting findings make it hard to draw definitive conclusions about in the Dutch context, especially bearing in mind that lack of results across secondary school grades. However, while the larger learning deficits among Grades 7 to 9 may be explained by the longer closure (16 weeks) among secondary schools, Senton et al. (2022) still found the increasing learning deficits from Grade 7 through 9. Lastly, although results are mixed, upper-secondary students in Sweden – who were the only group systematically required to remain in remote learning – showed small improvements post-pandemic. This unexpected finding further supports the conclusion that age plays a key role in learning resilience.[18]

While the evidence for widening gender gaps is mixed, Sections 1.1 to 1.10 consistently highlight disparities across student populations, particularly among disadvantaged groups. These findings help identify populations in greatest need of targeted interventions. Socioeconomic background was captured through various indicators, such as parental education (e.g., in the Netherlands and Italy), geographic location (e.g., the U.S., England, and Italy), and immigrant or ethnic background (e.g., Italy, Canada, and the U.S.). The latter is particularly important as it directly refers to the work of Ludewig et al. (2025), discussed earlier.

Geographic disparities also deserve further attention, especially as disadvantaged areas are often related to limited digital infrastructure. This issue was particularly pronounced in England, Japan, Sweden, Southern Italy, and certain areas of the United States. In addition to digital access, some disadvantaged areas were subject to longer school closures. In the U.S., low-SES areas experienced extended closures, whereas in rural Japan, schools often remained open. Effective and accurate local monitoring is essential to implement responsive and efficient recovery policies. In contrast, the Netherlands did not implement localized closures, reducing geographic disparities – particularly given the country's strong performance on the IRDLL index. Nevertheless, SES-related gaps remain, underscoring the importance of addressing out-of-school learning environments through targeted support. These issues will be explored in the following sections.

Another source of variation lies with students transitioning between educational stages – namely, from primary to secondary education. One might expect that first-year secondary students, undergoing major changes, would be especially vulnerable to learning deficits or mental

[18] Only France in Huillery (2024), reported larger learning deficits among grade 9 students compared to grade 4 ones. Nevertheless, this findings is extensively justified. First, France implemented a country-specific policy in 2017 for 4th grade students. Second, French performance in reading was already significantly below the OECD average, which could further mitigate the effects of the crisis considering the already bottomed level. Lastly, the author mentions the higher difficulty for parents to help their children in upper-secondary education. Although it is not something commonly highlighted in the literature, it seems reasonable to take it into account when considering the grade differences in learning deficits.

health challenges. On the other side, last-year secondary school students must be carrying larger stress-burden, considering the importance of succeeding in their final year. While no detailed empirical studies have yet focused on this subgroup, both Belgium and Germany implemented school closure policies that prioritized the latter cohorts. In both countries, students in their final year of primary or secondary school were given early access to in-person instruction. The lack of specific measures prevents us from drawing conclusions.[19]

Mental health outcomes

In addition to learning deficits, school closures also led to a widespread deterioration in students' mental health – a pattern observed across all countries studied. In every case, a growing proportion of students reported increased anxiety, reduced motivation, and a more negative attitude toward education. These outcomes appear to correlate with the duration of school closures, with improvements in students' sense of belonging observed after schools reopened. Mental health effects also varied by SES, with students from low-SES backgrounds more likely to report deteriorating well-being. However, since these populations often experienced longer closures, the relationship between SES and mental health must be interpreted with caution.

From additional literature, mental health worsening is also associated with larger learning deficits. Gortazar et al. (2024) conducted a robust framework among primary and secondary schools students and identified a significant correlation between the self-reported mental health of students and their learning outcomes. Moreover, Pena et al. (2024) used the 2022-PISA results from several countries to underline that, although the sense of school belonging recovered in the long-run, the health was disproportionately affecting non-cognitive skills among girls, migrants, and economically disadvantaged students. Students declined their beliefs in a "growth mindset" and low-SES students were more prompt to bullying.

[19] One aspect that was still not mentioned until now is the transition from one grade to the next one. For instance, grade repetitions (or retention) were canceled during the academic year 2019-2020 and from 2019 to 2021respectively for Italy and Spain (Bertoletti et al., 2023; Gomentio, 2024). We do not go into depth, as these decisions are mainly linked to the grading scale in each country and strongly related to the government's decision. As such, the measure is hardly comparable across country.

3 Recovery and intervention policies by countries

This section examines the recovery and intervention policies implemented by ten countries in response to the educational disruptions caused by the COVID-19 pandemic. It provides a comparative account of how Belgium, France, Germany, Italy, the Netherlands, Sweden, England, Canada, the United States, and Japan designed and delivered programmes aimed at mitigating learning deficits and supporting student well-being. Each country-specific subsection outlines the timeframe, target groups, and content of the interventions, as well as the financial and institutional frameworks within which they were implemented.

The objective of this section is to identify key patterns and differences in recovery strategies across countries, and to assess the extent to which these measures align with the challenges identified in Section 2. Special attention is given to the types of interventions adopted – such as tutoring, summer schools, digital infrastructure investments, and mental health support – as well as their degree of targeting and the mechanisms used for monitoring and evaluating. The concluding subsection 3.11 synthesises findings from Sections 3.1 to 3.10 and provides comparative insights that directly address the third research questions: (3) What types of recovery programmes were introduced, and how were they designed and targeted?

3.1 Interventions in Belgium

In line with Belgium's decentralized governance structure (see section 2.1), the country at times implemented different measures or allocated federal funds in varying ways across its language communities. Overall, governmental responses focused on three main priorities: digitalization, mental health support, and learning recovery. However, the practical implementation of these strategies differed substantially between communities. Moreover, as will be discussed, economic disparities among the communities led to significant differences in the funding available for educational improvements.

In the Flemish Community, €353 million was allocated in 2021 and 2022 to support **digitalization**. More specifically, this included €15 million for shared devices in primary education (or €25 per student up to 4th grade) and €45 million for personal devices (€290 per student in 5th and 6th grade). For secondary schools, €232 million was dedicated to providing individual devices (€510 per student). The Flemish government also allocated an additional €10 million to support students in special education. Lastly, €50 million was assigned to improving school ICT infrastructure. In the French Community, a total of €75 per student was allocated to help students in grades 3 to 7 acquire a computer. In secondary schools, a higher – though limited – amount was allocated: €500 per computer, covering only 5% of students to support access to a personal device (Gambi & De Witte, 2025).

Significant heterogeneity emerged between the North and South of Belgium in the implementation of **recovery policies**. In 2020, €21.8 million was released to fund summer schools, followed by an additional €10 million in 2021 (Gambi & De Witte, 2024). These summer schools were targeted according to local needs. During the 2021–2022 academic year, an additional €85 million was allocated to mitigate learning deficits by increasing teaching hours. Furthermore, the Flemish Community initiated a standardized testing program, beginning in the 2023–2024 school year, to monitor the effects and impacts of its recovery policies. By contrast, the French Community did not implement summer schools or tutoring programs to address

learning deficits. Instead, in an effort to limit the "summer slide" and the learning deficits due to the pandemic, the government reformed the academic calendar in 2022 by reducing the summer break to 6 weeks – a two weeks reduction. Additional funding was also allocated to recruit more teachers, specifically 0.25 full-time equivalents per 100 students (Gambi & De Witte, 2025).

Both communities invested in **mental health** support through their respective counselling centres, with a focus on students' socio-emotional well-being, preventive healthcare, and career guidance. The Flemish Community invested €27 million, while the French Community allocated €9 million (Gambi & De Witte, 2025).

It is important to recall that, in general, Belgium ranks among the OECD countries with the highest education spending (Gambi & De Witte, 2025). However, significant disparities persist between linguistic communities, resulting in unequal educational opportunities. For example, a striking comparison by De Witte & Smet (2021) indicates a 4.82% increase in per-student education spending in Flanders as a result of the health crisis, compared to just 0.43% in Wallonia.[20]

3.2 Interventions in France

France implemented multiple interventions to first ensure educational continuity during school closures, and later to address the learning deficits that followed. These measures focused primarily on the digitalization of education and learning recovery. Notably, we found no significant interventions explicitly focusing on student mental health during this period.

During the health crisis, **digital** education efforts were led by the "Ma classe à la maison" platform, which became the most widely used digital tool by teachers. This e-learning platform was designed to support students in an independent and interactive manner (Moulin & Maurya, 2025). Additional financial support was also allocated to schools located in areas with limited broadband access, alongside the distribution of 5,000 laptops to students lacking personal devices (Groof et al., 2022; Saint-Martin, 2021). In total, between 2020 and 2021 the "Ma classe à la maison" platform and investments in ICT infrastructure led to expenditures of €3.3 million and €3.8 million, respectively. Following the crisis, further investments were directed toward developing ICT resources and fostering parental involvement, with the goal of reducing digital inequalities among students. France also committed to equipping 45,000 classrooms with innovative digital solutions by 2022, aiming to facilitate hybrid, onsite, and remote learning environments (Moulin & Maurya, 2025). The overall cost of ICT development was estimated at €200 million (Lesay, 2021), while the classroom equipment initiative was part of a broader strategic vision for the future of education, for which no specific budgetary allocation was disclosed (Moulin & Maurya, 2025).

Significant investments were also made to **recover** from the learning deficits caused by the pandemic, through summer school programs and tutoring support. In secondary education, the "Devoirs faits" initiative provided students with access to 1.5 million additional teaching

[20] Nonetheless, such a difference in investment, within the same country, does not necessarily translates in better performance. A comparison of the PISA 2018 and 2022 results across regions show that, although the Flemish one is systematically performing better than Wallonia, the former present larger decline (OECD, 2019, 2023a). Specifically, the decline is about -17, -19 and -11 respectively in mathematics, reading and science for the Flemish region, while the Wallonian one presents declines of -21, -7 and -6 for the same fields. These results emphasize how investments only do not tackle everything.

hours. During the pandemic, all students could receive up to three hours of voluntary tutoring per week. Multiple summer school programs were implemented beginning in summer 2020, targeting both primary and secondary education. These programs were primarily aimed at re-engaging vulnerable students who had disengaged from online learning. Participation was voluntary, and some of these programs remain active today (Moulin & Maurya, 2025). The tutoring initiative had a reported cost of €6.5 million in 2020 (Ministère de l'Éducation nationale, 2021b), while the multiple summer school programs were estimated to have cost approximately €200 million (Moulin & Maurya, 2025).[21]

3.3 Interventions in Germany

Federal German government emerged from the COVID-19 crisis by investing heavily in three core areas: digitalization, learning recovery, and building a more resilient education system. However, we found no significant references to measures explicitly targeting mental health or non-cognitive skill development.

As shown in Table 2 through the German IRDLL index, the country demonstrated relatively poor **digitalization** performance, prompting the federal government to allocate €5.5 billion toward ICT infrastructure for education (Blume, 2023). Notably, €5 billion of this sum was part of a comprehensive, long-term plan launched in 2019 and set to run through 2024, aimed at modernizing schools and integrating digital tools into education. The remaining €500 million was made available as a direct response to COVID-19, followed by another €1 billion agreement specifically intended to purchase digital devices for students and teachers. These funds were managed at the state level, leading to considerable variation in implementation across Germany's 16 states. In general, funding was used to improve broadband access[22], laptops, cloud and platforms development. Although these investments appear to have been efficiently and effectively allocated, their decentralized administration makes national-level evaluation difficult.[23] As such, Blume (2023) argues for context-specific microanalyses to fully understand the scope and impact of digitalization efforts across regions.

In the aftermath of the health crisis, €2 billion was allocated to the states through a **recovery** and **resilience** package implemented in 2021 and 2022, with the funds split evenly between two objectives (Schult et al., 2025). The first €1 billion was directed toward learning recovery, based on expert recommendations, with a focus on core academic skills such as mathematics and literacy. This translated into programs such as tutoring and summer schools, particularly for students most at risk of falling behind. The second €1 billion was devoted to strengthening resilience, including investments in early childhood education, youth welfare services, and social activities (e.g., school camps), with the aim of bridging socioeconomic gaps and fostering inclusive learning environments (Schult et al., 2025). Although these investments

[21] For comparison sake, both programmes lead to a rough increase of €16 by student and year, considering that both academic years 2019-2020 and 2020-2021 counted 12.8 million students and the 1-year horizon of each plan (Ministère de l 'Education Nationale, 2020, 2021a).

[22] Blume (2023) states that in 2021 not 50% had internet access.

[23] For instance, Blume (2023) mentions a 9% raise in the teachers' share indicating adequate digital infrastructure at schools between 2020 and 2021. In the same line, from 2018 to 2021, the share of teachers using online platforms jumped by 46%, reaching a total of 58% in 2021. These figures emphasizes the changes caused the school closures, but also a timed and adequate policy response.

may ultimately also promote pupils' mental health, this latter point has not been explicitly mentioned as an objective of the programme in itself.

Despite the scale of funding, Germany's recovery and resilience measures faced significant implementation challenges. Most notably, a shortage of teachers delayed the rollout of both plans (Blume, 2023; Schult et al., 2025). Furthermore, Germany's highly decentralized education system impeded the measurement of policy effectiveness. While micro-level evaluation is recommended for digital infrastructure projects, systematic evaluation of recovery and resilience programs has been almost impossible, as highlighted by Schult et al. (2025). Two key reasons are cited:

1. The identification of target students was left to teachers' discretion, without a standardized procedure.
2. Funds were used autonomously by each state, leading to divergent priorities and no guarantee that original investment objectives were met. These initiatives were also not accompanied by standardized national evaluation frameworks (Blume, 2023; Helbig et al., 2022; Schult et al., 2025).

Finally, although the total investments were substantial, Germany's per-student spending remains among the lowest in Europe, amounting to €93.14 per student per year (Schult et al., 2024). Based on our estimates, total spending on digitalization from 2019 to 2024 amounts to approximately €118.4 per student.[24]

3.4 Interventions in Italy

A crucial element in understanding Italy's response to the COVID-19 health crisis is the government's belief in the capacity of students to recover quickly from learning deficits (Giancola & Salmieri, 2024). As a result, most educational investments were directed toward **digitalization** and the broader modernization of the Italian education system. These investments occurred in two main phases: during and post-pandemic (Giancola & Salmieri, 2024, 2025).

During the pandemic (i.e., 2020-2021), investments primarily targeted the **provision of ICT devices** and support to disadvantaged areas, based on the specific needs of students and teachers. Given Italy's low performance in ICT in education from the IRDLL index (see Table 2), these measures aimed to prevent certain regions from being 'left behind'. More concretely, the funds were used to supply devices to students from low SES backgrounds, provide digital training for teachers, and support school administrative teams in implementing health and safety protocols. Differently than other countries, Italy did not implement tutoring or summer school programs in either 2020 or 2021 (Giancola & Salmieri, 2025). The pandemic-related funds were distributed at the regional level, with allocation decisions based on the needs of individual schools. However, much of this funding derived from pre-existing digitalization strategies, making it difficult to determine a precise amount specific to pandemic-related initiatives.

In the post-crisis period (after 2021), Italy launched major education investments under the "National Recovery and Resilience Plan" (NRRP). This included an allocation of €1.5 billion to

[24] This was computed thanks to reported number of K12 students in Statistisches Bundesamt (2020, 2021, 2022, 2023), i.e., a total of 54.9 million students between 2019-2024 for a EUR 6.5 billion programme leads to EUR 118.4 per student and academic year.

support the construction of 200 new schools, as well as the modernization of existing classrooms and continued **digitalization** efforts. The plan also featured professional development programs for secondary school teachers, designed to address systemic challenges in the Italian secondary education system. Additionally, the NRRP included provisions for in-person tutoring in disadvantaged areas, for which local authorities were required to apply for funding. However, no national evaluation framework was implemented to monitor the impact of this measure, making its effectiveness difficult to assess (Giancola & Salmieri, 2024, 2025). From the perspective of the 7.4 million students enrolled in Italy during the 2021–2022 academic year (Palmini & Di Ascenzo, 2021), the total investment corresponds to approximately €202.50 per student. However, this figure likely overestimates the actual benefit per pupil, as not all students will directly benefit from new school construction, and much of the investment is intended for long-term structural improvement rather than immediate relief.

Taken together, these policies reflect the Italian government's strong emphasis on long-term system resilience, possibly at the cost of addressing immediate learning deficits caused by the pandemic. Particularly telling is the focus on infrastructure and modernization, while completely ignoring mental health support. Furthermore, as noted by Giancola and Salmieri (2024, 2025), there was no funding allocated to robust impact evaluation mechanisms, which would have allowed for evidence-based policy adjustments. This absence underscores a broader lack of data-driven decision-making in Italy's educational response to the COVID-19 crisis.

3.5 Interventions in The Netherlands

The high performance in terms of digitalization and its integration in the Dutch education has already been discussed in Section 1.11. Building on this foundation, government policy responses to the COVID-19 crisis in the Netherlands focused primarily on educational **recovery**, with a particular emphasis on reducing inequalities and promoting student **well-being**. That said, the Dutch government also made an early intervention in the area of digitalization: during the first wave of the pandemic (spring 2020), it provided laptops to students in vulnerable positions, the only direct investment in educational digital infrastructure during the crisis. At the same time (June 2020), a first subsidy program (called 'Subsidie voor Inhaal- en Ondersteuningsprogramma's' or IOP) of about €167 million was dedicated to combat learning losses in primary education, and €137 million to combat learning losses in secondary education. Schools above a certain threshold in terms of share of disadvantaged students could apply for funding of 900 euro per pupil for a double amount of their pupils, that is, for a maximum of 20 percent instead of a maximum of 10 percent of their pupils (Van der Steeg, 2025).[25] It has been estimated that around 70 percent of all primary education schools applied for this subsidy scheme, and 90 percent of all secondary education schools (Meeter et al., 2022).

One year into the pandemic, the government launched the National Education Programme (NEP), allocating €5.8 billion to the equivalent of K-12 education (Ministerie van Onderwijs, 2021). These funds were distributed to schools proportionally based on the share of low-SES students in their population, and schools were expected to spend the money on a

[25] We divided the €167 million devoted to primary school students by the total number of students enrolled in 2021, which leads to an average of €113 supplemental per student. Doing the same for the €137 million of secondary school leads to €147 supplemental per student. The number of students was retrieved from Ministerie van Onderwijs (2024a, 2024b).

predefined 'menu' of evidence-based interventions.[26] A key component of the NEP was the 'school scan", a monitoring tool to document schools' most urgent problems and investment decisions. Among the most frequently chosen interventions were **tutoring programs** (adopted by 85% of schools) and **well-being initiatives** (75%). Although the NEP was introduced relatively early during the pandemic, implementation faced delays due to successive lockdowns. As a result, schools were granted a four-year spending window, with funds expected to be fully utilized by 2025 (Haelermans & Smeets, 2024; Haelermans & Havermans, 2025). Ultimately, the Dutch government committed to an additional €1 billion per year until 2027–2028 to support a national initiative aimed at strengthening "basic skills" in reading, writing, mathematics, and financial literacy. A secondary aim is to ensure that secondary school students meet the prerequisites for entering their desired higher education tracks (Haelermans & Havermans, 2025). Like the NEP, this initiative is also structured around evidence-based implementation and ongoing evaluation. Although, the latter investment contributes to the resiliency of the Dutch education system, it was not designed as a response to the health crisis.[27]

Beyond learning recovery, the NEP also prioritizes the mitigation of inequalities resulting from the pandemic. Especially, the labor market allowance foresees € 375 million between 2021/22-2022/23 to attract and retain teachers in the top 15 percent primary and secondary education schools with the largest shares of disadvantaged pupils by giving them a wage premium. Although not designed as a response to the COVID-19, a school meal plan was also developed in the spring of 2023 : schools in primary and secondary education with more than 30% of low-SES students applying are subsidized at €11 per week and student to provide healthy food and alter social inequalities (Haelermans & Havermans, 2025).

A core element of the Dutch education strategy during and after the pandemic has been systematic monitoring and evaluation. As discussed further in Section 4, student performance has been continuously assessed using standardized testing, providing a reliable overview of policy outcomes and educational trends. While schools maintain a high level of autonomy in how they use allocated funds, the combination of central monitoring tools and a defined menu of evidence-based interventions ensures that local decision-making remains aligned with national objectives. This approach prevents excessive policy heterogeneity, which could otherwise hinder effective evaluation or targeted action.

3.6 Interventions in Sweden

Sweden did not implement any specific large-scale recovery measures in response to the COVID-19 pandemic. This is largely due to two factors: first, the absence of nationwide school closures or lockdowns, and second, Sweden's pre-existing advanced level of digitalization in education (see Table 2). In this context, the transition to online education in upper-secondary schools, i.e. where it was most needed, was widely regarded as smooth and effective (Wikström & Wikström, 2025). Nevertheless, the government expressed concerns regarding equity, particularly in relation

[26] The 'menu' set by the Dutch government covered multiple interventions gathered in six categories such as additional teaching time, more efficient teaching practices, physical and socio-emotional development, self-learning and metacognition development, (support) staff involvement development, facilities and preconditions Ministerie van Onderwijs (n.d.).

[27] From our computation, the amount invested by the Netherlands through the NEP reached €590 per students and per year between 2021-2022 to 2024-2025. The total number of students was retrieved from Ministerie van Onderwijs (2024a, 2024b).

to students from low-SES backgrounds and those enrolled in vocational or applied educational tracks. For the former, concerns were raised about limited access to laptops and digital devices, while for the latter, challenges were expected in the delivery of practical, hands-on components of vocational training. In both cases, minor adjustments were made to facilitate these students' return to school, but these efforts did not result in substantial additional investments. The Swedish government also acknowledged that, despite keeping schools open, the health crisis was likely to cause increased absenteeism among teachers and students. In response, grants were made available to schools to support the provision of additional teaching hours. While these grants may have been modest, the decentralized structure of the Swedish education system makes it difficult to determine the total amount invested (Wikström & Wikström, 2025).

3.7 Interventions in England

Policies implemented in England during and after the COVID-19 health crisis were designed to achieve three primary objectives: learning recovery, building educational resilience, and supporting mental health. Between June 2020 and October 2021, the government allocated approximately £4.9 billion toward these goals, followed by additional investments in subsequent years (Anders, 2024; Badunenko, 2025). It is important to note that while schools were required to apply for these funds, the implementation and use of the funding was left to their discretion, albeit within the framework of guidelines that specified expected outcomes.

The first major initiative was the universal Catch-Up Premium, launched in June 2020. This grant was allocated per pupil, allowing schools to support educational **recovery** following initial school closures (Anders, 2024). A portion of this funding was used to distribute laptops and other digital devices to disadvantaged students. Although many students received devices after the first lockdown, the distribution continued throughout the 2020-2021 academic year, eventually positioning England as the leading provider of digital devices in Europe during the pandemic. Simultaneously, the government introduced the National Tutoring Programme (NTP), targeting students aged 5 to 16 (and later expanded to include those up to 19 years old). The programme aimed to prevent learning deficits in mathematics, science, and English, with a focus on low-SES students. Support was delivered through tutoring sessions and summer schools, with funding allocated to schools based on a fixed amount per disadvantaged pupil. The NTP was subsequently expanded through multiple funding rounds. In February 2021, an additional £17 million was allocated for phonics and early reading catch-up for early primary school students. In October 2021, further funding was released to support additional teaching hours for students aged 16 to 19 (Anders, 2024). Importantly, the NTP also addressed **mental health** and **well-being**, with funds directed toward teacher training and the implementation of socio-emotional learning supports in schools (Badunenko, 2025).[28]

In October 2022, England introduced additional investments to expand the initial catch-up programme, with a specific focus on early childhood education (ages 3 to 5). These investments directed towards a scheme existing prior to the pandemic (the "Nuffield Early Language Intervention" or NEPI), which aims at developing pupil's language skills (Anders, 2024).

[28] In Sibieta (2021), the initial £3.1 billion of catch-up premium were estimated as being equivalent to £310 per student. However, the additional £1.8 billion of October 2021, spent for two years, reduced the average amount spent per student and per year up to £181.To compute this, we divided the total £4.9 billion by the total amount of students in the academic years 2020-2021 until 2022-2023, i.e. 26.97 million students from the Department of Education (2021, 2022, 2023). We argue this computation may be more accurate as, in reality, this amount has not yet been entirely spent in 2023 (Anders, 2024).

Furthermore, under the Education Recovery Premium, schools received £145 per disadvantaged student in primary education, which could be used to fund catch-up initiatives, such as summer schools or the recruitment of additional staff. The purpose was to enhance teacher training, classroom resources, and professional development, and to improve student outcomes in language, literacy, and mathematics. Lastly, £324 million was allocated to support upper-secondary students (aged 16 to 19), with funding used to provide small-group tuition in core academic and vocational subjects, including math, English, and applied pathways (Anders, 2024; Badunenko, 2025).[29]

Although the flexibility in the way school can use the funding is challenging, the incentives to use the tutoring programmes and implement summer schools according to the government's guidelines makes things easier. In addition, schools must report how do they use their money and the national school inspection may ask for reporting.

3.8 Interventions in Canada

As developed in the previous section on Canada, the country's highly decentralized education system has resulted in heterogeneous policy responses. The following paragraphs therefore focus on selected provinces that collectively represent the majority of the student population, while also identifying common policy directions adopted across jurisdictions. Overall, Canada's educational measures were primarily directed toward learning recovery and the well-being of students.

In terms of **recovery**, although four provinces did not adopt any specific response measures during or after the pandemic, three provinces (representing 70% of the national student population) launched free tutoring programs focused on mathematics and literacy. In the post-pandemic period, many policies meant to develop teacher's training by providing them evidence-based resources for effective teaching of core skills, particularly in reading. Additionally, six provinces put emphasize on the monitoring. Specifically, they reinstated standardized tests that had been cancelled during school closures, and five provinces (i.e., Alberta, Manitoba, Ontario, New Brunswick, and Nova Scotia) extended literacy assessments to include students from kindergarten to grade 3. The primary objective was to enable early detection of literacy difficulties. (Merchant & Volante, 2025).

Canada's approach to **mental health** and **well-being** differed from other countries examined in this report in that it also encompassed physical health initiatives. Triggered by concerning statistics about students' levels of physical activity, five provinces introduced policies to encourage physical engagement among pupils. These included guidelines and additional resources for schools and teachers, while Alberta and Manitoba developed new physical education curricula. Regarding mental health, nine provinces and all three territories allocated dedicated funding to support student well-being. In practice, four provinces improved teacher training in mental health, and several others expanded online mental health services initially introduced during the lockdowns. Lastly, two provinces launched partnership between education and health ministries, which provided schools with resources for addiction prevention and trauma-informed care (Merchant & Volante, 2025).

The striking element of Canadian measures is the absence of targeted population. Moreover, while the expansion of monitoring practices is a positive development, these are

[29] The specific amount by student is difficult to compute as the specific number of upper-secondary school students is not provided by the Department for Education.

largely continuations of pre-existing initiatives rather than new pandemic-driven reforms. Similarly, recovery policies addressing learning deficits remain relatively limited in scope. This lack of ambitious reform is further reflected in the modest increases in education spending. Between the 2019–2020 and 2020–2021 academic years, total public education expenditure increased by C$ 10.5 million, followed by a further C$ 14.9 million increase in 2021–2022 (Statistics Canada, NDa). When adjusted for student numbers, this translates to an additional investment of approximately C$ 2.50 per student per year (Statistics Canada, NDa; NDb).

3.9 Interventions in the US

In 2020, the United States launched massive federal investments to address the impacts of the COVID-19 pandemic, later supplemented by additional funding and designed with a four-year implementation horizon (Stadler, 2023). Due to the decentralized structure of the U.S. education system, these federal funds were allocated to school districts, accompanied by recommendations and guidelines on how the money could be used.

The Elementary and Secondary School Emergency Relief (ESSER) Fund was structured across three rounds of funding. The first phase (ESSER I) provided $ 13 billion at the start of the 2020–2021 academic year, and was intended to support COVID-19 preparedness and response efforts (Jack & Oster, 2024). Eligible uses included improving health and sanitation protocols, expanding digital learning infrastructure, offering staff training, and increasing instructional time through summer programs, as well as providing mental health support (Skinner et al., 2023). In 2021–2022, two additional funding packages were released: ESSER II ($ 54 billion) and ESSER III (ARP-ESSER, $ 122 billion). **While ESSER I focused on maintaining continuity of learning amid school closures, the subsequent packages incorporated a stronger emphasis on learning recovery and student support**. These later rounds encouraged the implementation of evidence-based interventions to address learning deficits and reduce socioeconomic disparities. Specific recommendations included standardized testing, student progress monitoring, parental engagement strategies, and social-emotional learning initiatives (Skinner et al., 2023). Additionally, ESSER III required that at least 20% of the funds be used specifically for learning deficits recovery, next to aimed to develop a safe environment for students back in schools (Jack & Oster, 2024; Skinner et al., 2023).[30]

Despite these guidelines, the autonomy granted to school districts regarding how to spend their allocations was significant. As Hanushek & Strauss (2024) observe, a limited portion of the funding was ultimately spent on learning recovery. Still, evidence of the implementation of tutoring programmes and summer schools or other additional teaching hours do exist. The US rely on a well-structured education organization and efficient standardized testing across the country. As such, while monitoring was not a specific expense post from the ESSER plan, the numerous evaluations conducted across states after the pandemic until enables the government to track the learning outcomes – not the efficiency of specific measures (Dewey et al., 2024; Goldhaber & Falken, 2025).

Stadler (2023) identified several challenges associated with the ESSER framework. One major issue was the simultaneous disbursement of funds across all districts, without geographic

[30] From the National Center for Education Statistics (2024) the US account for a yearly average of 49million students enrolled in public elementary and secondary schools. Given the time frame of each ESSER programme (3 years for ESSER I and four years for ESSER II and III) the expenses of the ESSER plans lead to a $ 1078.25 increase per student and year (Skinner & Sorenson, 2025).

or demographic targeting. This led to competition between districts for hiring qualified staff and acquiring resources, often leaving the most disadvantaged areas behind. Moreover, the absence of clearly defined goals and a lack of centralized monitoring mechanisms hindered efforts to evaluate the effectiveness of funded programs. the autonomy granted to school districts regarding how to spend their allocations was significant. As Hanushek & Strauss (2024) observe, a limited portion of the funding was ultimately spent on addressing and recover from the learning deficits. Despite some districts using the funds for relevant interventions (e.g., summer schools or additional teaching time), the lack of robust monitoring frameworks makes it difficult to determine, in both the short and long term, which measures were effective (Hanushek & Strauss, 2024; Jack & Oster, 2024; Stadler, 2023). Ultimately, this conclusion shows a severe gap between the initial objectives of the ESSER plans and their implementation in practice.

3.10 Interventions in Japan

As discussed in Section 1.10, Japan experienced only brief school closures during the COVID-19 pandemic. Nonetheless, the crisis exposed Japan's delays in educational digitalization. In addition, although their scope was limited, the few measures implemented during the pandemic worsened student's mental health. Hence, Japanese measures following COVID-19 articulate mainly around two axes : digitalization and mental health. The following paragraphs discuss the response and the conclusions drawn by the Council for Implementing Education Rebuilding (CIER) – a government body specifically tasked with designing a more resilient post-pandemic education system.

Focusing on **digitalization**, the Ministry of Education launched the "GIGA" school programme. Among its core components were the free provision of electronic devices (laptops, tablets) for all elementary and junior high school students, along with the deployment of high-speed internet in schools. The program was introduced in 2020, at the onset of the pandemic, and was planned with a four-year implementation timeline. In addition to improving access to ICT tools, the CIER emphasized the need to enhance teachers' digital competencies and ICT skills (Iwabuchi, 2025).[31]

Regarding school **recovery** and **mental health**, most solutions emerged at the local level. A national survey conducted by the Ministry of Education in 2020 asked schools what measures they would consider implementing in the post-pandemic context. It shows that 95% of the schools were considering launching additional social events, shortening breaks time (75%), focusing on key concepts (68%), etc. Nonetheless, the absence of monitoring, consistent with the general limited impact of the crisis, prevent from accurate evaluation (Iwabuchi, 2025).

Finally, **mental health** became since 2021 and the aftermath of the pandemic a core element of the government. Especially, mental health is mentioned as being a central goal in the new education plan of 2023 from the MOE. The latter translates into the creation of the Children and Family Agency in April 2023 to promote the adoption of evidence-based policy to improve

[31] From Board of editors (2020), a Japanese source translated via google, the GIGA programme covers weight about ¥231.8 billion, which is more or less equivalent to € 13.9 billion (these values are indicative and do not take inflation into account). Thanks to the yearly number of concerned students among these years, the increase in amount spent per student and year reaches : € 371, an upper bound.

mental health among adolescents (Usami, 2023). In addition, the national survey of students now includes mental health-related questions (Iwabuchi, 2025).

3.11 Conclusion

After having reviewed the recovery programmes in various countries, we summarize the findings in order to answer the third research question:

RQ3 : What types of recovery programmes were introduced in other countries to mitigate the consequences of the health crisis, and how were they designed and targeted?

The analysis is structured around three key dimensions along which these policies either diverged or converged. First, we identify the type of recovery programme and the amount of funding allocated. Second, we explore the targeting mechanisms used and the populations targeted by these measures. Finally, we differentiate the programmes based on the overall policy design and implementation strategies.

(1) Types of Recovery Programmes and Investment Levels

Table 3 provides an overview of the main objectives pursued by the policies implemented in each country and summarizes key findings from Sections 3.1 to 3.10. Column 4, titled "Key policy focus," shows that most policies fall into one of three categories: digitalization, learning recovery, or mental health support. Although not all countries implemented all three types of measures, every intervention reported fits into at least one of them. The sole exception is Sweden, which does not appear in the table due to the absence of any significant political response to the crisis. A closer examination of Table 3 reveals notable disparities between countries in two interconnected areas: the political objectives set by decision-makers and the ICT baseline prior to the crisis.

1.a) Political Objectives Reflected in Education Investments

Column 3 of Table 3 shows total amounts spent by country or region, while Column 8 presents per-student, per-year spending to make cross-country comparison easier. Both columns present the invested fundings in euro values as we converted the national currency amount in euros for comparisons according to the exchange rate of the 31st December 2021.[32] As explained in earlier sections, these amounts divide the total of the funding invested by each government for their recovery plans by the sum of students enrolled each year taken in the timeframe of the recovery plan. It is worth keeping in mind that these figures meant to be used for comparison purposes as they cover important heterogeneity. Most of the recovery plan were targeted towards disadvantaged students (see the following point for more details), hence some schools/individuals benefits more from these additional investments, while others take less advantage of it. Across countries, these figures reveal significant variation in education funding during or after the pandemic. Furthermore, when these amounts are considered alongside school closure durations (i.e., a proxy for the severity of the crisis) a counterintuitive finding emerges: there is no positive correlation between the duration of school closures and the amount spent per

[32] We arbitrarily chose the exchange rate of this day as it marks the end of the crisis for every studied countries and the start of the active implementation of the recovery programmes in most of them.

student per year.[33] One might expect more funding in response to greater disruption, but Table 3 shows the opposite. For instance, the Netherlands experienced 11.5 weeks of closure at one education level yet ranked among the top investors. Japan, with only 6 weeks of closure, ranks fourth behind Flanders and the United States. Conversely, Italy, Germany, and Wallonia experienced longer closures but invested significantly less.

This lack of correlation highlights the importance of political responsibility and fiscal capacity in shaping national responses. France offers a good illustration: as discussed in Section 2.2, its main objective was to keep schools open, thereby minimizing learning deficits and the need for recovery programmes. Fiscal constraints also played a role. In Belgium, for example, investment per student in Flanders is nearly ten times higher than in Wallonia, resulting in a stark contrast in recovery programmes, driven not by differing needs, but by budgetary capacity.[34]

1.b) ICT-use in education prior to the health crisis

Column 4 of Table 3 reflects variation in digitalization-focused investments. Based on the IRDLL results (Table 3), countries had markedly different levels of ICT integration in education prior to the pandemic. Accordingly, countries like Italy and Japan primarily invested in infrastructure and digital tools. While this strategy seems appropriate for Japan, where the pandemic's impact was limited, it appears less justified in the case of Italy, which faced both low digital readiness and high exposure to school closures. This again points to the influence of limited resources and constrained political priorities from point 1.a.

In contrast, the Netherlands invested mainly in recovery rather than digital infrastructure, owing to its already well-developed ICT systems in education. Among countries that funded both recovery and digitalization, the data show stronger alignment: France allocated over €1 million to the *Ma classe à la maison* platform, while Germany directed over three times more funding toward digitalization efforts. Countries that addressed digital gaps through broader programmes generally focused on expanding access to personal devices (e.g., Belgium and England). However, in countries with high local autonomy, such as the United States and Canada, the diversity of regional approaches makes national-level evaluation challenging.

1.c) Mental health programmes

While the absence of digitalization strategies may be justified by country-specific situation, the lack of mental health support is more difficult to explain. Recent literature has underscored the link between mental health worsening and learning deficits. For example, Arenas & Gortazar (2024) report significant and growing learning deficits associated with declining socio-emotional well-being. Similarly, Pena et al. (2025) find that students with a high sense of belonging or a growth mindset reported larger learning deficits, suggesting that emotional resilience was not enough to buffer academic setbacks. These findings challenge the idea of addressing learning deficits without parallel mental health interventions. Nevertheless, three countries (e.g., France,

[33] Computing the correlation between columns 8 and 9 leads to a negative results of -0.19, non-significant considering the few number of observations.

[34] It seems important to mention that these two elements are closely related and should not be taken separately: the financial resources available in a country are also the result of political decisions.

Germany, and Italy) eclipsed mental health from their crisis response, raising questions about the coherence and completeness of their recovery strategies.[35]

(2) Targeted population

Recent literature consistently highlights the disproportionate effects of the COVID-19 crisis on vulnerable groups (De Witte & François, 2023; Moscoviz & Evans, 2022). Section 2.11 further emphasizes the more severe impact on immigrant, low-SES, and disadvantaged students, which was observed across nearly all studied countries. In addition to SES, the section identifies three other sources of heterogeneity in how the pandemic affected students:

- Geographical area
- Age of the students (with younger ones more affected)
- Students at transitional stages between educational levels

As shown in Table 3, these various sources of vulnerability were considered to varying degrees in policy responses.[36] The following sections explore the extent to which interventions were targeted.

2.a) By geography and Socioeconomic Status

Socioeconomic status was almost universally accounted for in policy design, as students from disadvantaged backgrounds were most likely to suffer severe setbacks. However, the methods for targeting these individuals varied significantly across countries.

In some cases, countries targeted socioeconomically disadvantaged students indirectly through geographic prioritization. For instance, the summer school programmes in Flanders were implemented in pre-identified, economically disadvantaged regions. Similarly, Italy allocated additional funding regionally, depending on the "more in-need" regions. In contrast, the Netherlands and England employed a more direct approach, distributing fixed funding amounts proportional to the number or share of disadvantaged students in each school.

Germany stands out as an exception: eligibility for additional support was left to teachers' discretion, without a standardized evaluation procedure. While this ensured that some students received support, it introduced subjectivity and made outcomes harder to assess. In the other cases, although funding was tied to socioeconomic disadvantage, participation in tutoring and summer programmes remained voluntary, depending heavily on parental engagement. This underscores the importance of raising parental awareness, as was attempted in France and the United States.

Lastly, these targeted investments led to more or less fundings by schools depending on their share/number of low-SES individuals. As such, column 8 from Table 3 should be considered

[35] It is worth to recall that Italy and especially Germany's education system are more or less based on a decentralized structure. The autonomy left at school level may cover the mental health initiatives at local levels. Still, the absence of mental health measures is surprising, even more in France considering the its centralized structure.

[36] For the sake a completeness, it is worth mentioning that these heterogeneity sources are among a larger variety. Hence, other source of variations such as personality traits, gender, etc. are not discussed here because they are not specifically tackled by policy response, although they play a role.

only as a global average in order to make a cross-country comparison and not as a true average supplemental amount provided by student-year.

It is also striking that no country targeted investments based on the length of school closures, despite the strong link between prolonged remote learning and learning deficits. This may be partly explained by the decisional power left to local levels in countries such as the United States, Italy, Germany, Sweden, and Japan, which refers to our difficulties to identify and respond to regionally specific school closure durations.

2.b) Students' age

Section 2.11 demonstrated that younger students experienced greater learning deficits, when controlling for the length of school closures. Accordingly, some countries prioritized early childhood education to promote resilience in the long term. Among the countries reviewed, Germany and England allocated dedicated funding for children aged 3 to 5. However, while targeted investments in early childhood remain limited, all countries devoted specific resources to primary education.

2.c) Transitions Between Educational Levels

As noted in Section 2.11, Germany and Belgium made efforts to minimize remote learning for students completing primary school, while the Netherlands did it at the end of secondary school recognizing the risk associated with educational transitions. However, Table 3 does not indicate any specific investment targeting this group. Conversely, England prioritized upper-secondary students, allocating £324 million to support disadvantaged students' transition into higher education. This contrasting approach illustrates how political discussions and the conclusions shaped national responses, often reflecting policy preferences rather than evidence-based decisions.

(3) Overall design and implementation of the policies

Table 3, along with subsections 1 and 2, shows that while countries generally pursued similar objectives (i.e., recovery, digitalization and mental health support), the implementation of these goals varied significantly, especially in terms of geographic focus, age groups or educational levels. These variations reflect a crucial point emphasized by Salmieri et al. (2024): the practical application of educational investments is largely driven by political choices rather than scientific evidence. Subsections 1.a, 2.a, and 2.c clearly illustrate this, as political responsibility fundamentally shaped how and where investments were made.

This lack of evidence-based policymaking has serious implications, most notably the absence of standardized monitoring and evaluation systems. This issue is particularly acute in emergency contexts such as the COVID-19 crisis, where swift policy responses were necessary but often devised without robust frameworks. In contrast, building a resilient education system requires a scientific approach, including the identification of at-risk groups, the implementation of effective interventions, and the rigorous assessment of outcomes.

As seen in Section 2, the governance structure of education systems appears to influence the degree to which evidence is used in policymaking. In particular, high levels of school or local autonomy are correlated with weaker monitoring systems and limited evidence-based planning.

This divergence is clearly visible when comparing countries like Sweden, Japan, Italy, and, to some extent, Germany, with those that maintain greater central control, such as the Netherlands.

From Section 3, the structural organization of the education systems seems to play a role in the use of scientific evidence to set-up measures. Especially, the autonomy/independence enjoyed by certain schools or localities regarding the government correlates with the lack of monitoring and evidence-based policies. This leads to significant disruption between countries, with some which already understood the need of monitoring and scientific processes. In the first group, extensive local autonomy has hindered the establishment of standardized monitoring and evaluation mechanisms, primarily due to resource constraints and the fragmented administrative structures across regions. The resulting lack of coordinated data collection and limited use of evidence-based interventions has led to an unclear understanding of the educational landscape, making it difficult to respond effectively where action is most needed. This stands in stark contrast to the principles of evidence-based education, and ultimately undermines efforts to build resilient education systems.

The United States represents a unique case with regard to monitoring. As explained in Section 3.9, interstate monitoring enables the government to track learning outcomes up to the present; however, the lack of specific measures in the ESSER plan precludes a clear analysis of its efficiency. Crucially, recent publications relying on robust causal identification strategies and evaluating the 2022–2023 academic year have measured the effect of an additional $1,000 invested per student as yielding a 0.002 to 0.009 standard deviation increase in learning outcomes. The authors emphasize the limited impact of this investment in light of the overall amount spent and the scale of the learning deficits following the pandemic. As such, they specifically underline the inefficiency of the spending, attributing it to the “general use of funds” framework provided by the government. In other words, by issuing only broad guidelines, the ESSER programme granted schools substantial autonomy but lacked the structural support needed to ensure that funds were spent on evidence-based, cost-effective measures. Beyond monitoring, it is the strategic framework itself that is lacking in the United States (Dewey et al., 2024; Goldhaber & Falken, 2025).

In contrast, the Dutch approach combines a common national framework with institutional flexibility and evidence-based measures. Schools are free to choose among approved and scientifically robust interventions, but must do so within a structured and regularly monitored system. This framework is supported by frequent, high-quality data collection, enabling policymakers to both identify needs and act accordingly. These are examples of best practices that should be sustained and replicated where possible. Similarly, England adopted alike measures by recommending and providing additional supports for tutoring programmes, as well as targeting schools with larger share of disadvantaged individuals. Section 3.7 highlighted the monitoring measures set-up by England, but most of the evaluation are still ongoing, which explains the lack of information in Table 3.

Table 3. Summary of the implemented policies by country

Country	Recovery plan	Total Invested	Duration	Key Policy Focus	Targeted	Policy in Practice	Monitoring	Average Individual Support Per Student-Year	Weeks of Closure
Belgium	Flanders	€353 million	2 years	Digitalization, learning recovery, mental health	Low-SES (voluntary)	Support in personal/shared devices in both primary and secondary education level. Enhance of ICT infrastructure at schools Counselling centres development and summer schools	Yes	€486	12
	Wallonia	€28 million	1 year	Digitalization, learning recovery, mental health	/	Financial support for acquiring personal devices, support in counselling centres, more teachers and increasing teaching time	No	€44	
France	Devoirs faits	€206.5 million	2 years	Recovery	low-SES (voluntary)	Free and voluntary tutoring and multiple summer schools programmes	Yes	€16*	9
	Ma classe a la maison	€207.1 million		Digitalization	low-SES, low broadband access	Classrooms infrastructure development, devices purchase support and broadband access development		€16*	
Germany	Varying across states	€2 billion	2 years	Recovery and building resilient education	low-SES students	Mostly tutoring and summer schools programme at the local level, targeted by SES-level determined by the teachers	No	€93.14	13 to 17
		€6.5 billion	5 years	Digitalization	/	Development of ICT devices as well as the infrastructure in classes, completed with e-learning platforms. Developed at local levels.	No	€118.4*	
Italy	NRRP	€1.5 billion	1 year	Digitalization and infrastructure development	Low-SES	Development of ICT to avoid left-behind regions and development/modernization of education infrastructures	No	€202.5*	14 to 28.7
The Netherlands	IOP	€304 million	1 year	Recovery	Low-SES	Subsidy scheme with supplemental amounts dedicated to institutions with larger share of disadvantaged students	Yes	€260*	11.5 to 16
	NEP	€5.8 billion	4 to 5 years	Recovery and well-being	Low-SES	Extra funding for all schools to be spent autonomously on several interventions from a broad menu card of evidence-based interventions, with larger amount of funding dedicated to institutions with larger shares of disadvantaged students		€601.5*	
England	NTP	€5.8 billion	3 years	Recovery and well-being	Low-SES, but included help for all students	Targeted investment by disadvantaged pupils within schools to promote tutoring, additional teaching and well-being among 5 to 19 years old	Yes	€215.5*	16

	Education Recovery Premium Upper-secondary schools	/ €386 million	1 year	Recovery Recovery	/ In-need individual	Recovery programmes such as summer schools, tutoring and enrolling staff members Additional tuition session, tutoring programs	Yes Yes	€173*** /	
Canada	Varying across provinces	€17.6 million	2 years	Recovery and well-being	/	Re-introduction of large-scale standardized assessment programmes, free tutoring and development of guidelines/curricula for physical activity	Yes	€1.74*	/
United States	ESSER 1, 2, 3	€168 billion	4 years	Recovery, mental health and facing COVID-19	/	The ESSER plans were accompanied by a series of recommendations to face the COVID-19, recover the learning deficits and tackle mental health. These recommendations were applied on a school-by-school (district) basis	No	€952*	13.5
Japan	GIGA	€13.9 billion	4 years	Digitalization and well-being	/	Providing ICT tools to any elementary and lower-secondary school students Allocating budget to enhance social activities at schools	No	€371*	0 to 6

Note : * These expense increase per student-year have been computed by the authors and converted into euros according to the exchange rate of the 31st December 2021 (ECB, 2021). We divided the total amount invested by the sum of students enrolled in each academic year covered by the timeframe of the programme (see earlier sections for additional details). Note that this amount is made for comparison purposes and should not be considered as the true average additional amount provided by student-year. As investment were targeted, some institutions may have received more or less fundings compared to others, which raises or decreases the above figures depending on the institutions.

*** This figure does only cover low-SES students.

4 Impact evaluation of the implemented policies

This final chapter synthesises the main insights from the preceding sections, offering a comparative overview of some interventions from the recovery programmes implemented across countries in response to the COVID-19 pandemic. Drawing on the country-specific analyses of school closures (Section 2) and intervention policies (Section 3), it identifies common patterns, divergent outcomes, and key lessons regarding the effectiveness and evaluation of these recovery measures.

Given the limited availability of systematic evaluation data in many countries, this chapter does not seek to provide a detailed account of each national case or recovery plan. Instead, it focuses on those countries where results have been reported, highlighting the types of interventions for which impact evidence is available – such as tutoring schemes, summer schools, digital support initiatives, and socio-emotional programmes. It also examines the extent to which countries embedded evaluation mechanisms into policy design and implementation, and how these mechanisms influenced accountability, targeting, and scalability.

The analysis presented in this chapter is summarised in Table 4, which compiles information on policy content, costs and observed effects. The guiding question for this chapter is:

RQ4 : What are the reported results of these recovery programmes, including their costs, impact, and the evaluation methods used?

(1) Monitoring in light of local autonomy

Table 4 details the implemented interventions by country for which we observe some evaluation results. The timeframe of the intervention is presented, as well as the recovery plan (or region) from which the intervention comes from. The two final columns, present intervention's influence on learning outcomes as well as the source and method used in the analysis. Table 4 is particularly notable for its absence of findings in many countries: four countries (five, including Japan) out of ten provide no evaluation of their recovery measures, despite experiencing significant educational disruptions. This issue has already been raised in the literature, which identifies two primary explanations (see, e.g., François & De Witte, 2025; Jack & Oster, 2024; Salmieri et al., 2024). (a) First, many policies are still ongoing, and comprehensive evaluations have not yet been completed. Moreover, conducting national-level assessments requires extensive data collection and rigorous analytical procedures, which often lead to delays. In the countries that do report results, findings are typically based on administrative datasets with standardized assessments, enabling comparisons of student performance before and after the pandemic. (b) Second, as discussed in Section 3.11, many of the measures adopted were driven more by political considerations than by evidence-based design consequently to the situation of emergency. As a result, systematic monitoring remains limited, reducing the ability to accurately assess the effectiveness of these programmes.

This situation is further shaped by the issue of local autonomy, as emphasized in Section 2.11, which gave rise to a multitude of locally determined interventions. The governance structure of national education systems plays a decisive role in determining whether systematic monitoring can be implemented. As shown in Table 4 and Section 3, countries with high degrees of school-

or district-level autonomy – such as Germany, Sweden and Canada – face significant obstacles in conducting consistent monitoring efforts. In Section 3.11, we showed that, for their part, it was the lack of structure inherent in the organisation of the system that posed a problem for the US. This pattern was explicitly discussed by Schult et al. (2025) in the case of Germany (see Section 3.3), but it likely extends to other decentralized systems as well. Among these countries, only the United States, which invested substantially in data and evaluation infrastructure (see Section 3.9), appears able to carry out sustained monitoring. In contrast, Canada and Sweden have limited their follow-up to resuming existing evaluation systems, offering no new or expanded monitoring initiatives.

(2) Evidence of efficient interventions

Positive contributions still emerge from Table 4. In Belgium (Flanders), summer schools contributed to a global recovery of learning deficits just one year after the health crisis, despite students being severely affected (the "0" reported in the table entitles for a global recovery in terms of learning outcomes compared to the pre-pandemic outcomes). In the Netherlands, learning recovery led to an average improvement three years after the end of the crisis among primary school students. In addition, the specific evaluation of the first subsidy program IOP raise a significantly positive effects of additional remedial teaching interventions on learning growth. In England, tutoring in early childhood education showed significantly high learning gains two years after the pandemic.

Column 6 in Table 4 presents the research design from which the presented results are coming from, next to their source. As observed, these methods allow interpretation ranging from causal (e.g., IV regression, synthetic control matching, like in the U.S.) to descriptive only (e.g., Meeter et al., 2024). Additional robust econometric frameworks – still non-causal – complete Table 4 (e.g., Gambi & De Witte, 2024; Smith et al., 2023; Van Vugt et al., 2024).

These national findings on the rather positive impact of tutoring and summer school programmes are consistent with the results of meta-analyses and experimental studies (see, e.g., François & De Witte, 2025; Schnepf et al., 2024). Nonetheless, the actual cost-effectiveness of these measures must be evaluated in light of (a) the timeframe of both the implemented policy and the school closures, (b) the targeted population, and (c) the total amount invested. As discussed in the following paragraphs, these three aspects are closely interrelated.

2.a) Timeframe of the pandemic and the recovery policies

The most positive outcomes tend to correlate with longer implementation periods. For example, the Netherlands and England achieved gains relative to pre-COVID levels. Notably, England appear particularly efficient in their recovery, which is also more or less related to the timeframe of the intervention. The presented results focus on early childhood intervention, which were based on a programme developed since 2017. Although the evaluated intervention was conducted just after the health crisis, it benefitted from well-developed infrastructure, teachers and experience prior to the health crisis.

In contrast, the limited and negative outcomes in the U.S. can be explained, among other things, in the light of the short timeframe after which the evaluation took place. Moreover, the

difficulty to measure and evaluate significant intervention, as well as the heterogeneity of interventions (see Section 3.11) makes hard to draw clear conclusions.[37]

2.b) Targeted population

As developed in Section 3.11, for a recovery policy to be cost-effective, it needs to be targeted. The results presented in Table 4 are all targeting low-SES individuals via two different mechanisms: funding towards schools depending on the share of disadvantaged individuals or by deprived geographical areas. While existing evidence confirms the effectiveness of these approaches, Section 2.11 also reveals that some countries struggled to reach their target populations. In France, for example, the 2020 summer school programme enrolled 125,000 students, well below the 250,000 initially expected. As many recovery initiatives are voluntary, they risk attracting students who are not the most in need. This underscores the importance of parental involvement in reaching target groups. Differences in how this involvement was fostered and the efficiency of targeting the right group may also explain some of the variation in learning outcomes in Table 4. For instance, the Flemish programme relied solely on voluntary participation without targeted parental engagement, whereas England, the Netherlands, and the US (although leaving large autonomy in the type of implemented policy) allocated funding directly to schools. This difference may partly explain the observed heterogeneity in outcomes.[38]

Several solutions exist to complement voluntary-based summer programmes and ensure that target groups are effectively reached. Strengthening parental involvement could yield greater learning gains than simply enrolling students in need; however, this approach may be both costly and challenging to implement. A more pragmatic and efficient alternative, used in England and the Netherlands, is to allocate funding to schools based on the proportion of low-SES students. Nevertheless, this method can reduce flexibility if students outside the targeted disadvantaged group wish to enrol, as was observed in France.

Gortazar et al. (2024) propose a partial alternative solution. In a randomized controlled trial, they offered free online tutoring to very low-SES students aged 12 to 15. The programme featured small groups (two students per tutor), high frequency (three sessions per week), and delivery outside of school hours. The intervention resulted in significant learning gains (+0.26 SD) compared to the control group. Beyond its strong outcomes, this model shows high potential for effectively targeting the most vulnerable students – especially when paired with school-based selection mechanisms. Gortazar et al. (2024) based their study on voluntary enrolment by students' parents. As such, they highlighted the challenge of reaching the intended target group and addressed this by partnering with organisations that engaged and motivated parents to enrol eligible students. A key feature of the programme was that schools identified the students in need, suggesting that the voluntary element could, in principle, be replaced by compulsory

[37] Recent publications relying on robust causal identification strategies and evaluating the 2022-2023 learning outcomes from large US datasets also report a 0.15 SD in 2022 compared to 2019 (Dewey et al., 2024; Goldhaber & Falken, 2025).

[38] A further element in this direction is presented in King (2022). The study evaluates the learning outcomes of students who followed a summer school and did not find any significant outcome. According to the authors, the lack of results is characterized by the poor attendance level of low-SES individuals. In other words, the students with the most needs were not receiving the intended support.

participation for designated students. Naturally, such a shift would require careful political consideration.[39]

2.c) Cost-effectiveness and amount invested

As discussed in Section 3.11, per-student investment varied significantly across countries. Insufficient funding can undermine both the monitoring efforts and the outcomes reported in Table 4. For example, the funding levels in Flanders appear overestimated, as the budget allocated to summer schools amounted to only €21.8 million in the first year, followed by an additional €10 million the following year.

In this context, the model developed by Gortazar et al. (2024) offers a cost-effective solution for countries operating with limited budgets. Online tutoring presents several advantages: it builds on the existing ICT infrastructure established during the shift to remote learning; it requires minimal physical resources, making it scalable across regions; and it is less affected by teacher shortages in certain areas. While additional teaching time still represents a cost, Carlana and La Ferrara (2021) showed that employing university students as tutors can produce significant learning gains in settings very similar to those studied by Gortazar et al. (2024). This approach could further reduce the overall cost of large-scale tutoring programmes.

(3) Recovery plans incorporating mental health

A final element contributing to the differences observed in the national outcomes reported in Table 4 is the degree of emphasis placed on mental health recovery. Among the four countries that provided outcome data, Belgium (Flanders) and the United States explicitly emphasized mental health, while the Netherlands and England focused more broadly on overall well-being. One encouraging finding from Table 3 is the widespread recognition – across most of the countries studied – of the importance of mental health and well-being, as evidenced by the inclusion of related measures in national recovery policies. Japan, for instance, has designated mental health as a central pillar of its future education strategy. This emphasis is crucial, as mental health should not be underestimated – particularly given its profound and well-documented impact on students' academic performance. As previously noted, Arenas and Gortazar (2024) recently linked self-reported declines in mental health to greater learning deficits. In light of this evidence, it is reasonable to hypothesize that countries with less substantial learning recovery may have underemphasized mental health in their policy responses. In other words, countries should rigorously assess their mental health strategies and engage in cross-country comparisons to determine whether current efforts are sufficient. Furthermore, Arenas and Gortazar (2024) highlight the value of targeted mental health interventions, which may be relatively feasible to implement, given that students themselves are often aware of their psychological struggles.

[39] The choice of the targeted group also plays an important role. England presents very large positive findings, but for the youngest students population in the Table. As the latter pupils are generally recognized as being much more receptive to the positive effects of interventions, this explains our results.

Table 4. Summary of recovery interventions and their influence on learning

Countries	Recovery plan	Time frame	Details	Effect of specific Intervention	Sources
Belgium	Flanders	2020 to 2021-2022	Improvement from summer schools	/	Gambi & De Witte (2023) Regression
	Wallonia	2020-2021	/	/	
France	Devoirs faits	2019-2020 and 2020-2021	Tutoring/summer schools programme. Positive recovery signs among grade 1	/	Moulin & Maurya (2025)
	Ma classe a la maison		Digitalization plan with positive and pivotal role but missing targeted students	/	
Germany	Varying across states	Recovery plan (2020-2021 and 2021-2022) Digitalization plan (2019-2024)	Overall negative trend but recovery in mental health /	/	Schult et al. (2025)
Italy	NRRP	after 2021, but new infrastructure lasting for long	Lack of monitoring at local levels	/	Giancola & Salmieri (2025)
The Netherlands	NEP	2021-2025	Average performance's evolution for primary school students (aged 7 to 11) between reading, spelling, mathematics between 2017-2019 and 2023-2024	+0.024*	Van Vugt et al. (2024) Regression
	IOP	2020-2021	For each type of remedial program, the average changes in performance across reading, spelling and mathematics was measured among primary school students. Further remedial teaching interventions had the most significantly positive impact on learning growth	+0.25	Meeter et al. (2022) Comparative statistics
England	NTP	2020-2021 to 2022-2023	Focus on early childhood education (4 to 5 years old)	+0.30	Smith et al. (2023) Regression
	Education Recovery Premium	2022-2023	/	/	
	Upper-secondary schools	/	/	/	
Canada	Varying across provinces	2020-2021 and 2021-2022	/	/	

United States	ESSER 1, 2, 3	2020-2021 to 2023-2024	Measure of the impact of $1,000 invested by student on student's learning from grade 3 to 8 between 2019 and 2022	0.0086	Dewey et al.(2024) (IV) regression, synthetic control matching
			Measure of the impact of $1,000 invested by student on student's learning grade 4 to 8 between 2021 and 2023	0.0045	Goldhaber & Falken (2025) IV Regression
Japan	GIGA	2019-2020 to 2022-2023	Focus on digitalization and well-being. No improvement as there was no learning deficits	0	Iwabuchi (2025)

Note : This table details the effects of specific interventions implemented to recover from the learning deficits following the COVID-19. The results presented are the results of the evaluation post-interventions in SD terms, not the overall recovery plan. Due to the lack of data, it is still impossible to measure the global efficiency of the massive investment programmes described in Section 3.11 and Table 3. The recovery plan are still mentioned in the above table as the reported findings were made possible through these funds.

* This figure is an average of the learning outcomes reported in SD terms from Table 5.1 of Van Vugt et al. (2024).

5 Policy implications

Building on the comparative findings of this report, this section draws our policy recommendations for Dutch education stakeholders. While these suggestions may serve as preparation for potential future disruptions, their primary purpose is to strengthen the long-term resilience, equity, and responsiveness of the Dutch education system.

The analysis highlights the Netherlands as a case of relative good practice in several key areas. These strengths should be preserved and institutionalized. At the same time, experiences from other countries offer valuable insights that can further refine Dutch policy, particularly in addressing structural inequalities and enhancing the targeting and efficiency of interventions.

The Dutch response to the COVID-19 crisis was marked by several notable strengths. First, the Netherlands acted swiftly by implementing summer schools and tutoring initiatives as early as the summer of 2020. These immediate measures, introduced before many international counterparts launched recovery plans, demonstrate the importance of timely policy action. Moreover, despite its relatively advanced digital infrastructure, the Netherlands allocated targeted funding to improve ICT accessibility for disadvantaged students – an approach that helped prevent additional inequalities in access to remote learning.

Second, the Netherlands adopted a differentiated strategy in its school closure policies. Exceptions were made for certain student groups, such as those in primary and secondary education, in exam years or attending specific types of education. While such differentiation helped to minimise disruptions for some students, it also introduced heterogeneity that must be addressed in recovery strategies to ensure equity across all affected groups. Therefore, we recommend in the future to mirror the decision of allowing differentiated and targeted access to schooling or support for those who were subject to largest learning deficits.

Another strength lies in the design and duration of the Dutch recovery plan. Unlike many countries that implemented short-term interventions, the Nationaal Programma Onderwijs (NP Onderwijs) is a multi-year initiative with a four-year horizon. This extended timeframe enables schools to plan and implement strategies with longer-term impact, rather than relying on short bursts of funding that risk unsustainable outcomes. Importantly, the NP Onderwijs's funding model is equity-based: schools with higher shares of low-SES students received proportionally greater resources. This approach helps to ensure that support is directed to those most in need, aligning funding with levels of vulnerability.

Additionally, the NP Onderwijs explicitly acknowledges student well-being as a core component of learning recovery. By integrating mental health and social-emotional support into its policy framework, the Dutch government demonstrated a comprehensive understanding of the links between well-being and academic achievement. This integrated approach should be maintained and further developed as part of a broader strategy for inclusive education.

Perhaps most significantly, the Netherlands distinguishes itself in its use of structured autonomy. The national "menu card" of approved interventions provides schools with a framework of evidence-informed options, while preserving local decision-making authority. This model strikes a productive balance between flexibility and scientific rigour. Coupled with robust monitoring mechanisms, it enables data-driven adjustments and facilitates continuous learning

within the education system. This structured autonomy represents a model of good practice that could inform broader international discussions on system resilience and responsiveness.

While the Dutch response offers many strengths, insights from other countries point to areas for further development. One such area is early childhood education. Evidence from England indicates that targeted investment in early years education can produce substantial learning gains and enhance long-term system resilience. While massive investments leading to promising outcomes were already conducted in primary education, expanding high-quality early childhood programmes in the Netherlands could serve as a preventive measure by improving foundational skills before disruptions occur. Especially, such a measure would be particularly useful in disadvantaged areas.

Another area for policy improvement involves the mechanisms used to reach the most vulnerable students. While the Netherlands targeted funding based on socioeconomic indicators, many interventions remain on the basis of the school choice. Although this method effectively leverages the proximity of institutions to students and their autonomy, it risks neglecting certain solutions and, consequently, certain vulnerable students. Specifically, where parental involvement appears crucial to reaching students with the greatest needs (see e.g. Section 4 and Gortazar et al., 2024) this tool, which was included in the government's toolkit, was rarely used by Dutch schools. As such, enhancing communication with families and involving them more actively in recovery efforts may improve uptake among low-SES students. In addition, promising practices from other countries suggest that more directive strategies could be employed to ensure effective targeting. For example, recent experimental evidence from Gortazar et al. (2024) highlights the value of online tutoring programmes, where in-need student are determined by schools. Combining national guidelines for a structured identification of the students with local knowledge can enhance precision in targeting. Coupled with a non-voluntary (online) tutoring programme, it ensures that those most at risk receive the necessary support. While such an approach would require careful political and ethical consideration, it offers a scalable and cost-effective method to address learning deficits in a more inclusive way.

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