# National Competitiveness and Productivity Council Bulletin 25-3 The Competitiveness Implications of Post-Pandemic Learning Losses



- International analyses point to a long-term deterioration in maths proficiency globally and recent work by the OECD suggests the COVID-19 pandemic led to an acceleration of this decline. A less severe decline, however, is observed for Ireland compared to many peer economies.
- Declining maths proficiency undermines the future availability of critical skills. These skills are fundamental to long-term success in high-value industries such as ICT, pharmaceuticals, and financial services that contribute significantly to growth.
- Following on from pandemic-era school closures, absenteeism rates in primary and post-primary education in Ireland almost doubled. Absenteeism levels remain elevated but are now trending downward. It remains to be seen whether these levels of absenteeism will continue to converge to pre-pandemic rates.
- Learning losses associated with the pandemic and the need to mitigate the adverse impacts associated with these losses are an important public policy consideration. Targeted interventions can play a key role in mitigating against pandemic-related learning losses and facilitating a more resilient pipeline of skills in critical areas.

### **OVERVIEW**

The supply and quality of education and skills play a pivotal role in driving economic growth and enhancing national competitiveness. As noted in *Ireland's Competitiveness Challenge 2024*,<sup>1</sup> the development and retention of talent remain central to Ireland's economic resilience and long-term competitiveness. As Ireland adapts to shifting labour market demands, particularly in response to the emergence and adoption of disruptive technologies, the availability of a highly skilled and adaptable workforce will be key. A well-educated workforce is not only a catalyst for productivity and innovation but is also vital to growing strong indigenous companies and attractive foreign investment, especially in knowledge-intensive sectors and a geo-politically changed world.

The COVID-19 pandemic severely disrupted education systems globally, with closures impacting schools at primary and post-primary level, as well as third-level institutions and other training bodies. The rapid transition to remote learning posed significant challenges to learning continuity, particularly for maths. OECD research<sup>2</sup> examining 30 countries with comparable data across all levels of education, found that primary and secondary schools were fully closed (i.e. without a remote learning alternative) for an average of over 90<sup>3</sup> days

between 1<sup>st</sup> of January 2020 and 20<sup>th</sup> of May 2021. In Ireland, this figure was just over 86 days.<sup>4</sup> This disruption raises concerns regarding the persistence – and possible acceleration – of what has been a long-term trend of declining maths performance. This trend poses a risk to the future availability of STEM skills in Ireland, with potential ramifications for Irish productivity and competitiveness. Given the critical importance of STEM industries to Ireland's indigenous enterprise base, our FDI proposition and our economic competitiveness more broadly, it is fundamental that any learning losses in this area are addressed.

This Bulletin analyses the impact of COVID-19-related school closures on maths proficiency, which underpins success in STEM fields. We also compare Ireland's performance to international peers, assess trends in absenteeism in Ireland, and review OECD Performance Indices that provide further context to OECD Programme for International Student Assessment (PISA) results.

# SCHOOL CLOSURES AND LEARNING LOSSES

### **International Evidence**

Rather than considering national curricula, PISA assesses the real-world knowledge and skills of 15- and 16-yearolds in reading, mathematics, and science with a focus on

<sup>&</sup>lt;sup>1</sup> See: <u>Ireland's Competitiveness Challenge 2024</u> (July 2024), National Competitiveness and Productivity Council.

<sup>&</sup>lt;sup>2</sup> See: <u>The State of Global Education – 18 Months into the Pandemic</u> (September 2021), OECD.

<sup>&</sup>lt;sup>3</sup> This is a simple average of averages for school closures in primary, lower secondary and upper (general, not vocational) secondary schools, as reported by the OECD.

<sup>&</sup>lt;sup>4</sup> When interpreting the average, it should be noted this research compares jurisdictions that applied pandemic restrictions on education for varying lengths of time.

problem-solving, critical thinking, and communication. It provides a global benchmark for how well education systems prepare students for life's challenges and future success The PISA results for 2022 – focussing on maths – revealed a significant decline in scores across participating countries, with an average drop of 12 points compared to 2018,<sup>5</sup> equivalent to seven months of lost learning.<sup>6</sup>

The COVID-19 pandemic and subsequent school closures<sup>7</sup> are believed to have contributed to these losses, particularly in countries with prolonged shutdowns. Some regions experienced particularly severe declines, such as Italy and Mexico. However, the OECD data show that learning losses were not solely determined by closure duration,<sup>8</sup> with instructional quality also playing a role. Furthermore, this decline in maths performance is not the reversal of a long-term positive trend, but rather the compounding of an existing negative one.

Using the PISA data, Jakubowski, Gajderowicz, and Patrinos (2025)<sup>9</sup> find a correlation between longer closures and greater learning losses, estimating that every additional week of school shutdown resulted in a 0.44-point achievement decrease. This study also links learning deficits to economic consequences, predicting an average loss of 0.15 percentage points in GDP growth. It is also the case that the transition to remote learning during the COVID-19 pandemic presented distinct challenges for instruction in maths.

Di Pietro (2023) found that many parents reported having lower confidence in assisting their children with maths compared to other subjects, such as reading, thereby limiting the effectiveness of home-based learning.<sup>10</sup> The study also suggested that it was more difficult for instructors to adapt to teaching mathematics remotely and for students to understand and engage effectively. This is, in part, due to the fact that explanations often rely on handwriting and real-time explanation of symbolic material. This would suggest that remote learning in maths was less successful as a substitute for in-person instruction. Beyond the technical and instructional barriers, the pandemic may have also contributed to an increase in maths-related anxiety among students, negatively impacting motivation and self-efficacy. 15-year-olds in most countries are now more anxious about maths than in 2012,<sup>11</sup> the last time that this measure was assessed.<sup>12</sup> Since 2003, PISA data have consistently shown a negative correlation between maths anxiety and performance, across all participating education systems.

### Ireland's Performance

The PISA dataset provides a basis for assessing Ireland's performance in maths, on a pre- and post-COVID basis, and allows us to examine any change in performance within an international context. Ireland's post-pandemic decline in standardised maths scores aligns with global trends. However, Ireland has performed relatively better than many comparable countries, suggesting a more resilient performance in maths education. This can be seen in Figure 1.

#### Figure 1: PISA Maths Rankings 2018 vs. 2022



#### Source: OECD PISA

Ireland's mean maths score in 2022 was eight points lower than in 2018, reflecting a 1.6% decline. This compares favourably to the OECD average (-3%), as well as to the UK (-2.5%) and Finland (-4.5%). Even strong global performers suffered a decline in this period. Estonia

<sup>&</sup>lt;sup>5</sup> The PISA 2022 survey focused on mathematics, with reading, science and creative thinking as minor areas of assessment. In each round of PISA, one subject is tested in detail, taking up nearly half of the total testing time. The main subject in 2022 was mathematics, as it was in 2012 and 2003.

<sup>&</sup>lt;sup>6</sup> See: Jakubowski, M., Gajderowicz, T. and H. Patrinos. (2025). "<u>COVID-</u> 19, School Closures, and Student Learning Outcomes: New Global Evidence from PISA".

<sup>&</sup>lt;sup>7</sup> Unless explicitly stated, the reader should assume 'school closures' refer (1) school is entirely shutdown with no remote learning option and (2) the school building is closed but remote learning is in operation.

<sup>&</sup>lt;sup>8</sup> See: <u>PISA results Volume II</u>, OECD.

<sup>&</sup>lt;sup>9</sup> See Jakubowski, Gajderowicz and Patrinos (2025).

<sup>&</sup>lt;sup>10</sup> See: Di Pietro, G. (2023). "<u>The Impact of COVID-19 on Student</u> <u>Achievement: Evidence from a Recent Meta-analysis</u>", *Educational Research* Review, Vol 39.

<sup>&</sup>lt;sup>11</sup> See: <u>PISA 2022 Results (Volume V)</u>, OECD.

<sup>&</sup>lt;sup>12</sup> Students reported heightened anxiety, not only regarding grades and academic performance, but also in their ability to engage with maths related tasks in general.

(ranked first in the EU), experienced a 13-point drop. However, despite the overall trend of declining scores, some territories, including Taiwan and Saudi Arabia, recorded improvements. Regardless, Ireland continues to rank among the strongest performers internationally and has jumped from 21<sup>st</sup> to 11<sup>th</sup> place in overall rankings.

A key concern regarding pandemic-related school closures, is not only the overall decline in educational outcomes but also the unequal distribution of learning losses across socio-economic groups. Figure 2 demonstrates that Ireland follows the global trend of experiencing a more significant reduction in maths scores among disadvantaged students (a greater than 2% decrease), though the impact has been less pronounced here than in many comparator countries. Indeed, Ireland has a lower prevalence of low performing students (19%) than the OECD average (31%).





Source: OECD PISA

The IEA also benchmarks performance in maths and science in the *Trends in International Mathematics and Science Study* (TIMSS). This assessment compares the achievement of fourth class and second-year (or equivalent) students across countries. Irish second-year students have shown strong and stable maths performance, scoring 522 in 2023 compared to 524 in 2019, and well above the international average of 478, suggesting resilience to COVID-19-related disruptions.

The divergence between TIMSS and PISA results for Ireland is not unexpected, as the tests assess different

aspects of maths ability: TIMSS focuses on curriculumbased learning, while PISA evaluates the application of maths in real-world contexts<sup>13</sup>. This may indicate that while successful curriculum learning was maintained, students' ability to apply mathematical knowledge was more affected.

PISA data indicate that Ireland experienced longer school building closures than the OECD average between 2019 and 2022. A comparatively smaller share of 15- and 16year-old students reported that their schools were closed for less than three months during this period (Ireland 20% vs OECD average 49%, see Figure 3). Ireland, however, recorded a smaller decline in maths scores over this period. At first glance, it may seem counterintuitive that a country with extended school building closures experienced a less severe learning loss.<sup>14</sup> Several factors may explain this trend, however, including long-term performance patterns in maths (see Figure 4), recent changes to the secondary school maths curriculum,15 policy interventions designed to mitigate learning losses, and differences in the effectiveness of remote and inperson instruction across countries.





■ % students who reported that, in the previous three years, their school building was closed for 3 months or less (RHS)

▲ % Decrease in Mean Maths Test Score 2018 - 2022 (LHS)

#### Source: OECD PISA

In many countries, the COVID-19 pandemic may have accelerated an existing trend of declining maths performance. Taking a long-term view, between 2006 and

<sup>&</sup>lt;sup>13</sup> For a more detailed comparison, see: Hutchison, C. and Schagen, I. (2006) "Comparisons Between PISA and TIMSS – "<u>Are We the Man with</u> <u>Two Watches</u>?", National Foundation for Educational Research

 $<sup>^{\</sup>rm 14}$  Based on student responses. It is worth noting that in Ireland, all schools were closed for a period of more than 3 months.

<sup>&</sup>lt;sup>15</sup> For more information, see: <u>Resources for Parents | NCCA</u>.

2018, Ireland's maths scores declined by 0.2%. This was followed by a 1.6% decline from 2018 to 2022.

By comparison, OECD average maths scores declined by over 1% between 2006 and 2018, and experienced a steeper decline of over 3% from 2018 to 2022. The UK, which saw a 1.4% increase in maths scores from 2006 to 2018, recorded a 2.6% decline in the subsequent four-year period.

550 540 530 520 510 500 490 480 470 2022 2006 2009 2012 2015 2018 Finland Ireland Netherlands United Kingdom OECD Average

#### Figure 4a: Mean PISA Math Results 2006-2018

Source: OECD PISA

Figure 4b: Period-on-Period Change in Mean Maths Results, %



#### Source: OECD PISA

While the overall decline for Ireland has been less pronounced than for many other countries, the long-term decline in maths performance remains a concern for Ireland's future skills pipeline. A sustained downward

<sup>17</sup> During the 2021/22 school year, schools were generally open, but localised closures still occurred due to COVID-19 outbreaks. High

trend in maths proficiency could lead to fewer STEM graduates, potentially creating labour market challenges in high-demand sectors that require more advanced technical skills.

#### STUDENT ABSENTEEISM

Beyond school closures, the COVID-19 pandemic contributed to a sharp rise in the number of school days lost due to student absence, <sup>16</sup> compounding the negative effects of the pandemic on maths education. Absenteeism comprises of absences excused and unexcused. In contrast, truancy refers to unexcused absences only. For example, in Table 1, an absence includes all of the listed categories, but a truancy refers only to the 'Unexplained' category. Figure 5 shows a notable increase in absenteeism rates in Ireland in the aftermath of the COVID-19 pandemic.

Interpreting data on absenteeism during the 2019/20 and 2020/21 school years is complicated by the mandatory school closures that occurred during that period. The pandemic is a complicating factor due to student's possible difficulties in accessing remote learning, widespread illness, pandemic-related mental health challenges and general disruptions to family life. For these reasons amongst others, absence levels during the pandemic might not be representative of broader trends in absenteeism. Additionally, the fewer days that schools are open, means that there are fewer opportunities for episodes of absenteeism. A comparison between the 2018/19 and the 2021/22 academic years onward, provides a less ambiguous interpretation, as there were no mandatory school closures during these academic years<sup>17</sup>.

Figure 5 shows data on student absenteeism over an extended time period, beginning with the 2013/14 academic year. As shown, there is a significant increase in chronic absenteeism in both the primary and secondary cohorts in 2021/22, with a decline in rates observed in 2022/23, although still significantly above pre-pandemic rates. The percentage of student days lost due to absenteeism increased between 2018/19 (the pre-pandemic baseline) and 2020/21 (from 5.2% to 11.1% in primary education, and from 8.2% to 12.6% in secondary education), and then decreased in 2022/23 (from 11% to 8.6%, and from 12.6% to 11.4% respectively).

The proportion of students engaged in chronic absenteeism – defined as missing 20 days of school or

infection rates and public health advice led to increased absenteeism across schools (Table 1).

more — increased from 10.7% (2018/19) to 40.3% (2020/21), then declined to 25.1% (2022/23) for primary school students. For secondary students, the increase was more moderate, though still significant, rising from 14.5% (2018/19) to 26.8% (2020/21), falling to 22.3% (2022/23) the following academic year

# Figure 5: Lost Student Days and Chronic Absenteeism, 2013/14 to 2022/23



#### Source: Tusla

Table 1 compares the percentage change in the types of reasons reported by chronically absent students between the 2018/19 and 2021/22 school years. The onset of the Omicron variant, a relatively more infectious strain of COVID-19, led to the reintroduction of certain pandemic restrictions in late-2021 (and the official advice to self-isolate upon infection remained in place). Compared to 2018/19, absences due to illness increased by nearly 300% in 2021/2022 for primary students, and by over 1,000% for secondary students.

There were, however, significant increases across the board in terms of the reasons given for chronic absence, suggesting that there were other contributing factors and pandemic-related illness does not fully explain the growth in chronic absenteeism over this period. The OECD<sup>18</sup> has highlighted that a more relaxed attitude towards absenteeism among both students and parents, as well as

a decrease in well-being among students, are possible contributors to rising absenteeism rates.

## Table 1: Reasons Given for Chronic Absenteeism, % Change, 2018/2019 vs. 2021/2022

	Primary	Post- Primary
Illness	299.6	1008.2
Urgent	235.4	193.5
Holiday	164.0	103.6
Suspended	-55.3	-1.3
Other	617.1	213.5
Unexplained	125.3	114.0
Total Students in Responding Schools	0.5	14.9

#### Source: Tusla

It is too early to determine to what degree pandemic-era school closures have impacted medium to long-term trends in student absenteeism. However, both the latest domestic data and the international evidence<sup>19</sup> suggest that there is a risk that increased rates of absenteeism can persist over the medium to long term. This risk, combined with rising maths anxiety and a decline in maths performance generally, could form a reinforcing cycle, hindering students' ability to recover lost learning.

# LONG-TERM IMPLICATIONS FOR HUMAN CAPITAL AND PRODUCTIVITY

Recent international research estimates that productivity losses due to school closures could range from 0.4% to 2.1% cumulatively over the next 45 years, depending<sup>20</sup> on the duration of disruptions.<sup>21</sup> A 12-week school closure is projected to reduce PISA scores by 0.14 standard deviations (SD), while a two-year closure could lead to a 0.72 SD decline. These setbacks are expected to peak around 2067,<sup>22</sup> with estimates of human capital losses ranging from 0.2% to 0.9%. Beyond school closures, the increasing use of digital devices, including smartphones and social media, has further contributed to declining student performance.

Analysis suggests that in 2022<sup>23</sup>, one additional hour of unstructured digital device use during school was

<sup>&</sup>lt;sup>18</sup> See: <u>Evaluating post-pandemic education policies and combatting</u> <u>student absenteeism beyond COVID-19</u> (May 2024), OECD Education Policy Perspectives.

<sup>&</sup>lt;sup>19</sup> See: Fuller, S.C., Bastian, K.C., Swiderski, T. and D. L.L. (2024). "<u>Post-pandemic Changes in Absence Rates in North Carolina: Updated</u> <u>Through 2022-23</u>", *Education policy Initiative at Carolina (EPIC)*.

 $<sup>^{\</sup>rm 20}$  0.4% assumes 12 weeks of school closures, 2.1% assumes 2 years of school closures

<sup>&</sup>lt;sup>21</sup> See: De la Maisonneuve, C. Égert, B. and D. Turner. (2023). "Quantifying the Macroeconomic Impact of COVID-19-Related School Closures Through the Human Capital Channel", Economies, 11(12), 289.
<sup>22</sup> This is the year the first effected cohort from school closures will retire from the workforce with the effect completely diminishing in 2083 when the last cohort will have retired. Note that this forecast impact is predicated on there being no correction in the meantime, for example through lifelong learning.
<sup>23</sup> In countries participating in PISA

associated with a 6-point decline in PISA scores.<sup>24</sup> Without targeted intervention, these trends could contribute to a sustained long-term decline in multi-factor productivity (MFP) growth of nearly 3%.<sup>25</sup>

# ADDRESSING PANDEMIC RELATED LEARNING LOSSES

Despite experiencing one of the longest periods of pandemic-related school building closures amongst OECD PISA participating countries, the performance of Irish students in maths has shown some resilience compared to other countries. This is evidenced by the relative scale of the decline in PISA maths scores between 2018 and 2022. Although this is modest in relative terms, any loss in learning should be carefully monitored.

The Government has already taken a number of measures to mitigate learning losses due to pandemic-related school closures. Under the Covid Learning and Support Scheme (CLASS),<sup>26</sup> extra teaching supports were made available. This scheme, combined with other measures such as an enhanced Summer Programme,<sup>27</sup> and strategies such as the *Wellbeing Policy Statement and Framework for Practice*<sup>28</sup> and *Cineáltas: Action Plan on Bullying*<sup>29</sup> may have helped in stemming learning losses and maintain a sense of inclusion for Irish students, resulting in Ireland's relatively more favourable performance in PISA testing.

On foot of the latest attendance data published by Tusla, the Irish government is introducing a comprehensive strategy to improve school attendance, centred around the rollout of "Anseo" (an evidence-based framework for analysing and responding to attendance data in schools). This initiative includes a project to enable real-time attendance tracking, enhanced coordination with the School Completion Programme and youth services, and a cross-government effort to prioritise attendance from early childhood.

As illustrated in Figure 5, absenteeism rates in Ireland increased significantly in 2022, but decreased the following year. It remains to be seen whether absenteeism rates will converge with pre-pandemic norms. Various factors contribute to absenteeism, and a major concern is that these factors have been exacerbated by the pandemic. The Irish education system has been proactive

in working to improve school attendance. In the 2023/24 academic year, Tusla and the Department of Education launched a National School Attendance Campaign, supported by targeted grants to schools.

# Figure 6: OECD PISA Performance Indices, Ireland vs OECD Average, 2022



Source: OECD PISA. Note: Bars where Ireland is outlined in red indicate an index where Ireland is performing below the OECD average.

Figure 6 summarises a selection of educational performance indices contained within the PISA report. Bars where Ireland is outlined in red indicate an index where Ireland is performing below the OECD average. As shown, Ireland performs significantly worse in terms of problems with remote learning, sense of belonging among students, and confidence in capacity for self-learning. Addressing post-pandemic impacts on educational outcomes – and the recovery of learning losses – should continue to be a focus of public policy.

#### **CONCLUSION**

PISA data suggest that the period following the COVID-19 pandemic is associated with a decline in maths performance internationally. This holds for Ireland – although to a lesser extent than in other countries. Regardless, this fall in the performance of Irish students potentially carries implications for competitiveness and productivity. The decline in maths performance underscores the urgent need for targeted policy

<sup>&</sup>lt;sup>24</sup> See: Andrews, D., Égert, B. and C. de la Maisonneuve. (2024). "<u>From</u> <u>Decline to Revival: Policies to Unlock Human Capital and Productivity</u>", *OECD Economics Department Working Papers*, No. 1827.

<sup>&</sup>lt;sup>25</sup> See: Andrews, Égert & Maisonneuve (2024).

<sup>&</sup>lt;sup>26</sup> See The Department of Education (2021) <u>Covid Learning and Support</u> <u>Scheme (CLASS)</u>

 <sup>&</sup>lt;sup>27</sup> See : The Department of Education <u>2022 Summer Programme for all</u> <u>Primary Schools & 2022 Summer Programme for Post-Primary Schools</u>
 <sup>28</sup> See : The Department of Education (2018) <u>Wellbeing Policy</u> <u>Statement and Framework for Practice</u>

<sup>&</sup>lt;sup>29</sup> See: The Department of Education (2022) Cineáltas: Action Plan on Bullying

interventions to address learning losses and support students' well-being.

The public policy response to any loss of human capital post-pandemic needs to encompass a multi-faceted approach, including – but not be limited to – the monitoring and evaluation of absenteeism factors, targeted funding for schools, and the implementation of positive messaging campaigns. Maths performance is influenced by various factors, and effective strategies must be context responsive. OECD data suggest comparative weak spots for Ireland in terms of students' sense of belonging and confidence in capacity for self-learning.

The NCPC reports to the Taoiseach and the Government, through the Minister for Enterprise, Tourism and Employment, on the key competitiveness and productivity issues facing the Irish economy and makes recommendations to Government on how best to address these issues. The latest NCPC publications can be found at: <u>www.competitiveness.ie</u>.

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