A Summary of the Performance of Students in Ireland on the PISA 2009 Test of Mathematical Literacy and a Comparison with Performance in 2003

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The Programme for International Student Assessment (PISA), a project sponsored by the Organisation for Economic Co-operation and Development (OECD), assesses the knowledge and skills of 15-year-olds in reading, mathematics and science. It takes place in three-yearly cycles, the first of which was in 2000 and the most recent in 2009. In each cycle, one of the subject areas is designated the main focus of the assessment. In the first cycle reading was the main focus, in 2003 it was mathematics, and in 2006 science. Reading became the main focus again in 2009, while mathematics will be a major domain in 2012. Students in 65 countries (including all 33 OECD member states) participated in PISA 2009, which was implemented in March/April in Ireland. A consequence of mathematics being a minor assessment domain in 2009 is that mathematics items appeared in only 8 of the 13 test booklets, and mathematics scores were imputed for students not attempting mathematics items so that each pupil in the PISA assessment was assigned a mathematics score whether they were asked to complete mathematics questions or not.[1] All 35 mathematics items administered in PISA 2009 had been administered in earlier PISA assessments, though individual students asked to solve mathematics problems encountered a subset of the 35.

This report reviews student performance on PISA 2009 mathematics, examines changes over time, and discusses factors that are relevant to an interpretation of these changes. The report then draws some conclusions.

Performance in Mathematics in 2009

Ireland achieved a mean score[2] of 487.1 on the combined mathematics scale, which is significantly below the OECD average of 495.7. Ireland's ranking in mathematics is 26th out of 34 OECD countries[3] and 32nd out of 65 participating countries. Applying a 95% confidence interval which takes into account measurement and sampling error, we can say that Ireland's rank is between 22nd and 29th among OECD countries and between 28th and 35th among all countries.

Ireland's mean score does not differ significantly from the mean scores of 10 countries, including Sweden, the Czech Republic, the United Kingdom and the United States. Nineteen OECD countries (including Korea, Finland, Germany and Austria) achieved significantly higher mean scores than Ireland, while five OECD countries (Greece, Israel, Turkey, Chile and Mexico) performed significantly lower than Ireland.

[1] In fact, each student was assigned 5 plausible values (i.e., 5 possible mathematics scores, drawn at random form a larger set of possible scores).
[2] This mean score is on the scale established for PISA 2003, where the OECD country average was set at 500, and the OECD standard deviation at 100.
[3] Although Estonia is an OECD accession candidate country, their data for PISA 2009 are included in the OECD average estimates.

The mean score for Northern Ireland[4] (492.2) does not differ significantly from the mean score for the rest of Ireland or the OECD average mean score. The highest mean score on PISA 2009 mathematics was 600.1 points in Shanghai-China. Other high-scoring countries include Singapore (562.0), Hong Kong-China (554.5), Korea (546.2), Chinese-Taipei (543.2) and Finland (540.5).

Mathematics performance can also be interpreted in terms of proficiency levels (established in 2003 when mathematics was a major domain). Six levels of proficiency were identified. Level 6 represents the most difficult tasks while Level 1 represents the most basic tasks and is considered to be below the minimum level needed to meet the mathematics demands of adult life and further education (OECD, 2010a). There is also a 'below Level 1' category which takes account of the performance of students whose skill levels are below those assessed by PISA.

The percentage of students at/below Level 1 in Ireland (20.8%) is slightly less than on average across OECD countries (22.0%) and is similar to that in the United Kingdom (20.2%) and Poland (20.5%), both of which achieved an overall mean score not significantly different from the OECD average. However, Ireland has significantly fewer students at the higher proficiency levels (at/above Level 5) than the OECD average (6.7% compared to 12.7%), the United Kingdom (9.8%) and Poland (10.4%). There are also proportionally more high-achieving students in Northern Ireland (10.3%) than in the rest of Ireland (6.7%). The percentage of high-achieving students in Ireland is also much lower than the corresponding percentage in Finland where 21.6% of students achieved at Level 5 or 6.

This pattern of results suggests that Ireland's low average performance is, in part, attributable to the comparatively low performance of higher-achieving students.

In Ireland, males achieved a higher mean score (490.9) than females (483.3), but the difference is not significant. The mean scores for males and females in Ireland are significantly below the corresponding OECD average scores (501.4 and 489.9, respectively). Twenty-one OECD countries had a significant gender gap favouring males, the largest of which was Belgium with 21.8 points. No significant gender difference was observed in the remaining 13 OECD countries. In Northern Ireland, both male and female students achieved mean scores (501.1 and 483.8. respectively) that are not significantly different from the corresponding scores for Ireland or the OECD averages.

The proportions of low-achieving (at/below Level 1) males (20.6%) and females (21%) in Ireland are similar to the corresponding OECD averages (20.9% and 23.1%, respectively). In Ireland, there are considerably fewer high-achieving males (8.1%) and females (5.1%) than on average across the OECD (14.8% and 10.6%, respectively).

[4] Northern Ireland is not counted among the 65 participating countries in PISA 2009. It is a region within the UK sample, and scores are provided in this paper for comparative purposes only. Unlike the Republic of Ireland, the quality of the sample of schools in Northern Ireland was not adjudicated by the OECD. In the text, in the context of comparisons between the Republic of Ireland and Northern Ireland, the former is referred to as 'the rest of Ireland'.

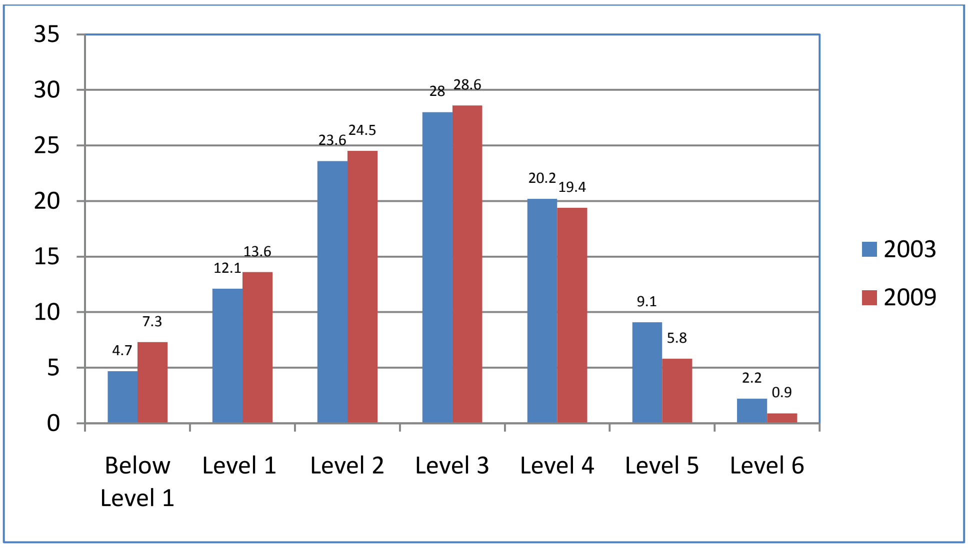
Comparison with PISA 2003

Changes in mathematics performance are examined for 40 countries between 2003, when mathematics was last a major domain, and 2009[5]. Ireland's mean mathematics score dropped 16 points, from 502.8 to 487.1. Most of this decline (14 of the 16 points) occurred between 2006 and 2009. Just one other country, the Czech Republic, experienced a greater decline (24 points). Ireland's rank dropped from 20th to 26th among countries that participated in both cycles. Northern Ireland has also seen a significant drop in mathematics performance since 2003 (from 514.7 to 492.2), though, unlike the rest of Ireland, much of its decline occurred between 2003 and 2006.

Just three countries have changed their position relative to the OECD average since 2003. Poland and Hungary were below the OECD average in 2003, but not significantly different from it in 2009, while Ireland's position changed from being at the OECD average to being significantly below it. Countries with significant declines include Sweden (-15), France (-14), Belgium (-14) and the Netherlands (-12), while Mexico (+33), Brazil (+30), Portugal (+21) and Germany (+10) had significant increases.

In 2003, Ireland had significantly fewer students at/below Level 1 (16.8%) than on average across the OECD (21.5%). In 2009, the percentage of low-achieving students increased to 20.8% in Ireland and now is not significantly different from the OECD average (22.0%). The percentage of students at/above Level 5 in Ireland decreased from 11.3% in 2003 to 6.7% in 2009 and still remains significantly lower than the corresponding OECD average (13.5% in 2009). Figure 1 shows the percentages of students in Ireland at each proficiency level in 2003 and 2009.

Figure 1: Distribution of Proficiency Levels on Combined Mathematical Literacy in Ireland, 2003 and 2009



[5] Australia, Austria, Belgium, Brazil, Canada, Czech Republic, Denmark, Finland, France, Germany, Greece, Hong Kong-China, Hungary, Iceland, Indonesia, Ireland, Italy, Japan, Korea, Luxembourg, Latvia, Liechtenstein, Macao-China, Mexico, the Netherlands, New Zealand, Norway, Poland, Portugal, Russian Federation, Serbia, Slovak Republic, Spain, Sweden, Switzerland, Thailand, Tunisia, Turkey, the United States and Uruguay participated in both PISA 2003 and 2009.

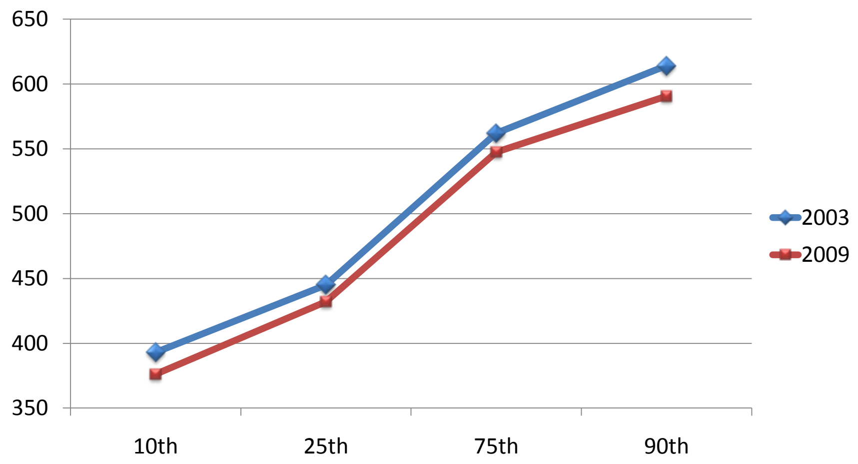
In Ireland, the performance of both male and female students dropped significantly between 2003 and 2009 (-19 points for males and -12 points for females) (Table 1). Males outperformed females in both years, but only significantly so in 2003. Similarly, in Northern Ireland, the performance of males and females dropped significantly since 2003. Males outperformed females in both years, but the difference was significant only in 2009. The average gender gap across the OECD changed very little between 2003 and 2009 (11.1 and 11.5 points, respectively).

Table 1: Comparison of Performance in Mathematics in PISA 2003 and 2009 – Gender and Key Benchmarks – Ireland

Mathematics	2003	2009	Change (2009-2003)
Mean score (all)	503	487	-16
Mean score (males)	510	491	-19
Mean score (females)	495	483	-12
Gender difference	15.0	8.0	-7.0
% at or below Level 1 (all)	16.8	20.8	4.0
% at or below Level 1 (males)	15.0	20.6	5.6
% at or below Level 1 (females)	18.7	21.0	2.3
% at or above Level 5 (all)	11.3	6.7	-4.7
% at or above Level 5 (males)	13.7	8.1	-5.6
% at or above Level 5 (females)	9.0	5.1	-3.9

A comparison of the performance of students in Ireland at key benchmarks – the 10th, 25th, 75th and 90th percentiles – in 2003 and 2009 (Figure 2) shows that the decline in performance in Ireland was less uniform across the distribution of achievement than in reading, with a slightly greater decline at the top, compared with the bottom.

Figure 2 – Performance in Mathematics in Ireland at Key Benchmarks – All Students, 2003 and 2009



Factors Examined to Interpret the Decline in Performance between 2003 and 2009

This section looks at possible factors impacting on the performance of students in Ireland in 2003 and 2009, and, by extension, reasons for the decline in performance in PISA mathematics between PISA 2003 and 2009.

It should be noted that both the Educational Research Centre (ERC) (Cosgrove, Shiel, Archer & Perkins, 2010) and Statistics Canada (LaRoche & Cartwright, 2010) have conducted detailed analyses of possible reasons underlying the decline in performance in reading in Ireland. This short paper focuses on aspects of those analyses that also relate to mathematics. Other analyses (for example, comparing the school and student samples in 2003 and 2009; examining the scaling of PISA 2009 mathematics data in detail) that might explain differences in performance between 2003 and 2009 have not yet been conducted.

Demographic change. Some of the demographic changes in Ireland between 2000 and 2009 might be expected to impact on mathematics in much the same way that they impacted on reading. These include an increase in the percentage of migrant students. Table 2 contrasts the percentages of native and migrant first- and second-generation students[6] in 2003 and 2009, as well as performance among these groups for 2009. There is an overall increase in the percentage of migrant students from 3.5% in 2003 to 8.3% in 2009. Further, in 2009, the mean mathematics score of second-generation migrant students is significantly lower (by 25 points) than the mean score of native students. It is also of interest that the mean score of first-generation migrant students is higher than that of native students, but not to a significant degree.

Table 2: Mean Mathematics Scores of Students in Ireland, by Migrant Status – 2003 and 2009

	2003		2009	
	%	Mean	%	Mean
Native (Ref. group)	96.5	503	91.7	491.7
First Generation Migrant	1.0	*	1.4	496.2
Second Generation Migrant	2.5	*	6.8	**466.5**

Note: Significant differences in bold. *Achievement not computed (too few students).

There was also an increase in Ireland between 2003 and 2009 in the proportion of students speaking a language other than the language of the test, from 0.8% to 5.6% (Table 3). In 2009, the gap between those who reported speaking the language of the test at home and those who spoke another language at home was 35 points, which is statistically significant.

[6] The OECD defines migrant students as students who were born in a country with both parents born outside the country (second-generation migrants) and those students who were born outside the country with both parents also born outside the country (first-generation migrants). For the purpose of identifying migrant students, Northern Ireland is considered to be outside of the rest of Ireland.

Table 3: Mean Mathematics Scores of Students in Ireland, by Language Spoken at Home

	2003		2009	
	%	Mean	%	Mean
Language of the test spoken at home	99.2	503	94.4	500.3
Other language spoken at home	0.8	*	5.6	**465.7**

Note: Significant differences in bold. *Achievement not computed (too few students). The 2009 standard errors for the mean scores in the last column are 6.0and 14.3 respectively.

Table 4 looks more closely at the 2009 data, where students are grouped by both migrant status and language spoken most often at home, and language of the test is not considered. Here, we see that the mean score of migrant students speaking a language other than English/Irish (3.5% of all students)[7] is some 35 points lower than the mean score of native students – a difference that is statistically significant. It should be noted that this is proportionately smaller than the corresponding difference for English reading (59 points).

Table 4: Mean Mathematics Scores of Students in Ireland, by Migrant/Language status

	%	Mean	SE	SD
Native (Ref. group)	92.0	491.7	2.70	83.8
Migrant with English or Irish	4.5	485.9	6.70	81.8
Migrant with other language	3.5	**457.1**	10.40	91.2

Note: Significant differences in bold.

In addition to migrant status and language spoken at home, other demographic factors that may be linked to changes in performance in 2009 include a decrease in the proportion of school leavers before age 16 (down from 2.1% in 2000 to 1.5% in 2009) and percentage of students with identified special education needs taking the PISA test (which is known to have increased but cannot be quantified accurately).

Grade level. Fifteen-year olds in the PISA sample in Ireland are distributed over four grade levels – Second Year, Third Year, Transition Year and Fifth Year. Table 5 shows the proportions of students at each grade level in 2003 and 2009, and the differences in scores between the two years for each grade level. It can be seen that the percentage of PISA students in Transition Year has increased from 17% to 24%, while the percentage in Fifth Year has decreased from 20% to 14%. The greatest decline in PISA mathematics occurs for Transition Year (33 points), whereas for Third Year it is just 12 points. The size of the decline in Transition Year may reflect the fact that students do not experience the same systematic approach to mathematics instruction in Transition Year as they experience in Third and Fifth years. It may also be the case that engagement with the PISA mathematics items was lower for Transition Year students that for students at other grade levels.

[7] The figure of 6.8% speaking another language at home (Table 3) includes students who speak English at home but took the PISA mathematics test in Irish and vice versa. The 3.8% (Table 4) includes only migrant students who reported speaking a language other than English/Irish at home.

Table 5: Distribution of Students Across Grade Levels and Mean Mathematics Scores, Ireland – 2003 and 2009

Grade Level	2003 %	Mean 2003	2009 %	Mean 2009	Diff (2003-2009)
Second Year	2.8	409.1	2.4	384.8	22.00
Third Year	60.9	495.4	59.1	480.1	**12.20**
Transition Year	16.7	537.3	24.0	509.5	**33.40**
Fifth Year	19.6	516.6	14.4	496.1	**19.00**

Educational experiences of students. A revised primary school mathematics curriculum was introduced in 1999, with implementation from the start of the 2002-03 school year. Although there is evidence from Inspectorate reports that teachers experienced some challenges in the initial stages of implementing the curriculum, no change in achievement was observed in National Assessments of Mathematics in Fourth Grade, which took place in 1999 (before implementation of the revised curriculum, but using a test that was consistent with the revised curriculum) and again in 2004 (when, implementation was underway, though perhaps mainly in the Junior classes in the initial stages). Since a large majority of students in Third Year in 2009 would have been in Fourth Class in 2004, and performance in mathematics in 2004 was similar to performance in the previous national assessment of mathematics in 1999, it can be concluded that, for Third Years at least, there is no evidence of a decline in achievement in primary level. Also, since the mathematics curriculum was implemented in stages (text books were not yet available for all class levels at the time of the 2004 assessment), it seems likely that students in Fourth and Fifth years in 2009 (Fifth Class in 2004) did not experience all aspects of the revised curriculum. In fact, a full cohort of students, all of whom have experienced the revised primary school curriculum from Junior Infants onward, has yet to sit the PISA test.

There has been some curriculum change at post-primary level with the introduction of Project Maths into schools in September 2008. However, for its first two years, the project was implemented in 24 pilot schools, and has only been extended to schools in general since September 2010. The total number of students in the 24 pilot schools who participated in PISA 2009 and had some exposure to the Project Maths curriculum was 35, all in Fifth Year. Hence, it seems unlikely that Project Maths had a direct impact on the mathematics performance of students in Ireland in PISA 2009 due to the very small numbers of students involved. Indeed, PISA will only begin to pick up on the effects of Project Maths in 2012, when Fifth Year students in all schools will have experienced at least some elements of the programme.

Test administration. There was a change to the procedure for test administration in 2009 in Ireland, whereby the PISA test was administered by teachers (76% of schools) or by external personnel (24%). This is in line with practice in other countries, and was implemented in an attempt to increase interest in PISA in schools. In earlier cycles of PISA, the test was always administered by an external administrator and both staff and students in the schools were often unaware of the assessment. In 2009, the mean average mathematics score of students in schools in which the test was administered by teachers achieved a mean score that was some 6 scale points lower than that achieved by students in schools in which the test was administered by an external administrator. However, the difference can be accounted for by the lower average socio-economic composition of schools in which teachers administered the PISA test.

Survey fatigue (disengagement arising from over-surveying) may have been more prevalent in schools in Ireland in 2009 than in 2000. Some of the PISA 2009 schools had also participated in the Teaching and Learning International Survey (TALIS) main study or in field trials for both the International Civic and Citizenship Education Study (ICCS) and PISA in 2008. This could have reduced the enthusiasm of schools to fully engage with PISA. Although the overall rate of skipped responses is about the same when we compare PISA 2000 with PISA 2009, the percentage of students skipping more than 50% of mathematics questions in their booklets has increased from 0.9% to 2.5%.

Sampling factors. As noted earlier, a detailed analysis of the comparability of the PISA 2000 and PISA 2009 samples was undertaken in an effort to understand the decline of almost one standard deviation in reading literacy between 2000 and 2009 (see LaRoche & Cartwright, 2010). Drawing on school-level variables such as school type, gender composition and average socioeconomic status, the analysis found that both samples were comparable with one another, and with their respective population of schools. The analysis also confirmed that the addition of a school characteristic used to group schools for sampling introduced in PISA 2009 – the percentages of students in a school with a Junior Certificate Examination fee waiver – did not lead to a qualitatively different sample in 2009 than in 2000.– the percentages of students in a school with a Junior Certificate Examination fee waiver – did not lead to a qualitatively different sample in 2009 than in 2000. However, the analysis did identify a number of low-performing schools – schools with exceptionally low achievement in reading literacy[8] – and it was found that mathematics achievement was also exceptionally low in these schools (a school-level average of 390 points, compared with a school-level mean reading score of 371). The presence of these schools in the 2009 sample was attributed to random sampling fluctuation, and it is unlikely that as many will appear in the PISA 2012 sample.

A feature of PISA 2009 reading literacy in Ireland was an increase in the percentage of missing responses (defined as skipped items, but excluding 'not reached' items). These increased from an average of 4.2% in 2000 to 5.2% in 2009, whereas there was a decrease in missingness across countries participating in both PISA 2000 and PISA 2009 reading. In the case of mathematics, as noted earlier, overall average percentage missing decreased marginally in mathematics (from 11.1% to 10.4%) between 2003 and 2009, but the percentage of students skipping more than half of the test items for mathematics has increased since 2000. Hence, it may be the case that missingness (skipped items) accounts for some of the drop in overall average performance among students in Ireland. Skipping responses could be indicative of disengagement with the test, an inability to answer some questions, or some combination of these and other factors (Cosgrove et al., 2010). Further

[8] This was defined as an mean reading achievement score that was one standard deviation below the mean score for schools in Ireland.

analyses will look at levels of missingness across particular item types, subgroups such as high and low achievers, and grade levels.

Scaling. Finally, as noted earlier, it was not possible to conduct a comprehensive review of the scaling of PISA 2009 mathematics for Ireland. However, it is important to note that PISA employs a backwards linking procedure. Performance in 2009 was linked back to 2006, which, in turn, was linked back to 2003. The mean score of students in Ireland in PISA 2003 was 502.8. This dropped to 501.5 in 2006 (a non-significant decline), and 487.1 in 2009. Hence, 1.2 points of the decline in the performance of students in Ireland occurred between 2003 and 2006, while the remainder – 14.5 points – occurred between 2006 and 2009.

It is clear that the percent correct score for students in Ireland on maths link items (Table 6, bottom row) dropped between 2003 and 2009, with an average drop of 2.3 percentage points. As with scale scores, the decline in percent correct scores was marginally greater for males (-2.96%) than for females (-1.64%). These data are consistent with the view that there has been a decline in the mathematics performance of students in Ireland. However, it will require further work to ascertain if the decline in scale scores is as large as that indicated by the OECD, or whether, as is the case in reading literacy, the size of the decline in Ireland is partially a function of the approach taken to scaling the data. However, the fact that mathematics was a minor domain in PISA 2009 means that scaling and linking is less likely to have contributed to the observed decline in mathematics, in the same way as it did for reading, where a combination of old and new PISA items were used.

Table 6. Maths Percent Correct in Ireland 2003 and 2009

	2003 % Correct			2009 % Correct		
	Overall	Boys	Girls	Overall	Boys	Girls
All items (N=84)	49.46 (0.15)	51.35 (0.20)	47.54 (0.22)	N/A	N/A	N/A
Non-link items (N=49)	50.83 (0.20)	52.64 (0.27)	48.98 (0.28)	N/A	N/A	N/A
Link items (N=35)	47.55 (0.24)	49.53 (0.32)	45.53 (0.35)	45.43	46.62	44.20
Link items (N=32)*	49.02 (0.26)	50.97 (0.37)	47.02 (0.34)	46.72 (0.25)	48.01 (0.35)	45.38 (0.34)

*Although there were 35 link items, just 32 were used in Ireland.

Conclusion

Historically, students in Ireland have not performed well in international assessments of mathematics achievement, though primary level pupils have done somewhat better than their post-primary counterparts. In an analysis of TIMSS 1995 data by the OECD, students in Fourth Class in Ireland achieved a mean score that was above the OECD country average, whereas students in Second Year (Grade 8) achieved a mean score that was not significantly different (OECD, 2000). In the first three cycles of PISA, 15-year old students in Ireland achieved mean scores in mathematics that were not significantly different from the corresponding OECD country average scores. This performance was in marked contrast to reading and science performance in those cycles, where mean scores in Ireland were significantly above the corresponding OECD country averages. An aspect of PISA mathematics in which students in Ireland have not done particularly well is Space and Shape, with female students in particular doing relatively poorly in that domain (Cosgrove et al., 2005). It should be noted that comparisons of the PISA test items and the content of the Junior Certificate mathematics curriculum and examination indicate that there is a relatively low level of familiarity with the content of some of the PISA questions, and this is more marked at Ordinary and Foundation levels (Close, 2006).

There is relatively little available corroborating evidence available to indicate that standards in mathematics among students in post-primary schools in Ireland have declined to the extent reported by the OECD in recent years. Between 2003 (when the Junior Certificate mathematics syllabus that most 15-year olds in PISA 2009 would have studid was examined for the first time) and 2009, the percentage of higher-level A-C grades awarded in mathematics ranged from 75.6% in 2005 to 79.8% in 2008, with 77.6% achieving these grades in 2009. In interpreting variation in Junior Certificate examination results, however, it should be noted that test items change from year to year, whereas in PISA, the use of link items ensures that students are exposed to at least some of the same test items from cycle to cycle. Hence, examinations such as the JCE may not provide the best barometer of standards on which to base policy about teaching and learning.

Interestingly, much of the media commentary on examination results in mathematics in recent years has focused on the proportions of students who do not achieve a grade D or higher in the Leaving Certificate examination. Yet, even in PISA 2009, lower-achieving students in Ireland did quite well, with 20.8% achieving at or below Level 1 on the mathematics proficiency scale, compared with an OECD average of 22%. However, just 6.7% achieved at Level 5 or above, compared with an OECD average of 12.7%, with a greater decline in performance between 2003 and 2009 among higher performers than among lower performers. Even if we set aside the 2009 results, as we seek corroborating evidence of a decline in performance elsewhere, it is clear higher-achieving students in Ireland do not perform particularly well in mathematics. For example, in PISA 2006, 10.2% of students in Ireland achieved at Level 5 or higher, compared to an OECD average of 13.3%. Hence, it would seem that there is an urgent need to address the apparent under-achievement of higher performers.

While it is acknowledged that Project Maths is designed to improve the mathematics performance of students in Ireland, and could, over time, lead to an increase in performance on assessments such as PISA, there are some caveats that should be considered:

1. The outcomes of national assessments of mathematics at primary level suggest that some students enter post-primary schooling with relatively low skills in the related areas of problem-solving and measures. Hence, it may be necessary to establish a stronger mathematical basis among primary school pupils so they can fully benefit from Project Maths at post-primary level. Ireland’s participation in the mathematics component of the Trends in International Mathematics and Science Study (TIMSS) in 2011 will provide further evidence relating to the performance of primary-level pupils in Ireland.

2. Ireland has relatively little experience in implementing large-scale curricular change of the type envisaged by Project Maths. Hence, it would seem important to monitor implementation of the Project carefully, and make adjustment both to content and to teaching approaches as needed.
3. There is a danger that, in seeking to increase the proportions of students taking higher-level mathematics courses, there will be an insufficient emphasis on ensuring that the performance of the highest-achieving students is enhanced.
4. There is a danger in assuming that Project Maths on its own is capable of bringing about the level of change needed to address gaps in the performance of students in Ireland, and there is a need to consider other parallel initiatives to enhance performance. From this point of view, the recently-launched literacy and numeracy strategy by the Department of Education and Skills (DES, 2010) is relevant.

There would also be value in monitoring more closely how well current Transition Year mathematics programmes support development of the mathematical knowledge and skills envisaged by Project Maths, and to consider implementing and evaluating programmes in mathematics designed to strengthen the performance of students at all ability levels in advance of entering Senior Cycle.

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