The 2014 National Assessments of English Reading and Mathematics

Volume II: Context Report

Lauren Kavanagh, Gerry Shiel and Lorraine Gilleece, with Joanne Kiniry

Educational Research Centre

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Preface

The 2014 National Assessments of English Reading and Mathematics (NA '14) were carried out by the Educational Research Centre on behalf of the Department of Education and Skills. National assessments of English reading and mathematics achievement in primary schools have been conducted periodically in Ireland since 1972, with the most recent assessment prior to 2014 taking place in 2009.

For previous national assessments, the Educational Research Centre has published one main report, which typically appeared about a year after the assessments had been implemented in schools. For the 2014 assessments, two reports were produced. The first report (the *Performance Report*, Shiel, Kavanagh & Millar, 2014) provided an overview of the performance of pupils on the tests of English reading and mathematics administered as part of NA '14, and related that to performance of pupils in the 2009 National Assessments (NA '09).

Significant increases in English reading and mathematics scores were observed from NA '09 to NA '14, at both grade levels at which the assessments were administered (Second and Sixth classes). NA '14 thus represented the first national assessment since 1980 where there were statistically significant increases in pupil performance. NA '14 also provided the first opportunity to gauge progress towards national targets for performance set out in the *National Strategy to Improve Literacy and Numeracy among Children and Young People 2011-2020*. These targets related to reducing the proportions of pupils performing at the lowest levels of proficiency in English reading and mathematics, and increasing the proportions performing at the highest proficiency levels. All of the performance targets set out in the National Strategy were achieved in the 2014 National Assessments, well in advance of the target date of 2020.

The current report (the *Context Report*) seeks to situate the performance outcomes on the 2014 National Assessments in the context of the schools, classrooms, and homes of participating Second and Sixth class pupils.

Overview of the Report

The present report is divided into nine chapters. Chapter 1 provides an overview of the 2014 National Assessments, as well as detail on the design and methodology of the study. Chapter 2 gives a summary of the performance outcomes first described in the Performance Report. Chapter 3 provides an overview of pertinent literature relating to contextual factors associated with pupil achievement. Chapter 4 relates pupil achievement to school characteristics and practices, while Chapter 5 deals with teacher and classroom factors. In Chapter 6, individual pupil characteristics are considered and are linked to achievement, while Chapter 7 considers parent, family, and other home factors. In Chapter 8, a multilevel model of English reading at Second class is presented, drawing on key variables identified as

associated with achievement in earlier chapters. Finally, Chapter 9 provides a series of conclusions and recommendations made on the basis of these findings.

Additional data tables which supplement this report can be found in an e-Appendix at www.erc.ie/na2014.

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Yvonne Keating (Chair), Department of Education and Skills, replacing Caitríona Ní Bhriain (May, 2015)
Suzanne Cobbe, Catholic Primary School Management Association
Seán Delaney, Marino Institute of Education
Arlene Forster, National Council for Curriculum and Assessment
Lauren Kavanagh, Educational Research Centre
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Lauren Kavanagh
Gerry Shiel
Lorraine Gilleece
December, 2015

List of Acronyms and Abbreviations

CPD	Continuing Professional Development
DES	Department of Education and Skills
DEIS	Delivering Equality of Opportunity in Schools
EAL	English as an Additional Language
ERC	Educational Research Centre
GAM	General Allocation Model
GUI	Growing Up in Ireland, National Longitudinal Study of Children
ICT	Information and Communications Technology
IEA	International Association for the Evaluation of Educational Achievement
IRT	Item Response Theory
ITE	Initial Teacher Education
L1	First Language
L2	Second Language
LS/RT	Learning Support/Resource Teaching
NA '04	The 2004 National Assessments of English Reading and Mathematics
NA '09	The 2009 National Assessments of Mathematics and English Reading
NA '14	The 2014 National Assessments of English Reading and Mathematics
NAIMS	The 2010 National Assessments of English Reading and Mathematics in Irish-Medium Schools
NCCA	National Council for Curriculum and Assessment
OECD	Organisation for Economic Co-operation and Development
PDST	Professional Development Service for Teachers
PIRLS	Progress in International Reading Literacy Study
PISA	Programme for International Student Assessment
PSEC	Primary School English Curriculum
PSMC	Primary School Mathematics Curriculum
PT 2011	The joint PIRLS and TIMSS study administered in 2011
SES	Socioeconomic Status
SLG	Scoileanna Lán-Ghaeilge (Irish-medium schools outside of the Gaeltacht)
SSE	School Self-Evaluation
SSP	School Support Programme under DEIS
TIMSS	Trends in International Mathematics and Science Study
WSE	Whole School Evaluation

Statistical Terms

The following are key statistical terms used in this report:

Correlation	Correlation coefficients describe the strength of a relationship between two variables. The value of a correlation (the r value) ranges from -1 to + 1. A positive correlation indicates that, as one variable increases, the other does too, while a negative correlation indicates that as one increases, the other decreases.
Effect Sizes	An effect size is a standardised measure of the difference between two mean scores that is expressed in standard deviation units. Effect sizes in this report were computed using Cohen's d (Cohen, 1988). According to the What Works Clearinghouse (2014), an effect size of 0.25 or higher on school-based research can be considered 'substantively important', whether or not the underlying difference is statistically significant. Effect sizes greater than 0.50 are considered large.
Mean Scale Scores	In NA '09, mean scores on all scales and subscales in English reading and mathematics were set to 250 points, and standard deviations to 50. Scores achieved by pupils participating in NA '14 were projected onto the same scales and subscales as those used in NA '09 using Item Response Theory (IRT) scaling.
Parameter Estimate	A parameter is a value summarizing population data. When a sample is drawn, such as in NA '14, parameter estimates are produced.
Statistical Significance	If the difference between two mean scores is statistically significant, it means that there is a 95% (or higher) chance that the difference is real. A statistical test has been carried out to establish this. (Where multiple comparisons have been carried out, alpha levels have been adjusted to reduce the likelihood of Type 1 error.)
Standard Deviation	The standard deviation is a measure of the dispersion of a set of data from its mean. The more spread apart the data, the higher the deviation. In a normal distribution, 68% of the scores are within one standard deviation of the mean, 95% within two standard deviations, and 99% within three.
Standard Error	Scores reported in this report are *estimates*, based on the sample of pupils selected. However, it is unlikely that the 'true' national mean is exactly the same as the sample mean. Some variation or error around scores is to be expected. Thus, each mean has a standard error, which allows us to estimate how accurately the mean found in our sample reflects the 'true' mean in the population. The 'true' mean score can be found in an interval that is 1.96 standard errors on either side of the obtained mean, 95% of the time.

Executive Summary

National assessments of English reading and mathematics in primary schools have been conducted periodically in Ireland since 1972. The 2014 National Assessments (NA '14) were carried out by the Educational Research Centre on behalf of the Department of Education and Skills. The assessments were administered by class teachers to over 8,000 pupils in Second and Sixth classes in May 2014. Performance outcomes from NA '14 were outlined in a report released in January 2015 (the NA '14 *Performance Report*; Shiel, Kavanagh & Millar, 2014). Significant and substantive improvements in both English reading and mathematics performance were observed at both grade levels in NA '14, compared with performance in the last National Assessments, which took place in 2009 (NA '09).

In addition to pupils in a representative sample of primary schools taking secure tests of English reading and mathematics, the pupils and their parents, teachers, and principals completed questionnaires that provided contextual data. The current report provides an analysis of the contextual data, and relates the data to performance outcomes.

In the following sections, salient findings from the report are summarised. First, a summary is provided of selected contextual factors that were related to English reading and/or mathematics achievement in NA '14. Next, findings relating to a number of overarching themes identified from the analysis of the NA '14 performance and contextual data are summarised. Recommendations relating to these key themes are made on the basis of NA '14 findings, the findings of relevant international assessments, and current policy imperatives. Readers should note that the main focus of the analyses at Second class was on reading, while at Sixth class it was on mathematics. A more detailed rationale for some of the recommendations is given in Chapter 9.

Factors Related to Achievement

A small number of characteristics of schools were found to be related to achievement in NA '14. In line with the findings of previous assessments, the school-level variables significantly associated with achievement were those related to elements of school intake. The mean English reading scores of pupils in Second and Sixth classes in schools in which 10% of pupils or more spoke a first language other than English or Irish, for example, were significantly lower than the mean scores of pupils in schools with no speakers of first languages other than English or Irish (though this finding needs to be interpreted with reference to other contextual factors, and to additional supports available in schools in which large proportions of pupils who speak other languages). Although average performance in Second class tended to be higher in girls' and mixed schools than in boys' schools, no significant differences in English reading or mathematics were found at either class level. Also, although average performance in English reading and mathematics was marginally higher in Irish-medium than in English-medium schools at both Second and Sixth class, differences

were not statistically significant (though it should be noted that a relatively small number of Irish-medium schools took part in NA '14). Structural characteristics of schools, such as enrolment size and location, were not associated with achievement differences in either domain.

Several pupil background variables, such as country of birth and language of the home, were related to achievement in NA '14. At both Second and Sixth class, pupils who mostly spoke English at home (91% at Second class, 92% at Sixth) had significantly higher mean reading scores than those who mostly spoke another language (excluding Irish) at home (9% at Second class, 7% at Sixth). Second class pupils who mostly spoke a language other than English or Irish at home had a significantly lower mean mathematics score than those who spoke mostly English. At Sixth, those who spoke mostly English at home had no advantage in mathematics over those who did not.

A number of pupil attitudinal variables were also found to be related to achievement. At Second class, liking school was significantly related to both reading and mathematics achievement, while at Sixth class, educational expectations and aspirations were significantly related to achievement in both domains. At Second class, liking reading and wanting to do well at it were related to reading achievement; at Sixth class, favourable attitudes towards reading, higher reading confidence, and willingness to expend effort on reading were associated with higher reading scores. At Sixth class, mathematics self-concept scores were significantly positively correlated with mathematics achievement.

Several pupil behaviours were also significantly associated with pupil achievement. Reading for enjoyment was related to higher reading achievement in some contexts (e.g. reading alone rather than with someone at Second class, reading books rather than comics/magazines at Sixth). Generally, pupils who engaged in extracurricular activities with moderate frequency, or for a moderate amount of time per day, had higher achievement scores than those who spent much more or much less time doing so.

Amongst Sixth class pupils, more frequent use of calculators, computers and concrete materials, as well as more frequent requests for help amongst Sixth class pupils were associated with lower mean mathematics achievement. At Second class, use of certain reading strategies upon encountering a new word, such as trying to sound the word out or trying to figure out its meaning from context were associated with lower mean reading achievement. It is possible that such mathematics and reading practices are encouraged in, or taught more explicitly to, lower-achieving pupils in order to support their learning.

A range of home and family characteristics were also related to pupil achievement in NA '14, with, for example, pupils from two-parent homes and those with fewer siblings significantly outperforming other pupils in both reading and mathematics. Socioeconomic variables were also significantly related to achievement, with pupils from financially better-off families and

those whose parents have higher levels of education having significantly higher mean achievement scores in both domains.

Elements of home atmosphere were also related to achievement, with those pupils who have many books in their homes, those who have Internet at home, and those who have access to educational games having significantly higher mean scores in both reading and mathematics than pupils who do not. Having access to some types of technology at home was associated with higher achievement (e.g. having a computer at home), while access to other types was associated with lower achievement (e.g. a pupil having a television in his/her bedroom).

A number of individual parent attributes were also associated with achievement. Parental confidence in helping with homework was significantly related to achievement in both domains and at both grade levels. Parent expectations of their children's future reading and mathematics performance were significantly related to their children's test performance.

Some parent practices were also related to achievement. Second class pupils whose parents strongly agreed that they set aside time for their child to read for enjoyment, agree rules with their child for behaviour at home, and agree rules about completing homework, had significantly higher mean achievement scores in both domains than other pupils.

Multilevel Model of Reading Achievement

A multilevel model of English reading achievement in Second class revealed that 9% of the variance in English reading achievement was between schools, and less than 1% was between classes. There were statistically significant associations between reading achievement and a number of variables, including: DEIS Band 1, a pupil having reached age 9 or above, the pupil never reading books alone for fun (all negatively associated with achievement), at least one parent having a third-level degree or higher, having a high number of books at home, the pupil never reading with a parent (possibly an indication of pupils not requiring parental support and instead engaging in independent reading), and high parental expectations (all positively associated with achievement). Overall, the model explained 36% of the total variance in reading achievement, 83% of between-school variance and 31% of within-school variance.

Key Themes and Recommendations

A number of overarching themes were identified in the analysis of NA '14 performance and contextual data. Here, each of these themes is summarised in turn, with reference to findings from the present report, the NA '14 Performance Report (Shiel et al., 2014), relevant international assessments and current policy imperatives. Consideration of each theme concludes with its attendant recommendations.

Overall Performance on Reading Literacy

Given the significant and substantive increases in performance observed in NA '14, as well as the relatively strong performance of pupils in Ireland on PIRLS 2011 reading literacy (an overall ranking of 10th internationally, with just 5 of 45 countries achieving significantly higher mean scores), it seems reasonable to conclude that overall performance on reading literacy at primary level is now quite strong. However, there are some challenges that need to be faced as the *National Strategy to Improve Literacy and Numeracy among Children and Young People 2011-2020* moves forward.

First, it is important to ensure that gains achieved between NA '09 and NA '14 are maintained, and, perhaps, improved upon. This can be done by ensuring that schools continue to prioritise reading literacy and other aspects of English that can support reading development, such as oral language and writing. Some of the impetus for this will come from implementation of the new Primary Language Curriculum (NCCA, 2015a, 2015b), which, initially, will cover Junior Infants to Second class (from 2016). It will also come from a continuing focus on literacy in school planning and School Self-Evaluation (SSE), and access to appropriate professional development opportunities for teachers.

Second, while reading performance increased significantly in DEIS schools between NA '09 and NA '14, corroborating the findings of studies specifically designed to evaluate the initiative (e.g., Weir & Denner, 2013), the gap between urban DEIS schools and other schools was maintained in NA '14, with the exception of DEIS Band 2 schools at Second class, where it narrowed. Hence, in general, performance gaps in reading in DEIS schools need to be addressed more intensively.

Third, it is important to monitor and seek to better understand links between gender and reading performance. Gender differences on overall performance in reading in NA '14 were relatively small, with a significant difference of 7 points in favour of girls on overall reading in Second class (down from 14 points in NA '09). There was a nonsignificant difference of 4 points in favour of girls on overall reading in Sixth (the same as in NA '09), though there was a significant difference in favour of girls on Reading Comprehension (by 5 points) at that class level. The multilevel model presented in Chapter 8 of this report suggests that older boys in Second class (9-year olds) may be at particular risk.

Recommendation 1:

- The current focus on print literacy in primary schools should continue for the duration of the National Strategy, with a view to maintaining and building on gains reported for NA '14. There should be a particular emphasis on improving the reading performance of pupils in DEIS schools, as well as the overall performance of older boys in Second class and the reading comprehension of boys in Sixth class.

Development of Digital Literacy Skills

The National Strategy to Improve Literacy and Numeracy recognised the importance of digital literacy, both in its definition of literacy, and in its plan to measure pupils' ability to read digital texts as part of future national assessments of reading.

In NA '14, 41% of pupils were in classrooms in which digital texts such as webpages were read at least once a week, while 18% were in classrooms in which e-books were read with the same frequency. In NA '14, teachers of pupils in Second class indicated that using ICTs to teach English was among the aspects of teaching with which they felt least confident. Eighteen percent of teachers identified ICTs as a priority area for continuing professional development. Principal teachers of two-thirds of pupils identified a shortage of teaching software and slow Internet as factors hindering teaching and learning at least 'to some extent' in their schools.

Data gathered across a number of national and international studies suggest that there are significant problems with pupils' access to and use of ICT infrastructure in primary schools. In PIRLS 2011, 56% of pupils in Fourth class in Ireland were in classrooms in which there was access to at least one computer for pupil use during reading lessons, compared with 85% or more in Norway, Denmark, New Zealand and the Netherlands (as cited in Cosgrove et al., 2014). According to their teachers, 19% of pupils in PIRLS 2011 in Ireland were in classes in which a computer was used by pupils to write stories at least weekly, compared with 27% across all participating countries, 37% in Northern Ireland, and 58% in Sweden. On the other hand, 98% of Fourth class pupils in Ireland were taught by teachers who reported using a computer in their classroom instruction — well above the corresponding international average (Clerkin, 2013).

Recommendation 2:

- In line with projected improvements in ICT infrastructure in schools, attention should be given to supporting the development of pupils' digital reading and writing skills and the application of those skills to a range of digital texts. The extensive use of computing devices by teachers during instruction needs to be matched by a greater use of such devices by pupils.

Overall Performance on Mathematics

There was a significant and substantive improvement in mathematics performance in NA '14, at both Second and Sixth classes, compared with NA '09. At both class levels, there were declines in the proportions of pupils performing at or below Level 1 on the overall mathematics proficiency scales (from 35% to 26% in Second, and from 35% to 27% at Sixth), and increases in the proportions performing at Levels 3-4 (from 35% to 47% at Second, and from 35% to 42% at Sixth). As with reading, however, there are still substantial gaps in average performance between pupils attending DEIS and non-DEIS schools. For example, although mean scores for pupils in Second and Sixth classes in DEIS Band 1 schools and in Sixth in DEIS Band 2 schools were higher in NA '14 than in NA '09, differences were not

statistically significant. At both Second and Sixth class levels, 50% of pupils in DEIS Band 1 schools performed at Level 1 or below, compared with 21% (Second class) and 25% (Sixth class) in non-DEIS urban schools.

In TIMSS 2011, pupils in Fourth class in Ireland achieved a mean score that was significantly above the international mean. However, Ireland ranked 17th of 48 participating countries, and 13 of these achieved significantly higher mean scores than Ireland (including the United States, England, Finland, Northern Ireland, and a group of five east-Asian countries). It is unclear why pupils in Ireland at both primary and post-primary levels have performed consistently better on reading literacy than on mathematics in international studies, given that, in general, countries that perform well in one domain also do well in the other. Since, for the most part, curriculum content is broadly similar in Ireland and in other countries in studies such as TIMSS, differences must arise for other reasons. While the nature and focus of mathematics instruction is likely to be a factor, other factors affecting curriculum implementation are also relevant, including support for teachers in the form of professional development, time allocated to teaching mathematics, the quality and appropriateness of support materials such as tests and text books, the support pupils receive at home and at school, and pupils' dispositions.

Recommendation 3:

- It is recommended that, for the remainder of its lifetime, the National Strategy places a stronger emphasis on mathematics/numeracy, with a view to further increasing pupils' proficiency in mathematics, improving their dispositions towards mathematics, and reducing gaps in performance between DEIS and non-DEIS schools.

Problem Solving in Mathematics

One-quarter of mathematics items at Second class and one-third at Sixth class in NA '14 comprised problems embedded in real-life contexts. Although performance on Apply and Problem Solve items improved significantly at both grade levels since NA '09, percent correct scores were lower in this area than in any other content or process area assessed in mathematics, with average scores of 54% correct in Second class (up from 49% in NA '09), and 49% correct at Sixth class (up from 44%). In contrast, the corresponding percentages for Implement items are 61% and 65% respectively. Hence, there is considerable room for further development in problem solving.

A consistent finding in both national and international studies is that girls in Ireland underperform on problem solving and other higher-level mathematical tasks, compared with boys. Girls at both Second and Sixth classes in NA '14 had significantly lower mean scores than boys on the Measures content area (which includes several problems) and on

the Apply and Problem Solve process skill. Girls also scored less well than boys on a measure of mathematical self-concept.

There was a clear awareness among teachers participating in NA '14 that mathematical problem solving presented a particular difficulty. More pupils (52%) were taught by teachers who expressed a need for CPD in the area of problem solving/reasoning than in any other aspect of mathematics. Problem solving was the area mentioned most often by teachers when asked to identify classroom targets for improving mathematics. Parents of pupils in Sixth class also identified problem solving as the area of greatest concern relating to their child's mathematical performance. Yet, a majority of pupils in Sixth class were taught by teachers who expressed themselves as being very confident in their ability to teach problem solving, and 'strongly agreed' or 'agreed' that 'many pupils who struggle with word problems cannot read the problems, but know the underlying mathematics'.

Recommendation 4:

- Schools and teachers should be supported in implementing innovative approaches to teaching mathematical problem solving, with particular emphasis on modifying the learning environment, which should feature high levels of mathematical discourse (math talk), mathematical modelling, argumentation, reasoning, and collaborative work. There should be a particular focus on discovery through problem solving, the use of non-routine problems, problems in real-life contexts, problems that are cross-curricular, and problems that require extended time to solve. Schools and teachers should ensure that additional support is given to girls where needed, especially for problem solving involving spatial reasoning.

Access to Support Programmes and Initiatives to Improve Performance

NA '14 looked at the performance on English reading and mathematics of a number of at-risk groups, and examined the supports to which they had access. It also looked at the range of add-on programmes used in schools.

In NA '14, 8% of pupils in Second and Sixth classes reported speaking a language other than English/Irish at home. As mentioned earlier, these pupils performed significantly less well in English reading than pupils who spoke English or Irish. The average gap between those who spoke a different language and those who spoke English or Irish was 27 score points at Second class, and 24 at Sixth. Speakers of a language other than English or Irish were unevenly distributed across schools, with, for example, 16% of pupils in Sixth class in schools where no pupils had a first language other than English or Irish, and 27% in schools in which more than 10% had a different first language. Just over 2% of pupils at Second and Sixth classes accessed additional support for English from an officially-sanctioned language teacher, though others availed of support from learning support/resource teachers.

In NA '14, 13% of pupils in Second and Sixth classes accessed learning support for English reading, while 10% at both class levels accessed learning support for mathematics. More boys than girls accessed support for English, and more girls than boys for mathematics. When numbers for learning support/resource teaching and language support are combined, 15% of pupils in Second and 14% in Sixth access support for English. Hence, mathematics lags behind English, where access to support is concerned. This is particularly apparent in DEIS Band 1 schools where, in Second class, 19% of pupils access learning support/resource teaching or language support for English, and 7% access support for mathematics. While additional support in English reading and mathematics was generally targeted at those who performed least well in NA '14, this was not always the case. For example, 3% of pupils in Second class who were not in receipt of support performed below Level 1 on English reading, and 2% did so in mathematics. Twelve percent of pupils in Second and 9% in Sixth were taught by teachers who believed that there is little or no coherence between class and support programmes.

Teachers in NA '14 reported that they implemented a range of programmes designed to improve the performance of pupils on English reading and mathematics, though it is unclear to what extent teachers adapted these programmes to address their specific needs. For English at Second class, programmes such as Reading for Fun, Paired Reading, and Jolly Phonics were used weekly or more often by teachers of at least 50% of pupils. Other programmes, such as First Steps Reading, Writing and Oral Language, and Literacy Lift-Off/Power Hour, tended to be used more extensively in DEIS than in non-DEIS schools. Programmes such as DEAR (Drop Everything and Read), Building Bridges, and Guided Reading/Guided Reading PM were also widely used. The range of supplementary programmes used in mathematics classes was less extensive than for reading, with Paired Maths, Maths for Fun, and Maths Recovery being used most widely. It is clear that mathematics lags well behind reading in terms of the range of available supplementary programmes and the frequency with which they are implemented. Little or no data are available on the impact of supplementary programmes on performance in English reading and mathematics.

Recommendation 5:

- There is a need for system-level evaluation of support provided to pupils who speak a language other than English or Irish at home, with a view to identifying the nature and levels of support that are most appropriate.

Recommendation 6:

- As schools focus on mathematics as part of School Self-Evaluation, the balance between access to learning support/resource teaching in English and mathematics should be examined, so that all pupils with learning difficulties in mathematics can access the support they need. There is a need to ensure that teachers are supported

in achieving high levels of coherence between class and support programmes in English and mathematics in all schools.

Recommendation 7:

- There is a need to increase teachers' awareness of the range of supplementary programmes available for teaching mathematics. There is also a need to examine how well existing supplementary programmes in English reading and mathematics are implemented, and how they impact on the performance and attitudes of pupils.

Instructional Time

The data on instructional time gathered in NA '14 indicate that instructional time in English classes has increased since NA '09 from 265 minutes per week to 294 minutes (i.e., by 29 minutes, to give 4 hours and 54 minutes per week). This is broadly in line with what was envisaged in Circular 0056/2011 (DES, 2011b) (i.e., an increase from 4 hours per week in L1 schools to 4.5 hours), even before taking into account any additional class time allocated to teaching English across the curriculum. Most pupils in Second class in NA '14 were taught by teachers who were satisfied with the allocation of instructional time to reading, with fewer than 10% taught by teachers who deemed available time to be insufficient. In PIRLS 2011, teachers of pupils in Fourth class in Ireland reported allocating 175 instructional hours per year to the language of the PIRLS test (English). Among EU countries in PIRLS 2011, only Croatia (172 hours) allocated fewer instructional hours to the language of the PIRLS test. In NA '14, instructional time in English was estimated be at 180 hours per year. Nevertheless, if there is a satisfactory focus on the development of literacy skills in other curriculum areas (as advocated by the National Strategy), the current allocation of time to the teaching of English in primary schools can be considered satisfactory.

According to NA '14, instructional time in mathematics at Sixth class is now 283 minutes per week, compared with 260 minutes in NA '09, and exceeds the 4 hours and 10 minutes envisaged in Circular 0056/2011, again without taking any additional time allocated to teaching mathematics/numeracy across the curriculum into account. However, 25% of pupils in Sixth class in NA '14 were taught by teachers who deemed the time allocated to mathematics to be insufficient. According to TIMSS 2011, teachers in Ireland allocated 150 hours per year to the teaching of mathematics. Although this was not the lowest among EU countries in the study (Finland reported 139 hours, and Croatia 134), it was behind Northern Ireland (232 hours), the Netherlands (195), England (188) and Germany (163). Based on NA '14 data, the annual allocation in Ireland is now 172 hours.

Although the allocation of some additional time to mathematics in primary schools in Ireland would seem desirable, attention also needs to be paid to how existing time is used. For example, Close (2013), using data from the TIMSS 2011 teacher questionnaire, noted that teachers in Ireland allocated 56% of time to Number, compared with 22% to Geometric

Shapes and Measures, 12% to Data Display, and 10% to other topics. He has argued that weaknesses in Shape and Space, Measures, and Apply and Problem Solve, revealed in earlier national assessments, point to a need to re-balance the amount of time allocated to different aspects of mathematics.

Recommendation 8:

- Schools in general should continue to allocate approximately one hour per day to the teaching of English, with additional time allocated in schools in which there are large numbers of struggling readers. Schools and teachers should continue to integrate literacy into a range of curricular domains.

Recommendation 9:

- The DES and the NCCA should examine the current allocation of instructional time to mathematics, and advise schools on whether this should be increased, taking the differing needs of schools into account. The distribution of time across aspects of mathematics should also be considered, with a view to achieving a better balance across content areas, and between higher- and lower-order processes.

Professional Development

The *National Strategy to Improve Literacy and Numeracy* identified initial teacher education and continuing professional development as key factors in raising teaching standards in literacy and numeracy in schools. In particular, it indicated that it would support primary teachers in accessing high-quality, accredited courses of 20 hours duration in literacy, numeracy, and the use of assessment every five years.

In NA '14, continuing professional development (CPD) was defined as including attendance at courses, participation in school-based activities related to English or mathematics (though no distinction was made between activities facilitated by an internal or external person/persons), and online activities. At Second class, teachers reported completing 21.4 hours of CPD related to English in the two years prior to NA '14, with 13 hours of this completed as part of a summer course. At Sixth class, teachers reported attending 17 hours of CPD on the teaching and learning of mathematics in the two years prior to NA '14, with 9 hours of this as part of a summer course. About one-fifth of pupils in Second class were taught by teachers who had not availed of any CPD in English. A similar proportion in Sixth class were taught by teachers who had not availed of any CPD in mathematics.

Even allowing for differences in how CPD was defined across NA '09 and NA '14, the data for NA '14 point to the increased involvement of teachers in CPD. For example, whereas in NA '09, teachers of pupils in Second class attended an average of 2.2 days of coursework on the teaching of English in the three years prior to the assessment (Eivers et al., 2010), in NA '14, they attended the equivalent of 5.6 days in the previous two years. Similarly, whereas

teachers of pupils in Sixth class in NA '09 had attended 1.5 days of CPD in mathematics in the previous three years, teacher of pupils in Sixth class in NA '14 reported attending the equivalent of 5.1 days in the previous two years. In NA '09, 48% of pupils in Second were taught by teachers who had attended no CPD days on English, while 52% in Sixth were taught by teachers who had attended no CPD in mathematics. In PIRLS and TIMSS 2011, teachers in Ireland reported participating less often in CPD in both English and mathematics than on average across participating countries (Clerkin, 2013), though these studies pre-dated implementation of the *National Strategy to Improve Literacy and Numeracy*.

Teachers in NA '14 identified a number of priority areas for further CPD. In the case of English, 44% of pupils were taught by teachers who identified the teaching of writing as a main priority area. Other priority areas included reading comprehension/comprehension strategies, oral language, assessment, addressing learning difficulties, and integrating ICT into teaching and learning English. In the case of mathematics, 51% of pupils in Sixth class in NA '14 were taught by teachers who identified problem solving/reasoning as a priority area for CPD. Other priority areas included ICT, specific mathematics content areas (such as Shape and Space), mathematics activities and resources, working with children with varying abilities, and assessment and recording.

Almost all pupils at both Second and Sixth classes in NA '14 were taught by teachers who 'strongly agreed' or 'agreed' that they would benefit from additional external CPD in English and mathematics, while between 75% and 80% were taught by teachers who similarly agreed that they would benefit from online CPD. Two-thirds of pupils in Second class were taught by teachers who disagreed with the view that all their CPD needs in English could be met at school level, while one-third of pupils in Sixth were taught by teachers who disagreed that all their CPD needs in mathematics could be addressed at school level. Crucially, two-thirds of pupils in Sixth class were taught by teachers who strongly agreed or agreed that they would benefit from a course to improve their understanding of the mathematics they teach.

Recommendation 10:

- While CPD in English will be available to teachers in the context of implementing the new Primary Language Curriculum in junior classes, a strategy should be put in place to ensure that teachers of all classes have access to appropriate CPD in mathematics throughout the remainder of the National Strategy. Availability should not be dependent on curriculum implementation.

Recommendation 11:

- In addition to covering policy priorities and curriculum implementation, CPD in English and mathematics should seek to address key areas that are of concern to teachers. For English, these include writing, reading comprehension, oral language,

and assessment in English. For mathematics, they include problem solving/reasoning, use of ICTs, specific content strands (e.g., Space and Shape), use of mathematics activities and resources, working with children of differing abilities and assessment and recording in mathematics. There would also be value in examining how a need expressed by teachers for a course to improve their understanding of the mathematics they teach could be met.

Recommendation 12:

- CPD in English and mathematics should continue to be available in a range of different formats. These include external courses, courses delivered online, and in-school courses and support activities.

Assessment, Evaluation, and Planning

The increases in average performance on English reading and mathematics at both Second and Sixth classes in NA '14 suggest that standardised tests currently in use in schools may overestimate pupil performance. Other factors contributing to a possible overestimation of performance based on standardised test results include the age of test norms (currently-available tests were standardised about ten years ago and the norms developed at that time can now be considered 'old'), the familiarity teachers and pupils may develop with particular tests over a number of years (tests in current use are not secure), and the higher status attributed to tests and test scores since Circular 0056/2011 (DES, 2011) was issued. A possible consequence of overestimating performance is that schools may not allocate resources to those in greatest relative need, or focus on aspects of the curriculum where pupils require additional support.

The broad range of purposes for which standardised test results are administered in schools is potentially problematic. There is a need to separate the evaluative purposes of tests (which include the submission of aggregated outcomes to the DES) and the use of tests by schools and teachers to monitor progress and plan instruction. There is an immediate opportunity to accomplish this in the context of the Primary Language Curriculum in the junior classes, where assessment continua will allow teachers to record the progress of pupils in a range of literacy-related areas (reading, writing, oral language) against expected development, and use that information in planning for instruction. As current standardised tests are not robust enough to provide precise information on performance in mathematics content areas and processes, these may need to be assessed using other measures.

Principal teachers responding to the School Questionnaire in NA '14 were asked to provide examples of 'specific and measurable' targets that were included in the school's School Improvement Plan (SIP). In the case of English, principals of 25% of pupils did not provide any target (perhaps because mathematics was emphasised ahead of English in the initial stage of School Self-Evaluation). Just 15% of pupils were taught by principals who provided

targets that referred to standardised test outcomes, and these generally pointed to relatively small expected changes in aggregated outcomes. On the other hand, it is noteworthy that many of the targets suggested by schools related to specific aspects of English (including reading comprehension and oral language) that schools sought to improve. In the case of mathematics, 40% of pupils attended schools where either no target was given, or it was indicated that the development of a SIP for mathematics was in progress. Twenty percent of pupils were in schools where the principal teacher indicated problem solving as a target. However, principals tended not to identify specific aspects of problem solving that needed to be addressed. This suggests that greater levels of specificity may be warranted in some cases.

Recommendation 13:

- In the short term, currently-available standardised tests of English reading and mathematics need to be re-normed and/or revised so that schools and teachers can make more accurate decisions about the learning needs of pupils.

Recommendation 14:

- There is a need to consider whether schools should continue to use non-secure tests as a basis for generating data that are used to report aggregated results to the DES and Boards of Management.

Recommendation 15:

- There is a need to develop diagnostic modules or item banks of test items corresponding to mathematics content areas and processes in the curriculum so that teachers can generate reliable data on pupil performance in these areas, and use such data as a basis for planning teaching and learning.

Recommendation 16:

- The targets that schools set for English reading and mathematics should be based on a combination of standardised tests results and other objective information gathered at school level, including data that are based on teacher assessments.

Parent Engagement and Support

Findings from NA '14 reinforce findings from previous national and international assessments that have demonstrated strong associations between pupils' home and family lives and their reading and mathematics achievement. Several home background characteristics are not amenable to change, and are not under the influence of schools. However, results of the multilevel model showed the independent contributions of manipulable elements of the home environment, indicating that there are ways in which schools can usefully advise parents to support their children's learning at home.

Statistically significant positive associations were found between reading achievement and the number of books in the home, frequency of parents' leisure reading, parents' setting aside of time for their child to read for pleasure, the child being a member of a public library, and the frequency with which the child reads books alone for fun. Membership of a public library was found to be related to reading achievement even when the number of books in the home was taken into account, suggesting that library membership offers something more in terms of reading achievement than mere access to large numbers of books. Parents should be encouraged to create opportunities for children to read for pleasure at home and become involved with their local library. They should model positive attitudes towards reading as well as positive reading behaviours to their children wherever possible. More frequent reading of magazines and comics by pupils was associated with lower achievement, however, suggesting that parents should have a role in monitoring the types of material which their children are reading, and, where possible, seek to broaden this.

Parental monitoring variables assessed in NA '14 were found to have much stronger relationships with achievement than more formal school-based parental involvement activities (e.g. committee membership). This supports recent findings from a similar model of reading achievement using PIRLS data (Gilleece, 2015). In NA '14, pupils who spent the most time playing computer games, watching television, using the Internet, and playing with friends, had the lowest mean scores in reading and mathematics, suggesting a role for parents in limiting the amount of time that their children spend on these activities. Additionally, Second and Sixth class pupils who had televisions in their bedrooms, and Second class pupils who had their own smartphones/mobile phones had significantly lower mean achievement than pupils who did not. The multilevel model of reading achievement at Second class showed these variables to be significantly negatively associated with achievement when all other variables in the model were held constant. In a context where 51% of pupils in NA '14 were in schools where principals indicated that pupils coming to school tired hindered progress in teaching and learning 'a lot' or 'to some extent', the importance of parental monitoring of pupil behaviour seems clear.

Parental monitoring and home-based involvement in education should be supported by strong home-school communication. In NA '14, nearly all pupils (99% at Second class; 96% at Sixth) were in schools where the results of standardised tests were used to give feedback on children's progress to parents. Despite this, parents' ratings of their children's English reading and mathematics tended to be overly positive, suggesting that many parents may not have a full understanding of how their children are progressing academically. As noted by Eivers et al. (2010), overestimating a child's performance in reading and/or mathematics may have implications for the nature and extent of support which parents provide to their child at home. Guides to interpreting test scores, such as those provided for parents on the NCCA website (www.ncca.ie) should be helpful for ensuring that parents fully comprehend the feedback on their children's standardised test performance that they receive from

schools. Findings from the PIRLS and TIMSS 2011 international studies showed that parents in Ireland received information about their children's academic development less frequently than parents on average internationally (Eivers & Creaven, 2013). Having clear, comprehensive, and understandable information on how their children are performing relative to others in their class and nationally could make parents more aware of when extra home support for English reading and/or mathematics could be beneficial.

Encouraging parents to support reading and mathematics in the home is an important step, but providing information on *how* to do so may be a prerequisite for many parents. Indeed, a substantial majority of parents of pupils in NA '14 (76% at Second class, 71% at Sixth) indicated that they would attend a course or information evening for parents aimed at helping their children with English, were one organised by their child's school. Even larger proportions of parents (79% at Second, 75% at Sixth) reported that they would attend such a course for mathematics. However, very small proportions of parents at both grade levels reported that they had actually attended a course or information evening aimed at helping their child with English (7% at Second class, 5% at Sixth) or mathematics (6% at Second class, 5% at Sixth), despite the fact that around 40% of pupils at each grade level were in schools where a parent programme for English reading was implemented in the 2013-14 school year, and around 30% of pupils at each grade level were attending schools where such a parent programme was available for mathematics. The mismatches between parent desire for, availability of, and actual uptake of such programmes are concerning, and may suggest either a lack of awareness on the part of parents of such initiatives, where they are in fact available in schools, or that schools target the programmes at particular groups of parents (e.g. parents of children in particular grade levels), meaning that they are not open to all parents who might feel a need to avail of them. In both NA '14 and NA '09, schools were less likely to offer parent programmes for mathematics than for reading. Similarly, schools were more likely to have shared resources with parents for supporting English reading (e.g. websites, reading lists) in the 2013-14 school year (74% at Second class; 68% at Sixth) than for supporting mathematics at home (60% at Second class; 55% at Sixth). This occurred despite parents indicating greater demand for programmes in mathematics, and parents reporting lower levels of confidence (particularly at Sixth class) in helping their children with mathematics homework than with English homework.

One in two pupils in both Second and Sixth classes in NA '14 were in schools where principals indicated that a lack of support for children from their parents hindered progress in teaching and learning 'a lot' or 'to some extent'. Principals in NA '14 also responded to a series of statements relating to the engagement of teachers, parents, and pupils in various aspects of school life. Those relating to parent-level engagement (parental support for pupil achievement, and parent involvement in school activities) were least likely to be rated as very high or high by school principals. Hence, there appears to be considerable scope to strengthen the links between home and school in order to support pupil achievement. It is acknowledged, however, that not all teachers may be aware of how best to forge

partnerships with parents or feel confident about doing so. In NA '14, teachers of Second class pupils were asked to indicate their levels of confidence in relation to various aspects of teaching English. Of these, *working with parents to raise children's literacy levels* was one of the areas in which teachers were least likely to say they were very confident (14th of 15) and in which they were most likely to say they were not at all confident (2nd of 15). Raising teacher confidence in collaborating with parents, through initial education programmes and continuing professional development, may be a necessary first step.

Recommendation 17: Schools should seek to raise awareness among parents about behaviours and practices that are supportive of children's academic development (such as reading books at home for pleasure) and those that are not (unmonitored television access, large amounts of technology use).

Recommendation 18: Schools should share information and resources with parents to help them support their children's learning in the home. An increased focus on mathematics may be particularly useful in this regard. Schools should also seek to ensure that parents understand the performance of their children in reading and mathematics relative to others in their class and nationally.

Recommendation 19: There should be an increased emphasis in initial teacher education and in continuing professional development programmes on preparing teachers to work in partnership with parents.

Chapter 1: Overview of the Study and Methodology

National assessments of English reading and mathematics in primary schools have been conducted periodically in Ireland since 1972. The 2014 National Assessments (NA '14) were carried out by the Educational Research Centre on behalf of the Department of Education and Skills. The assessments were administered by class teachers to over 8,000 pupils in Second and Sixth classes in May 2014. In addition to pupils in a representative sample of primary schools taking secure tests of English reading and mathematics, the pupils and their parents, teachers, and principals completed questionnaires that provided contextual data. The current report provides an analysis of the contextual data, and relates the questionnaire data to performance outcomes. Additionally, the report examines trends in non-achievement outcomes since the last round of national assessments, conducted in 2009.

This introductory chapter comprises four main sections. First, the context of the study is outlined, including consideration of the links between the 2014 National Assessments (NA '14) and the 2009 National Assessments (NA '09), and between NA '14 and the *National Strategy to Improve Literacy and Numeracy among Children and Young People 2011-2020* (DES, 2011a). Second, the development and piloting of the questionnaires and other instruments is described, and their content summarised. Third, detail on the administration of the main study is provided, accompanied by information on questionnaire response rates. A description of the analysis of the questionnaire data, and guidance on how analyses presented in this reported should be interpreted, comprise the final section of this chapter.

Context of the Study

The 2009 National Assessments

National assessments of reading and mathematics achievement provide important information on national educational standards. The 2014 National Assessments are the eighth in a series of such assessments that have been conducted at primary level in Ireland since the early 1970s. Prior to NA '09, national assessments were administered at a range of grade levels. For NA '09, the decision was taken to administer the assessments to Second and Sixth class pupils, and to assess English reading and mathematics at both grades.

Accordingly, it was necessary that new tests and questionnaires be developed for use at Second and Sixth classes in NA '09 (Eivers et al., 2010). Test frameworks were created based on the 1999 Primary School English and mathematics curricula (DES/NCCA, 1999b, 1999c). A rotated test booklet design was employed at each class level (i.e. not all pupils took the same version of the test), in order to allow greater coverage of content. The inclusion of common items within grade levels facilitated linking across test booklets during scaling.

In scaling the NA '09 tests, the mean score for each scale and subscale, at each grade level, was set to 250, and the standard deviation was set to 50. Proficiency levels were also

developed such that, at each class level, 10% of students were deemed to have performed at the highest level (Level 4), 25% at Level 3, 30% at Level 2, 25% at Level 1, and 10% below Level 1. NA '09 thus provided baseline data, and NA '09 results serve as a benchmark against which performance of pupils in future national assessments can be compared. The National Assessments of English Reading and Mathematics Performance Report (Shiel, Kavanagh & Millar, 2014) outlined performance in NA '14 relative to performance in NA '09.

In addition to NA '09, a number of other national and international studies provide an important context for the present report. They include:

- The Progress in International Reading Literacy Study (PIRLS), 2011
- The Trends in International Maths and Science Study (TIMSS), 2011
- Growing Up in Ireland (from 2007 onwards, e.g. Williams et al., 2009)
- The Programme for International Student Assessment (PISA), 2009, 2012.

These will be referred to in greater detail in Chapter 3 of this report.

The National Strategy to Improve Literacy and Numeracy

In July 2011, the Department of Education and Skills (DES) launched *The National Strategy to Improve Literacy and Numeracy among Children and Young People 2011-2020.* The Strategy identified a number of challenges for the Irish education system relating to literacy and numeracy, including that:

- One in ten children in Ireland has serious literacy difficulties.
- One in three children in disadvantaged areas has serious literacy difficulties.
- Educators at post-primary level identified literacy difficulties as a major obstacle to accessing the post-primary curriculum.
- There were significant declines in both reading and mathematics performance in Ireland in PISA 2009.
- There had been no significant improvement in literacy and numeracy as assessed by the National Assessments in over 30 years.

As a result, raising literacy and numeracy standards was deemed an "urgent national priority" (DES, 2011a, p.14). To address this, the Strategy document outlined a number of reforms that would be introduced:

- The establishment of targets for the improvement of literacy and numeracy.
- A proposal to clarify what children are expected to learn at each stage of the education system (early childhood care and education, primary, post-primary) in the areas of literacy and numeracy.
- Improvement of professional skills of teachers, at all levels, in the teaching of literacy and numeracy.
- The targeting of resources at pupils and students in the most disadvantaged settings.

- The provision of professional development for school leaders, to build their capacity to lead improvement in literacy and numeracy.
- The provision of help to parents and communities to support children's learning.
- The raising of public awareness of the roles that the family, community, the education system, libraries, and other bodies can play in promoting successful literacy and numeracy among young people.

National Targets

In relation to the National Assessments of English Reading and Mathematics, the Strategy set forth the following targets:

- To reduce the percentage of children performing at or below Proficiency Level 1 (i.e. at the lowest level) in the National Assessments of English Reading and Mathematics by at least 5 percentage points at both Second and Sixth classes by 2020; and
- To increase the percentage of primary children performing at Proficiency Level 3 or higher (i.e., at the highest levels) in the National Assessments of English Reading and Mathematics by at least 5 percentage points at both Second and Sixth classes by 2020.

Each of these performance targets for 2020 was exceeded in NA '14 (see Shiel et al., 2014 for a detailed overview of performance outcomes, and Chapter 2 of this report for a summary).

School Planning

In addition to national targets, the Strategy tasks individual schools with setting specific targets for the promotion and improvement in literacy and numeracy in their School Improvement Plans. Schools are expected to engage in "robust self-evaluation" (p.40), and to use outcomes of literacy and numeracy assessments to inform their planning. Subsequent to the publication of the National Strategy, the DES issued Circular 0039/2012, the aim of which was to explain to schools the purpose and importance of School Self-Evaluation (SSE), to describe the process of SSE, to suggest how time should be allocated by schools to SSE, and to outline the actions required of schools in relation to SSE. School Self-Evaluation was defined as a "collaborative, reflective process of internal review" and its importance rests on the assumption that when teachers reflect on teaching and learning, and use this reflection to inform their planning and practice in formal ways, school improvement and development can take place in a more systematic way. In year 1 (2012-13 for many schools), schools were to select either literacy or numeracy as the area of focus. In year 2, they were to select whichever of the two areas (literacy or numeracy) that they had not focused on in year 1 as their focus for year 2. By the start of the 2015/16 school year, schools were expected to have

commenced self-evaluation in another curriculum area. Improvement plans for each of the areas of focus were to contain specific and measurable targets.

Finally, the Circular signposted supports available to schools to assist with their engagement in SSE. Guidelines for schools on SSE (prepared by the Inspectorate) were made available. These contained a framework for evaluating teaching and learning, sample tools for gathering evidence and making judgements, and reporting and planning templates (DES, 2012).

Teaching and Learning

The Strategy also indicated that increasing the time allocated to the teaching and learning of literacy and numeracy in primary schools was an important objective, and that the NCCA was requested to provide guidance on new time allocations by 2016. To provide interim advice, the DES issued Circular 0056/2011 on increasing the time allocation for both literacy and numeracy, which took effect from January 2012 (DES, 2011b). The Circular indicated that schools were required to increase the time allocated to literacy in the first language (L1) of the school (English or Irish) and in the second language (L2; English or Irish) by one hour per week, and to increase time spent on mathematics by 70 minutes per week, by a combination of the following suggested approaches:

- Integrating literacy and numeracy teaching into other curricular areas.
- Increasing the amount of discretionary curriculum time allocated to literacy and numeracy.
- Reducing the time allocated to other curricular areas.
- Prioritising those curriculum objectives considered to be most valuable for children's learning and delaying the introduction of elements of some subjects.

Parental Involvement

The importance of families and communities in the promotion of literacy and numeracy is acknowledged in the Strategy. The Strategy states that all parents should be provided with information and resources to support their children's literacy and numeracy from birth, and that tailored information on supporting children's learning should be provided to parents with literacy difficulties. The Strategy also tasks schools with engaging with parents as part of literacy and numeracy planning in their schools.

Early Years Education

In January 2010, an initiative was introduced by the Department of Children and Youth Affairs (DCYA) whereby every child in Ireland would be entitled to one free year of pre-school, through the Early Childhood Care and Education (ECCE) scheme. The stated aim of the scheme is to provide children with their first formal learning experiences outside of the home, to prepare children for the social and educational demands of school, and to: "promote equality of opportunity at the most important developmental stage of children's

lives" (DCYA, 2009). Children aged between 3 years, 2 months and 4 years, 7 months in September of the year before they start primary school were eligible for the scheme. Although the free pre-school year generally begins in September each year, in the first year of its introduction, 2010, children entered the scheme in January. Thus, the vast majority of Second class children who participated in the 2014 National Assessments would have been eligible for a truncated version of the free pre-school year in the year prior to starting primary school.[1]

The Collection of Contextual Information in NA '14

A series of questionnaires was developed for use in NA '09, in order to provide a context in which to interpret achievement (see Eivers et al., 2010). For NA '14 it was deemed necessary to amend these questionnaires to reflect important policy developments (particularly those articulated in the National Strategy) and attendant changes in practice, while also retaining questions which would allow a consideration of trends in non-achievement outcomes from NA '09 to NA '14. To this end, parent, teacher, and school questionnaires containing new questions were piloted in conjunction with the field trial of the assessments conducted in May 2013.

The field trial was conducted in 20 primary schools that were randomly selected from a convenience subset of schools (i.e. only vertical schools in Dublin, Cork, Galway, Limerick and Waterford, that had English as the primary language of instruction, and which were not involved in any other ERC studies at the time of sampling). The field trial questionnaire response rates are presented in Table 1.1.

Table 1.1: Response rates for the National Assessments Field Trial (May 2013)

	Questionnaire		
	Parent	**Teacher**	**School**
Second class	85.0%	100%	100%
Sixth class	88.2%	100%	

Given the increased focus and emphasis on literacy and numeracy in schools as a result of the National Strategy, it was deemed necessary to include more questions that related directly to the teaching and learning of, and planning and evaluation in relation to, reading and mathematics. In order to elicit this additional information, while attempting to avoid burdening respondents with unduly lengthy questionnaires, it was decided to focus more

[1] According to Budget 2016 (October 13, 2015), from September 2016, free access to pre-school will be widened to cover all children between the ages of three and five and a half years of age, who are not already in primary school. They will also be able to enrol in January, April or September of any given year (www.budget.gov.ie).

closely on English reading in questionnaires relating to Second class, and to focus on mathematics in those relating to Sixth class.

Following analysis of field trial questionnaire data, feedback was provided on questionnaire content by members of the National Advisory Committee, who helped select the questions for inclusion in the main study questionnaires and suggested minor amendments to existing questions. The content of the finalised questionnaires administered is summarised in the following subsections (full versions of the questionnaires can be found at www.erc.ie/na2014).

Pupil Questionnaire

The Pupil Questionnaire asked pupils about their home languages, homework activities, attitudes towards mathematics and reading, as well as their involvement in activities outside of school. The Second and Sixth class questionnaires differed in two main ways. First, the Second class questionnaire was briefer and simpler than the Sixth class version. Second, the Second class version focused more on questions relating to reading, while the Sixth class questionnaire had a greater emphasis on mathematics.

Parent Questionnaire

The Parent Questionnaire collected information on features of pupils' home backgrounds (such as family size and composition), parents' educational attainment and occupation status, family financial status, and resources (educational, technological) in the home. Information was also collected on parent practices, such as helping with homework, communicating with the child's school, reading practices in the home, etc. Parents were asked to rate their children's progress in English reading and mathematics, and to list any concerns they might have about their children's performance in these domains. Parents were also asked about their experiences of and attitudes towards their child's school and its resources. The content of the versions for Second class and Sixth class parents overlapped considerably; however, as in the questionnaires for pupils, there was a greater emphasis on English reading at Second class, and on mathematics at Sixth.

Teacher Questionnaire

Second and Sixth class teachers answered questions about their own teaching backgrounds, (their qualifications, the length of their teaching experience, whether they held a post of responsibility), as well as questions about continuing professional development (past and desired) in literacy and numeracy teaching. The questionnaires also contained questions on classroom organisation, teaching and assessment strategies for English and mathematics, and the time allocated to teaching each subject on a weekly basis. Teachers were asked about access to and use of various resources, and about planning and organisational activities, including class-level target setting for English (Second class) and mathematics (Sixth).

Pupil Record Form

In addition to a teacher questionnaire, every class teacher was asked to complete a Pupil Record Form, which sought additional information about each pupil in their class. Teachers were asked to report on the number of days of school missed by each pupil in the previous ten school days, and about whether each pupil was in receipt of additional support for either English or mathematics.

School Questionnaire

The School Questionnaire was completed by school principals. The questionnaire was designed to collect information on school location, enrolment, and average attendance, in addition to information on school infrastructure, resources, and staffing. The questionnaire included a number of questions on the provision of additional support in the school, and about a range of assessment, evaluation, and planning activities.

Main Study Administration of Questionnaires

The main study sample for NA '14 was selected in two stages. Schools were sampled first, and then intact classes were sampled from these schools. The target population consisted of all Second and Sixth class pupils in mainstream classes in primary schools in Ireland in May 2014, with private schools and special schools excluded. To ensure that a representative sample was selected, the remaining schools were stratified according to enrolment size, DEIS status, area/language of instruction (Gaeltacht school, Gaelscoil, Ordinary School), and the proportion of female pupils enrolled. In total, 130 vertical schools, 10 junior schools, and 10 senior schools were selected to participate. All 150 originally selected schools agreed to participate in the study. The second stage of sampling involved the selection of classes. Participating schools supplied the ERC with details of their Second and Sixth classes, excluding special classes. ERC staff then randomly selected up to two intact classes at each grade level for each school. In practice, this meant that in small- and medium-sized schools, all pupils at the target grade level were selected. Testing took place between May 6th and May 23rd, 2014.

Paper versions of all questionnaires were sent to schools several weeks in advance of the testing window, with schools then posting these back to the ERC. Pupils completed paper versions of the questionnaire, while parents, teachers, and principals also had the option to complete online versions of the questionnaires. Polish, Latvian, and Lithuanian versions of the paper-based Parent Questionnaire were available, in addition to English and Irish versions. In Irish-medium schools, bilingual versions of the Parent Questionnaire were administered, and both language versions were available to parents online. Similarly, bilingual versions of the Pupil Questionnaire were administered in Irish-medium schools. Questionnaire response rates for the main study were very high, as shown in Table 1.2.

Table 1.2: Response rates for the National Assessments main study questionnaires

	Second (N=4370)		**Sixth** (N=4470)	
	N	**%**	**N**	**%**
Pupil Questionnaire	4260	97.5	4328	96.8
Parent Questionnaire	4001	91.6	4064	90.9
	Number of classes = 200		Number of classes = 200	
Teacher Questionnaire	197	98.5	198	99.0
Pupil Record Form	200	100	199	99.5
	Number of schools = 150			
School Questionnaire	N=149 **%** = 99			

Analysis of the Data

As previously mentioned, this report focuses on the relationships between contextual variables and pupil achievement. Where contextual variables are *continuous* (e.g. minutes allocated to the teaching of mathematics per week), correlations are used. The value of a correlation between two variables can range from -1 to +1. A positive correlation coefficient indicates that as one variable increases, so does the other. A negative correlation indicates that as one variable increases, the other decreases. A correlation coefficient close to 0 indicates little or no relationship, while the closer the value is to ±1, the stronger the relationship. The following rule of thumb can be used to interpret the strength of the correlation coefficients reported in this volume:

- Weak < .1
- Weak to moderate .1 to .24
- Moderate .25 to .39
- Moderate to strong .4 to .55
- Strong >.56

Where contextual variables are *categorical* (e.g. gender), comparisons are used. In this report, where the mean English reading and mathematics test scores of different groups are compared, there are generally three columns for each grade level (see Example Table). The first column shows the percentage of pupils who belong to that group/category, while Reading and Maths columns contain the mean reading and mathematics scores for pupils in that category. In the sample table below, for example, just under 8% of Second class pupils speak a language other than English or Irish when at home. These pupils have a mean English reading score of 241 and a mean mathematics score of 254. In this table, the category *English* is marked by an asterisk. This means that this category is the reference category, or

the group of pupils against which other groups are compared. Where the mean score of pupils from one category differs significantly from the mean of pupils in the reference category, this score is highlighted using bold font. Therefore, in the example below, the mean reading score of Second class pupils who mostly speak Irish at home (269) does not differ significantly from the mean reading score of pupils who mostly speak English at home (268). However, the mean of pupils who mostly speak another language at home (241) is statistically significantly different from the mean of pupils who speak English at home.

Example Table: Language of the home and mean reading and mathematics scores, by grade level

	Second			Sixth		
	%	Reading	Maths	%	Reading	Maths
English*	91.3	267.5	266.5	91.5	266.1	263.7
Irish	0.9	269.1	250.0	0.5	**283.1**	292.5
Other	7.8	**240.6**	**254.3**	7.9	**242.6**	261.4

Results reported in this volume (mean scores, percentages) are weighted. Where mean scores are compared, jackknifed standard errors (computed using WesVar) are given in the e-Appendix. Jackknifing is a technique for estimating sampling errors that takes into account the fact that pupils in NA '14 were not randomly selected from among all pupils nationally, but rather were clustered within schools (and may have been more similar to each other than if they had been sampled randomly from the population). Jackknifed standard errors tend to be larger than those obtained for simple random samples, making it more difficult to find statistically significant differences.

Where comparisons are made between the mean scores of more than two groups, such as in the example above, alpha levels are adjusted in order to control for Type 1 error (i.e. to guard against declaring a difference to be statistically significant when it is not). The method of alpha adjustment used was the Bonferroni correction, whereby the chosen alpha level (0.05) is divided by the number of tests. Therefore, if three comparisons are made, the alpha level used to construct the confidence interval is .05/3, or 0.0167.

So, while the size of the difference between two scores is important, the error associated with the estimated scores and their differences is also taken into account, as is the number of comparisons being made. For these reasons, scale-score point differences of the same size may be significant in one case, but not in another.

Finally, Chapter 8 presents a multilevel model of reading achievement at the Second class level. Guidance on interpreting the model is presented at the beginning of that chapter.

Chapter 2: Summary of Performance Outcomes

The 2014 National Assessments of English Reading and Mathematics (NA '14) were administered to representative samples of over 8,000 pupils in Second and Sixth classes in 150 primary schools, in May 2014. Performance outcomes were reported in early 2015 (Shiel et al., 2014), and were compared with performance in 2009. The present chapter provides a summary of that report, which gives a context in which the findings contained in the present report can be understood. The chapter opens with a brief overview of the 2014 National Assessments and their policy context. Overall performance in English reading and mathematics in 2014 relative to 2009 is then summarised. Next, gender differences in NA '14 performance are considered. Finally, an overview of findings relating to the performance of pupils in schools in the School Support Programme under DEIS is provided.[2]

Overview and Context of the 2014 National Assessments

The 2014 National Assessments were administered by class teachers, under the supervision of inspectors of the Department of Education and Skills. The tests used in NA '14 were secure instruments developed for NA '09 and updated for NA '14 through the inclusion of a small number of new items to replace those that were released after NA '09. The tests were based on the Primary School English and mathematics curricula. The English reading tests included both comprehension and vocabulary items. The following comprehension processes were assessed by the reading tests: Retrieve, Infer, Interpret & Integrate, and Examine & Evaluate[3]. In mathematics, a number of mathematical content strands and cognitive process skills were assessed. The content areas were: Number & Algebra, Shape & Space, Measures, and Data. The process skills assessed were: Understand & Recall, Implement, Integrate & Connect, Reason, and Apply & Problem Solve. More information on the assessment frameworks for English reading and mathematics can be found in Shiel et al. (2015), with detailed information on the development of the tests available in Eivers et al. (2010).

At each class level, there were multiple test booklets in each domain, allowing for greater coverage of content areas and process skills. Item Response Theory (IRT) scaling was used to link test booklets, and also to place performance in 2014 on the same scales developed for NA '09. Scales and content area subscales developed for NA '09 had been set to a mean score of 250 and a standard deviation of 50. Also, pupils were assigned to proficiency levels

[2] Findings related to the performance of pupils in schools in the School Support Programme under DEIS should be treated with caution, as they are based on small sample sizes, and precise estimates of performance and change cannot be computed.

[3] Examine and Evaluate was assessed at the Sixth class level only.

in English reading and mathematics at each class level, such that 10% of pupils performed below Level 1, 25% at Level 1, 30% at Level 2, 25% at Level 3 and 10% at Level 4.[4]

The National Strategy to Improve Literacy and Numeracy among Children and Young People, 2011-2020 noted that the reading and mathematics skills of pupils in primary schools (as assessed by the National Assessments series) had not improved in over 30 years, "despite considerable investment in reducing teacher-pupil ratios, the introduction of learning support (formerly remedial) and resource teachers, the provision of better teaching materials and considerable reform" (DES, 2011a, p. 12). As part of the Strategy, a number of national targets for literacy and numeracy performance at primary level were set (see Chapter 1). The 2014 National Assessments provided the opportunity to gauge progress towards the achievement of those targets.

Key Findings

Overall Performance in Reading

Overall performance in English reading at Second class was significantly higher in NA '14 than in NA '09, by 14 score points. The corresponding effect size was 0.29. According to the US Department of Education's What Works Clearinghouse, effect sizes of 0.25 or higher can be interpreted as being 'substantively important' (that is, they can be considered important in the context of educational studies). Significant performance increases of similar size were observed on both the Reading Vocabulary and Reading Comprehension component subscales, and on the Retrieve, Infer and Integrate & Interpret process subscales.

Overall performance in English reading in Sixth class was also significantly higher in NA '14 than in NA '09, by 13 score points. The corresponding effect size, 0.26, can also be considered substantively important. Significant performance increases were observed for both the Reading Vocabulary and Reading Comprehension component subscales, and for the Retrieve, Infer, Integrate & Interpret and Examine & Evaluate process subscales. Pupils in Sixth class made less progress on the Examine & Evaluate subscale than on the other process subscales; however, given the relatively small number of items assessing the Examine & Evaluate process, scores on this subscale should be interpreted with caution.

In NA '14, 22% of pupils in Second class performed at or below Proficiency Level 1 on overall reading, compared with 35% in NA '09, while 46% performed at Levels 3 and 4 combined, compared with 35% in NA '09. At Sixth class, 25% performed at or below Level 1, again compared with 35% in NA '09, while 44% performed at Levels 3 and 4 combined, compared with 35% in NA '09. This means that the 2020 performance targets for English reading were achieved ahead of schedule in 2014, at both the Second and Sixth class levels.

[4] For detail on the English reading and mathematics skills that pupils at different proficiency levels are expected to display consistently, see Shiel et al. (2014).

Overall Performance in Mathematics

Overall performance in mathematics at Second class was significantly higher in NA '14 than in NA '09, by 14 score points. The effect size at Second class was 0.28, which can be interpreted as being substantively important. Significant increases in performance were observed on three of four content areas assessed, and on all five mathematics processes. The exception was the Data content area, where the increase was just 4 score points.

Overall performance in mathematics at Sixth class was also significantly higher in NA '14 than in NA '09, by 12 score points, with an effect size of 0.24. There were significant increases on all four content areas and on all five processes at the Sixth class level.

In NA '14, 26% of pupils in Second class performed at or below Proficiency Level 1 on overall mathematics, compared with 35% in NA '09. Forty-seven percent performed at Levels 3 and 4 combined, compared with 35% in NA '09. At Sixth class, 27% performed at or below Level 1, and 42% performed at Levels 3 and 4 combined. All 2020 performance targets for mathematics set out in the National Strategy were thus achieved in 2014.

Gender Differences in Performance

In NA '14, girls in Second class significantly outperformed boys on the overall reading scale, by 7 score points. The corresponding difference in NA '09 was 14 points in favour of girls. There was a 17 percentage point decrease in the proportion of boys, and a 10 percentage point decrease in the proportion of girls who performed at or below Level 1 on the overall reading scale in NA '14, compared with NA '09. There was a 13 percentage point increase in the proportion of boys and an 8 percentage point increase in the proportion of girls performing at Levels 3-4 in reading, compared with NA '09.

At Sixth class, girls in NA '14 achieved a mean score on overall reading that was higher than that of boys by 4 score points. This difference was not statistically significant. At Sixth class, there was an 11 percentage point decrease in the proportion of boys performing at or below Level 1, and a 9 percentage point decrease in the proportion of girls performing at or below Level 1, compared with NA '09. There was a 7-point increase in the proportion of boys and an 11-point increase in the proportion of girls performing at Levels 3-4.

Boys in Second class had a higher mean score on overall mathematics than girls in NA '14, and the 5-point difference was statistically significant. Boys significantly outperformed girls on the Measures, Data, and Apply & Problem Solve subscales, but did not differ significantly from girls on any of the other content or process subscales. The proportion of Second class boys performing at or below Level 1 decreased by 10 percentage points and the proportion of girls performing at or below Level 1 decreased by 9 points. The proportion of boys performing at or above Level 3 increased by 13 percentage points, and the proportion of girls increased by 12 percentage points.

At the Sixth class level, boys in NA '14 had a 4-point advantage over girls, but the difference was not statistically significant. Boys had a significantly higher mean score than girls on the Measures and Apply & Problem Solve subscales, but there were no gender differences on the other content or process subscales. The proportion of boys performing at or below Level 1 on the overall mathematics scale decreased by 7 percentage points, while the proportion of girls performing at the lowest levels decreased by 8 percentage points. There was a 6 percentage point increase in the proportion of boys and a 6-point increase in the proportion of girls performing at or above Level 3.

Performance of Pupils in Schools in SSP under DEIS

Caution should be exercised in interpreting the outcomes in this section, due to small numbers of pupils in DEIS schools selected to participate in the National Assessments, and the large standard errors associated with estimates such as mean scores and differences.[5]

Pupils in Second class in DEIS Band 1 schools achieved a mean score on overall reading in NA '14 that was 14 points higher than in NA '09, and the difference was statistically significant. The corresponding effect size (0.35) can be interpreted as being substantively important. Second class pupils in Band 2 schools had a mean score on overall reading in NA '14 that was significantly higher (by 27 points) than the NA '09 meanscore for Band 2 schools. The effect size (0.60) can be interpreted as being large in the context of a study such as NA '14.

In Sixth class, the mean overall reading score of pupils in Band 1 schools in NA '14 was 13 points higher than in NA '09. The difference was not statistically significant. Pupils in DEIS Band 2 schools had a higher mean score in NA '14 than in NA '09 and the difference, 14 score points, was statistically significant. The effect size was the same as for Band 1 schools (0.29).

In Second class mathematics, pupils in Band 1 schools in NA '14 had a mean score that was 13 points higher than in NA '09, though the difference was not statistically significant. In Band 2 schools, there was a significant increase of 29 score points in mathematics at Second class. The corresponding effect size of 0.62 can be interpreted as large.

Pupils in Sixth class in Band 1 schools in NA '14 had a mean score on overall mathematics score that was higher than that of pupils at the same class level in NA '09. The difference of 14 points was not statistically significant. There was a smaller increase in mathematics in Sixth class in Band 2 schools, and the 10 point difference was not statistically significant.

For English reading and mathematics at Second and Sixth classes in both Band 1 and Band 2 schools, there were substantial reductions in the proportions of pupils performing at or below Proficiency Level 1, and increases in the proportions of pupils performing at Levels 3-4. However, in the case of Band 1 schools in particular, there are still large proportions of

[5] Although reported in Chapter 5 of the Performance Report, no reference is made to performance in rural DEIS schools here, as only a very small number of such schools were selected to take part in NA '14.

pupils performing at the lowest proficiency levels. For example, 44% of pupils in Second class in Band 1 schools performed at or below Level 1, compared with 22% nationally.

Conclusion

NA '14 represents the first National Assessment since 1980 in which there were statistically significant increases in English reading and mathematics performance. The significant increases in average performance on English reading and mathematics in Second and Sixth classes were accompanied by substantively important effect sizes. All targets for performance set out in the *National Strategy to Improve Literacy and Numeracy* were also achieved in NA '14, well in advance of the scheduled target date of 2020. While pupils in DEIS Band 1 and Band 2 schools improved in reading and mathematics at both Second and Sixth classes, their average performance still lagged behind that of pupils nationally.

Chapter 3: Review of the Literature

Questionnaires were administered in conjunction with the 2014 National Assessments in order to provide a context in which to interpret pupil achievement. The nature of the information collected via these questionnaires was informed by the existing national and international literature on contextual factors related to pupil achievement, as well as recent policy initiatives and educational reforms. The present chapter reviews factors associated with reading and/or mathematics achievement, as identified in previous large-scale assessments. First, home and family characteristics and their relationships with achievement are considered. Next, literature on associations between individual pupil characteristics and achievement is summarised. Third, teacher and classroom factors associated with achievement are highlighted. Finally, the literature surrounding school-level characteristics and pupil achievement is briefly outlined.

Home and Family Factors

Parent and Family Characteristics

Family socioeconomic status (SES) has consistently been found to be strongly associated with pupil performance in assessments of pupil achievement. In NA '09, for example, pupils from homes classified as low SES had significantly lower achievement than pupils from medium and high SES backgrounds, at both Second and Sixth class, and in both English reading and mathematics (Eivers et al., 2010). Gaps in test scores between low SES and high SES pupils ranged from 27 points (Second class maths) to 43 points (Sixth class reading). Indicators of SES, such as parent employment status, parent educational attainment, and medical card coverage, have been found to be related to achievement in a host of Irish and international studies. In PIRLS and TIMSS 2011 (PT2011), for example, the number of full-time jobs held by pupils' parents was positively associated with achievement in both reading and mathematics (Cosgrove & Creaven, 2013).

Elements of family structure have been found to be related to pupil achievement in a range of Irish and international studies. In NA '09, for example, pupils from one-parent homes and pupils with large numbers of siblings had significantly lower achievement in both reading and mathematics than other pupils (Eivers et al., 2010). It is worth noting, however, that once SES is taken into account, associations between these variables and achievement tend to weaken considerably, or disappear (e.g. Eivers, Shiel & Shortt, 2004).

Language of the home has also been found to be related to pupils' test performance. Where once only two languages featured prominently in pupils' home lives (English and Irish), a consequence of increasing numbers of migrant pupils in Irish schools has been increasing linguistic diversity among pupils. In NA '04, less than 3% of participating pupils spoke a language other than English or Irish with their parents. In NA '09, 6-10% of participating

pupils usually spoke a language other than English or Irish at home. In PT 2011, 84% of participating Irish children indicated that they always spoke English at home, 13% reported that they sometimes did so, and 2% reported that they never spoke English at home (Eivers, 2013). The international averages for pupils always speaking the language of the test at home were 72% for TIMSS and 73% for PIRLS, meaning Ireland had fewer additional language pupils than most other participating countries. Pupils in Ireland who speak a language other than English or Irish at home tend to perform more poorly on assessments of English reading than pupils of English-speaking families. In NA '09, for example, Second and Sixth class pupils who spoke English most often at home had significantly higher mean scores than those who did not (Eivers et al., 2010). In PIRLS 2011, the mean reading score for pupils in Ireland who reported that they always spoke English at home was 556 points, 540 for those who sometimes did so, and 481 for the 2% of participating pupils who never spoke English at home. The relationship with mathematics at primary level is less straightforward. In NA '09, pupils from English-speaking homes scored significantly higher than others on the Second class mathematics assessments; however, performance did not vary significantly by home language at the Sixth class level.

Home Atmosphere

Previous studies have found pupil achievement to be related to aspects of the home atmosphere. 'Atmosphere' refers to the environment created by parents or guardians in the home; whether it is supportive of children's academic development appears to be related to pupil achievement. One way in which parents can create an atmosphere supportive of learning is through the provision of resources. In NA '09, for example, parents were asked whether their children had access to educational games and/or reference books at home. Second and Sixth class pupils with access to both types of resource at home had mean reading and mathematics scores that were significantly higher than those of pupils who had access to just one or the other, and higher than those of pupils who had access to neither. At Sixth class, for example, pupils with home access to both educational games and reference books had a mean reading score that was 19 scale score points higher than pupils with access to just one of these, and 45 points higher than that of pupils who had home access to neither.

In many studies, the number of books in the home has been used as an indicator of home atmosphere. Generally, very strong associations have been found between number of books in the home and achievement (e.g. Eivers et al., 2010), with many studies finding that pupils who have access to more books in the home have significantly higher test scores in both reading and mathematics (e.g. Eivers et al., 2010; McCoy, Quail & Smyth, 2012; Cosgrove & Creaven, 2013).

Home access to technology has also been identified as associated with achievement. Previous national assessments have found positive relationships between achievement and having home access to a computer and to the Internet (Eivers et al., 2005). In NA '09,

however, the Sixth class pupils (21%) classified as high users of technology (based on time spent on the Internet and playing computer games) had significantly lower mean reading and mathematics scores than moderate users and those pupils who spent no time on the Internet or playing computer games (9%).

In NA '09, 53% of Second class pupils and 62% of Sixth class pupils had a television in their bedroom. Having a television in the bedroom was strongly related to achievement. Sixth class pupils who did not had mean mathematics and English reading scores that were 28 points higher than their counterparts who did. At Second class, those without a TV in their bedrooms scored 30 points higher in mathematics and 34 points higher in reading than those with. Boys and pupils from low SES backgrounds were more likely to have televisions in their bedrooms. For example, 81% of Sixth class boys from low SES families had a television in their bedroom, while 30% of girls from high SES families had. Findings from the first wave of GUI showed that 45% of nine-year-olds had a television in their bedroom, with 35% having a video/DVD player (Williams et al., 2009). Again, having a television in the bedroom was found to be related to SES, with children of lower social class and from lower income groups more likely to have a television in their bedroom. Wave 2 data from GUI showed that 54% of 13-year-olds had a television in their bedroom, and 43% had a video/DVD player.

Parent Practices

Parental involvement in education has repeatedly been shown to have positive effects on pupil achievement. Parental involvement can take many forms, from dynamic aspects such as aspirations and expectations, to specific behaviours, such as volunteering in the classroom, reading with/or to children, being involved in decision making in a child's school, etc. Parental participation activities in the home and in school have been shown to be related to children's educational outcomes, while the quality of home-school communication and collaboration has also been identified as a predictor of children's success at school. Parental involvement can influence children's achievement in a number of ways: through direct instruction, by providing reinforcement of aspects of children's learning at school, through parental modelling of school-related attitudes and skills, and through the provision of encouragement (Hoover-Dempsey, Walker & Sandler, 2005).

Interpreting findings on the relationships between parental involvement and achievement from cross-sectional studies (such as those from the National Assessments series) can be problematic, as such studies do not take account of pupils' prior achievement. There is evidence to suggest that when children are succeeding at school, their parents may take a more hands-off approach to involvement, while if children are struggling, parents may take a more active role (e.g. they may contact the school more frequently, etc.).

In NA '09, Second and Sixth class pupils who received more help with homework had relatively poorer test performance in both domains than pupils who received less help

(Eivers et al., 2010). In PT 2011, parents making sure that time was set aside for homework daily (as opposed to less frequently) was associated with higher achievement in reading, but not in mathematics (Cosgrove & Creaven, 2013). Conversely, teacher-reported parental support for pupil achievement was significantly associated with mathematics achievement, but not reading achievement. Gilleece (2015) found that informal parental involvement practices were more strongly associated with reading achievement in PIRLS 2011 than more formal parental involvement behaviours. Parental expectations were strongly associated with achievement, for example, while volunteering on school trips and serving on committees were not. Involvement in the home may be more strongly associated with achievement than school-related parental involvement. In the 2004 National Assessments, pupils whose parents frequently engaged in parent-child literacy interactions and whose parents read regularly had significantly higher reading achievement than other pupils (Eivers et al., 2005), while children whose parents played mathematical games with them and who engaged them in reading maps and timetables performed relatively better in mathematics (Shiel, Surgenor, Close & Millar, 2006).

Pupil Factors

A range of individual pupil characteristics have been found to be significantly related to pupil achievement in previous studies. The following subsections provide an overview of some of the main pupil correlates of reading and mathematics achievement as identified in previous national and international assessments, and which were also assessed as part of NA '14.

Demographic Characteristics

Changes in the demographic composition of Ireland's population, resulting from a period of unprecedented immigration from the middle of the 1990s until the mid-2000s, have also been reflected in Irish classrooms. What had theretofore been largely a monocultural education system began to see increasing diversity in terms of pupils' cultural backgrounds and ethnicities. In 2004, information on pupils' country of birth was collected for the first time as part of the National Assessments. In NA '04, 10% of Fourth class pupils who participated in the mathematics assessment were born outside of Ireland. The mean mathematics score for these pupils did not differ significantly from the mean score of pupils who were born in Ireland. In the reading assessment, 8% of First class pupils and 10% of Fifth class pupils were born outside of Ireland. Mean scores for these pupils did not differ significantly from those of Irish-born pupils, at either grade level. In NA '09, 14% of Second class pupils and 15% of Sixth class pupils were born outside of Ireland. These pupils had slightly lower mean scores in both domains than pupils born in Ireland, but the differences were only statistically significant for English reading. In PT 2011, information on country of birth was not collected; instead, the focus was on pupils' home languages– a variable which

has been found to be more closely linked to achievement than birth country in a number of studies.

Other demographic characteristics of pupils that have been found to be associated with pupil achievement include pupil gender and age. For an overview of how gender has been related to achievement in the National Assessments (including NA '14), see Volume 1 of this report (Shiel et al., 2014). With respect to pupil age, in NA '98, pupils who were substantially older or younger than average for their grade had lower mean reading scores than those in the average range (Cosgrove, Kellaghan, Forde & Morgan, 2000). In NA '04, it was found that First class pupils who were younger than average for their class level performed relatively poorly on the reading assessment; however, performance in reading was not found to be related to pupil age at the Fifth class level. Mathematics was only assessed at Fourth class, and no age effects on performance were found. In NA '09, no age effects were reported in either domain or at either grade level. For example, the mean age of Second class pupils performing below Proficiency Level 1 in reading and maths (i.e. at the lowest level of proficiency) was 8.2 years, while the mean for pupils performing at Proficiency Level 4 (the highest level) was 8.1 years.

Attitudes and Engagement

Pupil engagement in education is a concept that has received much research attention in recent decades. Despite being defined in myriad ways, most contemporary definitions reflect the growing consensus that pupil engagement has affective, behavioural, and cognitive elements (e.g. Fredericks, Blumenfeld & Paris, 2004). Underlying the interest of researchers and educators in the concept is the idea that pupil engagement is central to academic success (e.g. Klem & Connell, 2004), and that its converse, disengagement from school, has negative and long-lasting consequences (Henry, Knight & Thornberry, 2012). Indeed, a wide range of indicators of pupil engagement have been linked to pupil achievement by previous studies. These include: school attendance, attitudes towards school, academic aspirations and expectations, and attitudes towards specific subjects.

In NA '09, for example, attendance at school showed significant (albeit weak to moderate) correlations with test performance in both domains, and at both grade levels (Eivers et al., 2010). NA '09 also assessed pupils' aspirations and expectations for their education (at the Sixth class level only), with pupils asked how long they hoped to, and how long they expected to, continue in formal education. Pupils who expected that they would cease their education after the Leaving Certificate had mean reading and mathematics scores that were significantly lower than those who expected they would progress to third-level, and significantly lower than those who expected they would leave the education system after the Junior Certificate. Three-quarters of Sixth class pupils in NA '14 aspired to attend College or University. These pupils significantly outperformed, in both domains, pupils who aspired to complete the Leaving Certificate.

The Growing Up in Ireland study included three measures of affective pupil engagement: frequency with which children like school, look forward to school, and like their teacher. The authors concluded that there were, overall, high levels of engagement among nine-year-olds in Ireland. The study, however, revealed that engagement varied by gender, with boys significantly more likely than girls to report that they never like school, never look forward to school, and never like their teacher (McCoy, Smyth & Banks, 2012). Additionally, children with special educational needs were more likely than others to report that they never like school or their teacher (McCoy, Smyth & Banks, 2012). Children's liking of school was not found to vary significantly by DEIS status. McCoy, Smyth and Banks (2012) did not link these measures of engagement to pupil achievement. In PT 2011, 74% of Irish pupils agreed a little or agreed a lot they liked being in school. The international averages were 85% for PIRLS and 86% for TIMSS. Similarly, fewer Irish pupils (82%) felt that they 'belonged' at their school than did so internationally (88%) (Clerkin & Creaven, 2013).

In PIRLS 2011, 37% of Irish pupils liked reading (compared to an international PIRLS average of 28%), 14% did not like reading (compared to 15% internationally), with the remainder somewhat liking reading (Clerkin & Creaven, 2013). In Ireland, the mean score for pupils who liked reading was 65 scale points (over three-fifths of a standard deviation) higher than the mean for pupils who did not like reading. In TIMSS 2011, however, the mean score of Irish pupils who liked mathematics (41%) was just 18 points (or one-fifth of a standard deviation) higher than the mean for Irish pupils who did not (23%). Gender differences were also found in relation to the liking or otherwise of subjects. Girls were found to be 1.6 times more likely to like reading, while boys were twice as likely to not like it. One in five girls and one in four boys said that they did not like mathematics, higher than the international TIMSS averages of 17% of girls and 16% of boys. More Irish boys reported liking mathematics than liking reading, while more girls said that they liked reading than liked mathematics. This gender pattern was also found among nine-year-olds participating in Growing Up in Ireland (McCoy, Smyth & Banks, 2012).

Out-of-School Activities

Using Growing up in Ireland data, McCoy, Quail and Smyth (2012) explored relationships between children's engagement in activities outside of school and their reading and mathematics achievement, while controlling for a range of family background and socioeconomic variables. They found that children who took part in organised cultural activities (e.g. after-school lessons in music, dance, etc.) and read frequently for enjoyment significantly outperformed on the achievement tests those children who had what the authors termed a more 'traditional childhood' (p.57), focused more on television watching, playing sports, spending time with friends, and involving low levels of ICT use. Additionally, children who made frequent use of ICT for purposes such as social interaction, listening to music, watching films, etc. were found to have an academic advantage over other children. In NA '09, Sixth class pupils classified as high users of technology (based on time spent each

day on the Internet and/or playing computer games) had significantly lower reading and mathematics scores than those pupils categorised as moderate users. These findings suggest that while some ICT use may be positively associated with academic achievement, *excessive* use of technology may have a negative impact on achievement. They also suggest that the use of technology for different purposes (e.g. for social interaction vs. playing computer games) may have different relationships with achievement.

School Factors

School Intake

Previous research has consistently found stronger relationships between elements of school intake (e.g. average school SES) and pupil achievement, than between achievement and other types of school characteristic. In NA '09, the school intake characteristics most strongly related to pupil achievement were the percentage of pupils with at least one parent employed (r = .29 to .35), and the percentage of pupils from one-parent homes (r = -.25 to -.32). The percentage of pupils receiving learning support/resource teaching (LS/RT) in mathematics was also significantly negatively correlated with achievement in both domains and at both levels, while the percentage of pupils receiving LS/RT in English was related to achievement in both domains at Sixth class (but in neither domain at Second). Percentages of pupils who were members of the Traveller community and percentages of pupils whose L1 was not English were significantly negatively correlated with Second and Sixth class achievement in both domains. There were also moderate positive correlations between average school SES and achievement, although average SES was a better predictor of achievement at the Sixth class level than at Second class (Eivers et al, 2010). In PT 2011, average pupil age was positively associated with achievement in both reading and mathematics (Cosgrove & Creaven, 2013).

In NA '09, there were also large differences in achievement based on school DEIS status, with Band 1 schools having the lowest mean scores in each domain and at each grade level (see Chapter 2 of this report, or Shiel et al., 2014 for further information on English reading and mathematics achievement by school DEIS status in NA '14 relative to NA '09). In NA '09, differences in average achievement by school gender composition (all girls, all boys, mixed) were small. Second class pupils in all-boys schools had significantly lower mean reading scores than pupils in mixed-gender schools. There were no significant differences by school gender composition in mathematics at Second class, or in either domain at Sixth class (Eivers et al., 2010)

Language of Instruction

As in most previous studies in the National Assessments series, the number of Irish-medium schools (Gaeltacht schools and Irish-medium schools outside of the Gaeltacht) included in NA '14 was small (these schools having been sampled in proportion to their representation

in the population). Typically, separate achievement results for Irish-medium schools have not been reported in previous National Assessments[6], and are also not reported separately here. Interested readers are referred to National Assessments of English Reading and Mathematics in Irish-Medium Schools (NAIMS 2010) which were conducted in representative samples of scoileanna lán-Ghaeilge (SLG; Irish-medium schools outside of the Gaeltacht) and Gaeltacht schools, and represent the most recent available information on achievement in Irish-medium schools. NAIMS compared the performance of sampled pupils to achievement of pupils in NA '09. To summarise the findings, Second class and Sixth class pupils in SLG had significantly higher scores in English reading and maths than Second and Sixth class pupils who participated in NA '09. Second class pupils in Gaeltacht schools did not differ significantly from pupils in general in NA '09 in either English reading or mathematics, but Sixth class pupils in Gaeltacht schools achievement significantly higher mean scores in both (Gilleece, Shiel, Clerkin & Millar, 2012).

School Climate

Because many school characteristics found to be significantly related to pupil achievement have also been found to be highly correlated with SES, isolating the effects of schools can be difficult. However, given that the SES profile of pupils is not amenable to change, the identification of additional, and manipulable, school attributes which influence achievement is an important task. Relatively few school characteristics have been found to be significantly associated with pupil achievement when socioeconomic status is held constant. Among those that have been consistently identified as related to achievement regardless of school SES include the academic emphasis of the school (Hoy, 2012). The academic emphasis of a school may be defined as the degree to which a school is driven for high academic achievement. A school with strong academic emphasis is one which has a serious learning environment, in which high academic achievers are respected by other students and staff, and in which teachers believe that all students have the ability to succeed and achieve (Hoy, 2012). In PT 2011, school emphasis on academic success in Ireland was associated with higher pupil achievement in reading, but no such effect was observed for mathematics (Cosgrove & Creaven, 2013).

Another school climate factor found to be related to pupil achievement is high pupil attendance rates. In NA '09, for example, the average annual school attendance rate was positively correlated with pupil achievement (Eivers et al., 2010). Also, a positive disciplinary climate has been identified as associated with pupil achievement, even when the socioeconomic status of the school is factored in (e.g. Cosgrove et al., 2005).

[6] An exception to this was the 1988 National Assessment of English Reading, which involved a sample of pupils in Fifth class in English-medium schools and all pupils in Fifth class in SLG. Pupils in SLG had significantly higher mean scores than their English-medium counterparts (a difference of almost one half of a standard deviation)

Structural Characteristics

In NA '09, school enrolment size was not significantly related to achievement in reading or mathematics (Eivers et al., 2010). In PT 2011, school size was associated with mathematics achievement but not reading achievement; Fourth class pupils in smaller schools outperformed those in larger schools on the mathematics test (Cosgrove & Creaven, 2013). In NA '09, school location (city, urban, or rural) was not associated with achievement in either domain (Eivers et al., 2010).

Between-School Variance

Between-school variance is the proportion of total variation in achievement that lies between schools. The higher the proportion, the greater the differences in average achievement between schools. In NA '09, 15-16% of the variation in reading achievement and 22-23% of the variation in mathematics achievement was attributable to differences in schools (as cited in Gilleece et al., 2012). Typically, studies have found between-school variance to be low in Ireland, compared to other countries (e.g. Cosgrove & Creaven, 2013; Perkins, Shiel, Merriman, Cosgrove & Moran, 2013), and have found lower between-school variance in reading achievement than in mathematics achievement. In PT 2011 and in NA '09, for example, between-school variance was considerably lower for reading than for mathematics (Eivers et al., 2010; Cosgrove & Creaven, 2013). Low between-school variance, however, does not automatically imply that schools are unimportant. If all schools are producing relatively similar levels of achievement, it is possible that the effects of schooling are compensating for inequalities in pupils backgrounds which might otherwise impact on variation in achievement (Sørenson & Morgan, 2000).

Classroom and Teacher Factors

This section reviews international and Irish literature on classroom characteristics, teacher characteristics, and teacher practices and, where available, their respective relationships with pupil achievement.

Teacher Characteristics

Gender

In Ireland, as in many countries worldwide, a large majority of teachers are female. The 2011 Census of Ireland found that 85% of primary teachers were women (Central Statistics Office, 2012). In NA '09, there was found an interaction between teacher gender and grade level, with 92% of Second class pupils taught by a female teacher, compared to 69% of Sixth class pupils (Eivers et al., 2010). This interaction was most evident in all-boys schools, where 44% of Sixth class pupils were taught by male teachers, while only 14% of Second class pupils were taught by a male teacher. In PT 2011, 71% of Fourth class pupils in the Irish sample were taught by female teachers, compared to an average of over 80% across all PT

2011 countries (Clerkin, 2013). Despite females comprising the vast majority of teachers, this is not reflected in school principal posts, where in NA '09, for example, 48% of principals were male and 52% were female (Eivers et al., 2010).

While some concern has been expressed about the gender imbalance in the teaching profession, the evidence suggests little or no association between teacher gender and pupil achievement (e.g. Driessen, 2007; Drudy, 2008). Similarly, recent studies on the effect of same-gender teacher assignment have found no relationships between having a gender-matched teacher and achievement (e.g. Cho, 2012; Winters, Haight, Swaim & Pickering, 2013).

Teaching Experience

Findings from international studies, such as those from PT 2011, suggest that Ireland has a more youthful and more recently qualified teacher profile than is found in most other countries. In PT 2011, the mean length of time teaching was just over 12 years for Irish teachers and 17 years across all participating countries. The median teaching experience was eight years, the lowest of all PT 2011 countries (along with England, New Zealand, Singapore and the United Arab Emirates) (Clerkin, 2013). In NA '09, the mean length of teaching experience was 11 years for Second class teachers and 16 years for Sixth class teachers. The median for Second class teachers was six years and the median for Sixth class teachers was 13 years (mode: 2^{nd}- 2 years; 6^{th}- 5 years) (Eivers et al., 2010). In PT 2011, Ireland and the Netherlands had the highest percentage of pupils (11%) of pupils taught by teachers under the age of 25, compared to an international average of 3% (Clerkin, 2013). Data from the GUI study showed that two in five nine-year-olds were taught by a teacher aged 29 or under (Williams et al., 2009).

In reviewing the literature on teacher experience and pupil achievement, Rice (2010) noted that the existing body of research demonstrates that "experience matters, but more is not always better. The impact is strongest during the first few years of teaching; after that, marginal returns diminish" (p.1). Studies have shown, for example, that teachers with more than 20 years' experience are more effective than teachers who have no experience, but that they are not considerably more effective than teachers who have five years' experience (Rice, 2010). There is also evidence to suggest that, after a certain point, teacher effectiveness may actually decline.

Qualifications

In PT 2011, almost all fourth class pupils (97%) were taught by a teacher who had at least an undergraduate degree, while 18% of pupils were taught by teachers who had also completed a postgraduate degree. The small proportion of teachers who had not been educated to degree level had teaching experience of between 37 and 41 years' experience and presumably held diplomas from before the requirement for teachers in the Irish education system to hold degrees (Clerkin, 2013). Participating teachers who held postgraduate degrees

were not asked to specify whether these related to teaching/education. Seventy-nine percent of pupils were taught by teachers with undergraduate degrees and approximately one-quarter were taught by teachers who also had a postgraduate degree as well (Clerkin, 2013). In NA '09, over a third of Second class pupils (35%) and 42% of Sixth class pupils were taught by a teacher who reported having an additional qualification relating to their work as a teacher (e.g. a certificate/diploma, a master's degree, a doctoral degree) (Eivers et al, 2010).

Teacher Knowledge & Beliefs

Teacher content knowledge has been found to be related to pupil achievement in a number of previous studies. Hill, Rowan and Loewenberg Ball (2005), for example, found that teachers' mathematical knowledge for teaching was significantly related to pupil achievement gains in mathematics, even when key pupil and teacher covariates were controlled for. Mullens, Murnane and Willlet (1996) found that pupils learned advanced mathematical concepts more quickly if their teachers had achieved highly in mathematics during their own education. Metzler and Woessmann (2012) found a significant effect of teacher subject knowledge on both pupil mathematics and reading achievement. In the Irish context, Delaney (2010) found large variation in mathematical knowledge for teaching among primary teachers. Specific areas of difficulty for Irish primary teachers included: applying properties of shapes, numbers and operations; attending to pupil explanations and assessing pupil understandings; and linking fraction calculations to word problems. Among the strengths of teachers in Ireland were the identification and classification of pupil errors, and responding to algebra items (Delaney, 2010).

Teacher pedagogical beliefs have also been found to be associated with achievement. Research on this area has tended to focus on the distinction between teachers' orientation towards constructivist beliefs (where pupils are seen as active participants rather than passive recipients in the process of acquiring knowledge) or direct transmission/ behaviourist beliefs (traditional, teacher-centred approach to teaching and learning). Staub and Stern (2002), for example, found that teacher beliefs reflecting a constructivist orientation rather than a direct transmission view of teaching and learning were associated with larger pupil achievement gains in mathematical word problems.

While it is important to acknowledge that teacher knowledge is likely to be related to pupil achievement, it was beyond the scope of the current study to reliably assess teacher knowledge. Teacher beliefs about the teaching of mathematics were assessed in the questionnaire for Sixth class teachers.

Teacher Practices

Continuing Professional Development

The introduction to the Curriculum emphasises that the role of the teacher must involve continuing professional reflection and development if teachers are to keep abreast of developments in educational theory and practice and if they are to, as they should, adopt innovative approaches to teaching (DES/NCCA, 1999a). A stated objective in the National Strategy is to improve the professional skills of teachers as they relate to literacy and numeracy teaching and learning. More specifically, the Strategy includes a commitment to provide access to "approved, high-quality professional development courses of at least twenty hours' duration in literacy, numeracy and assessment (as discrete or integrated themes, provided incrementally or in block) every five years for primary teachers" (p.36)

In NA '09, approximately half of pupils were taught by teachers who had not participated in any mathematics CPD in the previous three years. Similarly, roughly half of Second class pupils and 39% of Sixth class pupils had teachers who had not engaged in CPD in English in that period (Eivers et al., 2010). In PT 2011, 11% of Fourth class pupils were taught by a teacher who had participated in 16 hours or more of reading-related CPD in the two years prior to PT 2011, compared to an international PIRLS average of 24%. Rather than being asked the amount of time spent on CPD in mathematics, teachers of pupils in TIMSS were asked to indicate whether or not they had participated in a range of specific areas of CPD (e.g. mathematics assessment, integrating ICT into mathematics, etc.). Compared to the international TIMSS average, Irish pupils were less likely to have been taught by a teacher who had engaged in any of the specified CPD activities in the two years leading up to PT2011 (Clerkin, 2013).

Time Allocated to Different Subjects

As noted in Chapter 1, taking effect from January 2012, Circular 0056/2011 increased the time allocated to teaching literacy and numeracy in primary classrooms from those originally indicated in the 1999 Primary School Curriculum (see Table 3.1). In NA '09, Eivers et al. (2010) reported that the average time allocated to English per week was 4 hours and 25 minutes at Second class, and 4 hours 35 minutes at Sixth. For mathematics, the average weekly time allocation was 3 hours 45 minutes at Second class and 4 hours 18 minutes at Sixth. As Eivers et al. (2010) reported, in most schools, time allocations for both English and maths were considerably higher than the guidelines specified in the Curriculum, with larger gaps at Sixth class. Also, although curricular guidelines suggested allocating considerably more time to English than to maths, in practice, similar time was allocated to each.

Table 3.1: Suggested minimum weekly time framework for First Class to Sixth Class, Primary School Curriculum (DES/NCCA, 1999a)

Curriculum Area	Time per week
L1	4 hours
L2	3 hours 30 mins
Mathematics	3 hours
SESE	3 hours
SPHE	30 mins
PE	1 hour
Arts education	3 hours
Discretionary curriculum time	2 hours
Religious education	2 hours 30 mins

Similarly, McCoy, Smyth and Banks (2012) reported on GUI data collected in schools before the Circular was issued, and found that teachers of nine-year-olds allocated, on average, 4.3 hours per week to English and 3.7 hours to mathematics. However, McCoy, Smyth and Banks (2012) also highlighted variation across classrooms, noting that while the most common pattern for English was that four hours per week was spent on it, five or more hours per week were allocated to English in 40% of classrooms. Similarly, 40% of classrooms were found to have a time allocation of three hours or less per week for mathematics, while approximately 25% of classrooms were found to spend at least four hours on maths per week (McCoy, Smyth & Banks, 2012).The authors suggest that teachers may adjust the time they allocate to particular subjects based on the perceived needs of their pupils. For example, they found DEIS status to be significantly related to time allocated to particular subjects, with nine-year-olds in Band 1 schools spending significantly more time on English than pupils in non-DEIS schools. Time spent on mathematics was not found to differ significantly by disadvantaged status.

Some debate exists about the relationships between instructional time and pupil achievement. Data from PT 2011, for example, showed that there was no significant association between teacher-reported time allocated to each subject (English, maths and science) and achievement in that subject (Cosgrove & Creaven, 2013).

Teaching and Organisation Methods

Teachers may employ any of an array of teaching methods and approaches to classroom organisation, ranging from more teacher-centred, whole-class teaching methods, to more constructivist, child-centred methods.

Indeed, the introduction to the Primary School Curriculum (DES/NCCA, 1999a) states that:

> Different forms of classroom organisation will complement the variety of learning the curriculum has to offer. Working collaboratively in groups, working individually, and whole-class teaching and learning will all be appropriate in particular learning contexts and in accomplishing different learning goals. (p.21)

In NA '09, 89% of Second class pupils and 83% of Sixth class pupils were taught in classes where most mathematics lessons involved whole-class teaching, with corresponding figures of 83% (Second class) and 80% (Sixth class) for English lessons. Teachers at both grade levels were far less likely to make frequent use of small group or team teaching approaches in either subject (Eivers et al., 2010).

McCoy, Smyth and Banks (2012) found that more active approaches to teaching (e.g. group work, hands-on activities) were more likely to be undertaken by recently qualified teachers than more experienced teachers. More active, child-centred approaches were found to be taken in all-girls schools, in fee-paying schools, and in scoileanna lán-Ghaeilge, while teacher-centred approaches were more prevalent in rural and Band 1 DEIS schools. Lesson organisation was also found to be related to class size, with more active, constructivist approaches taken in smaller classes, and more traditional methods more likely to be adopted by teachers of larger classes (McCoy, Smyth & Banks, 2012).

International literature on the relationships between different teaching methods and pupil achievement indicates that different approaches vary in effectiveness across contexts (e.g. varying with pupil age/grade level, social composition of the classroom, class size, etc.) (McCoy, Smyth & Banks, 2012).

Use of ICT

The introduction to the Primary School Curriculum, in explicating the role of the teacher, states that teachers should "[utilise] the learning potential of information and communication technologies" (DES/NCCA, 1999a, p.21).

In PT 2011, 98% of Fourth class pupils in Ireland were taught by teachers who reported using a computer in their classroom instruction, a considerably higher proportion than the PIRLS and TIMSS international averages (74% in both studies) (Clerkin, 2013). Also, the proportions of Irish pupils taught in classes where a computer was available for pupils to use in mathematics (55%), science (62%) and reading (56%) were greater than the international averages (42% for mathematics, 47% for science, and 45% for reading). Nonetheless, the percentage of Irish teachers who felt that they had received sufficient support to integrate the use of computers into their teaching practice (72%) was lower than the international averages, and can be compared with the finding that at least 90% of pupils in Northern Ireland and England taught by teachers who felt they had adequate support to do so (Clerkin, 2013).

In NA '09, approximately one-quarter of Second class pupils used computers regularly (most lessons, or once/twice a week) in both English and mathematics lessons; at Sixth class, 23% used computers this frequently in English lessons, but just 14% did so in mathematics lessons (Eivers et al., 2010).

Classroom Characteristics

Class Size

Evidence on the relationship between class size and pupil achievement has been mixed. Given that smaller class sizes may result from policies capping class sizes, for such purposes as allocating resources to children with special educational needs, or to pupils from disadvantaged backgrounds, for example, the findings on class size and achievement can be ambiguous. Indeed, in previous National Assessments, class size has been found to be negatively (albeit weakly) correlated with achievement, meaning that pupils in larger classes have performed better (e.g. Eivers et al., 2005). As Eivers et al. (2010) point out, this is due to the allocation of smaller class sizes in disadvantaged schools and the effect disappears once this is controlled for. In PT 2011, although school size was associated with achievement in maths and science, class size was not found to be related to achievement in any domain when school disadvantaged status was held constant (Cosgrove & Creaven, 2013). Nonetheless, it is clear that class size can shape the environment in the classroom and the teaching approaches selected by the teacher (McCoy, Smyth & Banks, 2012).

In NA '09, at each grade level, pupils were taught in classes with an average of 25 pupils. In PT 2011, the average size of Fourth grade classes in Ireland was 26 pupils, which is slightly higher than the international average class sizes for PIRLS (24 pupils) and TIMSS (25 pupils). However, the Irish average class size was much smaller than in some of the countries with the highest mean achievement scores, such as Korea (*M* = 30 pupils), Hong Kong (*M* = 33 pupils) and Korea (*M* = 30 pupils).

Single-grade vs. Multi-grade Settings

In NA '09, approximately one-third of pupils at each grade level were taught in multi-grade settings. Second class pupils in a multi-grade classroom had significantly higher mean reading scores than their single-grade counterparts, while in mathematics, a nine-point difference in favour of multi-grade pupils was not statistically significant. At Sixth class, there were just one-point differences in the mean reading and mathematics scores of pupils in single-grade and multi-grade classrooms. Quail and Smyth (2014) reported that 35% of nine-year-olds in the Growing Up in Ireland study were taught in multi-grade settings, and found that, overall, there were no significant differences between the reading and mathematics achievement of pupils taught in single- and multi-grade settings (analyses controlled for social background, class size, teacher experience, and school social and gender composition). However, Quail and Smyth (2014) found that while there were few differences in the academic (and social) outcomes of boys in single-grade versus multi-grade settings, girls in multi-grade settings had significantly

lower reading and mathematics scores than their counterparts in single-grade settings; they were also more negative about their academic abilities.

Summary

This chapter has provided an overview of the home, pupil, school, and class-level factors found to be associated with pupil achievement in previous studies. The chapter drew primarily on findings from previous national assessments, PIRLS 2011, TIMSS 2011 and Growing Up in Ireland, findings which informed in part the development of NA '14 questionnaires. The ensuing chapters will examine the relationships between contextual factors and pupil achievement in NA '14. It should be noted that Chapters 4 to 7 present the results of bivariate analyses. Such analyses relate one variable to another and do not account for the influence that a third variable (e.g. SES) may play in this relationship. Chapter 8 presents a multilevel model of reading achievement at Second class, which allows for the identification of contextual factors associated with achievement when the effects of other variables are held constant.

Chapter 4: School Factors

This chapter examines some school-related factors that are relevant for the development of reading and mathematics. It is based on responses provided by school principals to the School Questionnaire administered as part of NA '14. It is divided into five sections. In the first, demographic data on schools and principal teachers are provided. In the second, school resources, library posts, and programmes for parents are described. In the third, the provision of additional support to pupils with difficulties in reading and mathematics is considered. The fourth section looks at assessment, evaluation, and planning at school level. The final section examines comments provided by school principals in response to an open-ended question on English reading and mathematics in their schools.

This chapter contains a number of summary tables, which typically report percentages of pupils and mean scores for English reading (Second) and mathematics (Sixth). More detailed supporting tables can be found in the companion e-Appendix (see www.erc.ie/na2014).

Background on Schools and on Principal Teachers

In the Performance Report on NA '14, performance in reading and mathematics was compared across schools in the School Support Programme (SSP) under DEIS, and schools outside the programme. Here, performance is examined with respect to some additional categories of schools, including those relating to school location, language of instruction of the school, and language spoken by pupils at home.

Schools

Table 4.1 shows the percentages of pupils in Second and Sixth classes attending school in various locations. Twenty-seven percent of pupils in Second class attended schools located in cities, while 37% attended schools in villages or rural areas. Thirty-one percent of pupils in Sixth class attended schools in cities, while 32% attended schools in villages or rural areas.

The mean reading achievement scores of pupils attending school in cities did not differ significantly from the mean scores of pupils attending school in other locations (Table 4.1). A similar outcome was found for mathematics, even though, at Sixth class, there was an 11-point difference in favour of pupils attending schools in villages, compared with those in cities (see e-Appendix Tables A4.1 and A4.2 for more detail).

When schools were categorised by size (large was defined as greater than 261 pupils enrolled, medium as between 101 and 260, and small as 100 or fewer), between 11% and 13% of pupils were found to be enrolled in small schools (depending on class level), and between 43% and 45% in large schools (Table 4.2). No significant achievement differences in reading achievement were observed when average performance in large schools was compared to average performance in medium and small schools, though, in the case of

mathematics in Sixth class, pupils in small schools had a higher mean score (270 points), compared with those in medium (260) and large (261) schools (also see e-Appendix Tables A4.3 and A4.4).

Table 4.1: School location and mean reading and mathematics scores, by grade level

	Second			Sixth		
	%	Reading	Maths	%	Reading	Maths
City*	27.1	265.4	263.9	30.5	264.0	258.8
Large town	14.2	256.0	262.7	15.2	254.5	250.9
Small town	22.2	262.4	264.8	22.5	260.5	260.9
Village or rural	36.5	267.0	263.0	31.8	267.9	270.2

*City: city or suburbs of Dublin, Cork, Galway or Waterford; Large town: Other large town or city, with population greater than 10,000; Small town: town with population between 1500 and 10,000; Village or rural: A village or rural community with population less than 1,500. Scores in **bold** are significantly different from the mean for the reference (*) group.

Table 4.2: School size and mean reading and mathematics scores, by grade level

	Second			Sixth		
	%	Reading	Maths	%	Reading	Maths
Large*	42.8	263.8	260.8	44.5	274.3	261.0
Medium	44.1	264.2	261.3	44.4	261.4	260.2
Small	13.1	263.7	266.8	11.1	261.7	**270.4**

Small = 1-100, Medium = 101-260; Large >261.
Scores in **bold** are significantly different from the mean for the reference (*) group.

Schools were also categorised by gender composition, with schools in which only girls are enrolled in Second to Sixth classes described as girls' schools, schools in which boys only are enrolled in Second to Sixth classes as boys' schools, and all other schools as mixed. Hence, between 10% and 12% of pupils were enrolled in girls' schools, and between 7% and 10% in boys' schools (Table 4.3). Although average performance in Second class tended to be higher in girls' and mixed schools than in boys' schools, no significant differences in English reading or mathematics were found at either class level (e-Appendix Tables A4.5 and A4.6).

Table 4.3: School gender composition and mean reading and mathematics scores, by grade level

	Second			Sixth		
	%	Reading	Maths	%	Reading	Maths
Mixed*	82.4	264.1	263.8	77.9	265.0	263.4
Girls	10.4	267.2	261.6	12.4	261.7	261.4
Boys	7.2	257.3	264.7	9.7	248.5	248.6

*Girls: All girls, Second to Sixth Classes; Boys: All boys, Second to Sixth classes. Scores in **bold** are significantly different from the mean for the reference (*) group.

Overall attendance was 94% at both Second and Sixth class levels for the first quarter of 2014 (Table 4.4; e-Appendix Table A4.7). Although attendance rates were marginally lower in DEIS Band 1 schools, differences in attendance rates across school types were not statistically significant (e-Appendix Tables A4.8 and A4.9).

Table 4.4: Average school percentage attendance rate (First Quarter, 2014), by DEIS status and grade level

	Second	Sixth
Urban Band 1	91.3	92.1
Urban Band 2	93.2	93.1
Urban, non-DEIS	93.8	93.9
Rural DEIS	94.1	93.5
Rural, non-DEIS	94.6	94.5
Total	93.8	93.9

In NA '09, attendance rates at both Second and Sixth classes were also 94% (Eivers et al., 2010).

Approximately 11% of pupils in NA '14 attended schools in which Gaeilge was the medium of instruction (i.e., SLG or Gaeltacht schools) (Table 4.5). Although mean English reading scores at Second and Sixth classes were higher in Irish-medium schools than in English-medium schools, differences were not statistically significant (e-Appendix Tables A4.10 and A4.11). Differences in mathematics were small, and not significant at either grade level.

It was not possible to complete a detailed comparison of performance between Gaeltacht schools, SLG and Ordinary schools, as numbers of pupils and schools in the Gaeltacht and SLG sectors in NA '14 were too small to make comparisons meaningful, or to benchmark performance against the scores achieved in NAIMS 2010.

Table 4.5: Main language of the school and mean reading and mathematics scores, by grade level

	Second			Sixth		
	%	Reading	Maths	%	Reading	Maths
English*	89.1	263.2	263.3	91.8	262.4	261.8
Gaeilge	10.9	270.0	266.4	8.2	269.5	261.3

Scores in **bold** are significantly different from the mean for the reference (*) group.

Principal teachers indicated that, on average across schools, 9.5% of pupils in Second class, and 10.0% in Sixth had a first language other than English or Gaeilge (e-Appendix Table A4.12). At Second class, 21% of pupils were in schools where no pupils had a first language other than English or Gaeilge (Table 4.6, e-Appendix Table A4.13), while 27% were in schools in which more than 10% had a different first language. At Sixth class, 16% were in schools in which no pupils had a first language other than English or Gaeilge, while 27% were in schools in which more than 10% had a different first language. In general, differences in average reading and mathematics performance between pupils in schools in which no pupils had a first language other than English or Irish, and pupils in schools with varying proportions with other first languages were not statistically significant. However, in Sixth class, the mean score in reading of pupils in schools with 10% or more pupils who speak a first language other than English/Gaeilge (252) was significantly lower than the mean score of pupils in schools with no speakers of first languages other than English or Gaeilge (269) (see e-Appendix Table A4.14).

Table 4.6: Categories of pupils whose first language is a language other than English or Gaeilge and mean achievement scores, by grade level

	Second			Sixth		
	%	Reading	Maths	%	Reading	Maths
0%*	20.6	263.0	260.5	16.2	269.2	272.1
GT 0% and LEQ 5%	38.7	270.9	269.1	42.2	267.5	265.9
GT 5% and LEQ 10%	13.5	270.2	270.7	14.2	264.2	253.1
GT 10%	27.2	252.5	254.7	27.4	**252.1**	253.2

GT = Greater than; LEQ = Less than or equal to; Scores in **bold** are significantly different from the mean for the reference (*) group.

Sixty-five percent of pupils in Second class and 58% in Sixth were in schools in which none of the pupils had identified themselves as members of the Traveller community (Table 4.7; e-Appendix Tables A4.16 and A4.17). On the other hand, 9% of pupils in Second, and 13% in Sixth were in schools in which more than 5% of pupils had identified themselves in this way. At Second class, pupils in schools with no Traveller pupils had significantly higher mean scores on English reading and mathematics than pupils in schools with in which more than 5% of pupils were members of the Traveller community. In Sixth class, pupils in schools with no pupils in the Traveller community had significantly higher mean scores in both English reading and mathematics than pupils in schools in which up to 5% of pupils are members of the Traveller community, as well as in schools where more than 5% were members. Band 1 DEIS schools have greater proportions of pupils who have identified themselves as members of the Traveller community than other school types (e-Appendix Tables A4.18, A4.19). These findings reflect the challenges faced by schools in addressing the needs of pupils from different backgrounds, and highlight the need for resources to be allocated in order for them to do so.

Table 4.7: Percentages of pupils who had identified themselves as members of the Traveller community and mean achievement scores, by grade level

	Second			Sixth		
	%	Reading	Maths	%	Reading	Maths
0% *	65.0	267.7	266.7	58.2	268.9	268.4
GT 0% and LEQ 5%	26.4	259.2	259.9	28.8	**258.6**	**256.9**
GT 5%	8.7	**249.3**	**251.4**	13.0	**243.4**	**241.6**

GT = Greater than; LEQ = Less than or equal to; Scores in **bold** are significantly different from the mean for the reference (*) group.

Principal Teachers

Twenty-eight percent of pupils in the Second and Sixth classes in NA '14 attended schools in which the principal teacher taught classes in addition to performing administrative and leadership duties (Table 4.8). There were no achievement differences in English reading or mathematics in Second class, or in mathematics at Sixth class, between pupils in schools with teaching and administrative principals. However, pupils in Sixth class who attended schools with teaching principals had a significantly higher mean reading score than pupils who attended schools with administrative principals (e-Appendix Tables A4.20 and A4.21). However, this may arise from other characteristics of the school (e.g. DEIS status), rather than whether or not the principal has full-time teaching duties.

Table 4.8: Principal status (teaching or administrative) and mean reading and mathematics scores, by grade level

	Second			Sixth		
	%	Reading	Maths	%	Reading	Maths
Teaching*	28.2	264.8	263.5	28.2	270.3	263.5
Administrative	71.8	263.6	263.7	71.8	**260.6**	263.7

Scores in **bold** are significantly different from the mean for the reference (*) group.

Thirty-one percent of pupils in Second class and 34% in Sixth were in schools where the principal had 1-5 years' experience as a principal, while 24% at both class levels were in schools with principals with 16 years of experience or more (Table 4.9). There were no significant differences in average scores on English reading or mathematics in Second or Sixth classes when the performance of pupils attending schools with principal teachers of differing levels of experience was compared, although pupils taught by more experienced principals tended to have higher mean scores (e-Appendix Tables A4.22, A4.23).

Table 4.9: Principals' years' experience as principal and mean reading and mathematics scores, by grade level

	Second			Sixth		
	%	Reading	Maths	%	Reading	Maths
1-5 years	30.6	263.1	264.3	33.8	259.8	257.7
6-10 years	24.1	260.9	261.9	23.9	259.8	257.5
11-15 years	22.7	264.9	264.2	19.8	266.9	265.2
16 years or higher	22.7	265.9	263.4	22.6	265.6	267.5

Scores in **bold** are significantly different from the mean for the reference (*) group.

School Resources, Library Posts and Parental Programmes

This section looks at resources for teaching reading and mathematics in schools, including the availability of school and classroom libraries, library books, computer rooms, and computing devices. Library posts and programmes for parents are also considered.

Libraries and Books

Just under half of pupils (47% in Second class, 48% in Sixth) were in schools in which a room was used partly or exclusively as a school library (Table 4.10; e-Appendix Table A4.24). Availability of a school library was greater in large schools than in medium-sized and small schools (e-Appendix Tables A4.25 and A4.26). Almost all pupils were in schools in which there was a classroom library in at least some classrooms, with 88% of pupils in Second class in a school in which there was a classroom library in every classroom. Almost three in ten pupils in Second and Sixth classes were in schools with a dedicated computer room (Table 4.10), and this was also related to school size, with, for example, 35% of pupils in Second

class in large schools and 7% in small schools having access to a dedicated computer room (e-Appendix Tables A4.25 and A4.26).

Table 4.10: Percentages of pupils in schools with varying configurations of library facilities and a dedicated computer room, by grade level

	Second	Sixth
Room used as school library, exclusive or not	46.8	48.4
Room used *exclusively* as a central library	27.5	29.9
Room used as school library & other uses	22.5	21.4
Classroom library in some classrooms	11.2	13.3
Classroom library in every classroom	87.5	83.0
A dedicated computer room	27.3	29.2

The average number of print books across all libraries in schools attended by pupils in Second class was 3058 (Table 4.11). Of these, just 1% were in a language other than English or Irish. Sixty-two percent of pupils were in schools with no books in languages other than English or Irish. On average, 247 books had been added to libraries in schools with pupils in Second class between September 2013 and April 2014 (when the NA '14 School Questionnaire was administered). This represented about 10% of all library books. The ratio of print books to pupils was 12.4:1 in Second class and 14.7: 1 in Sixth. Pupils in Second class across all schools had access to an average of 16 e-book titles. However, 79% of pupils in Second class had no access to e-books at school (Table 4.11; e-Appendix Table A4.27).

Table 4.11: Mean numbers/percentages of library books of different types in schools, by grade level

	Second	Sixth
Print books contained in all libraries in school (Number)	3057.8	3199.7
Print books in a language other than English/Irish (Number)	22.1	22.6
Print books in a language other than English/Irish (% of all books)	1.0	1.0
New print titles added to school's libraries since September 2013 (Number)	246.6	228.7
New print titles added to school's libraries since September 2013 (% of all books)	10.4	10.0
E-books that pupils currently have access to (Number)	16.7	15.3
Pupils in schools with no e-books (%)	79.1	79.8
Pupils in schools with no print library books in languages other than English/Irish (%)	62.3	62.4
Average ratio of print library books to pupils	12.4	14.7

There was some variation across schools with regard to access to books. For example, in DEIS Band 1 schools with pupils in Second class, the ratio of books to pupils was 15.3: 1, while in DEIS Band 2 schools it was 17.7:1, and in non-DEIS urban schools, it was 11.6:1 (e-Appendix Table A4.32). On the other hand, there was an average of 30.1 books in languages other than English or Gaeilge in non-DEIS urban schools, compared with 11 in urban DEIS Band 1 schools, and 8 in urban DEIS Band 2 schools. (See e-Appendix Table A4.33 for data on Sixth class).

Computing Devices

On average across schools with pupils in Second class, there were 30 computing devices available for use by pupils at all class levels in English and mathematics classes (Table 4.12; e-Appendix Table A4.34). The average ratio of pupils to computing devices was 14:1 in schools with pupils in Second class, and 15:1 in school with pupils in Sixth. Across schools, almost three-quarters of computing devices available for pupil use were located in classrooms and resource rooms.

Table 4.12: Mean numbers of computing devices available for use by pupils in English and mathematics in schools, and average ratio of pupils to devices, by grade level

	Second	Sixth
Devices in a central computer room	6.9	8.0
Devices in classroom/resource rooms	23.3	23.5
Total number of devices	30.2	31.4
Average ratio of pupils to devices	13.9	14.7

Although, on average, larger schools had more computing devices available to pupils, ratios of pupils to computers were better in small schools with pupils in Second class (7:1) than in medium-sized (15:1) and large (15:1) schools (e-Appendix Table A4.35), and a similar pattern was observed for schools with pupils in Sixth class (e-Appendix Table A4.36). Average ratios of pupils to computers were lower (more favourable) for urban DEIS Band 1 and Band 2 schools with pupils in Second class (8:1 in both school types) than in urban non-DEIS schools (15:1) and rural non-DEIS schools (16:1) (e-Appendix Table A4.37). Similar findings were observed for schools with pupils in Sixth class (e-Appendix Table A4.38).

Schools with pupils in Second class had an average of 12 interactive whiteboards, while schools with pupils in Sixth had 13 (Table 4.13; e-Appendix Table A4.39). The ratio of pupils to interactive whiteboards was 26:1 in schools with pupils in Second, and 27:1 in schools with pupils in Sixth (Table 4.13). Although the average numbers of interactive whiteboards varied by school size (e-Appendix Tables A.40, A.41), ratios were broadly similar across DEIS categories (e-Appendix Tables A4.42, A4.43). For example, in urban DEIS Band 1 schools with pupils in Second class, the ratio was 27:1; in urban DEIS Band 2 schools it was 28:1, in urban non-DEIS schools it was also 28:1. There was a more favourable ratio in rural non-DEIS

schools (23:1), though it should be noted that there were just a few such schools in the sample.

Table 4.13: Mean numbers of interactive whiteboards available for teaching English and mathematics in schools, and average ratio of pupils to whiteboards, by grade level

	Second	Sixth
Interactive whiteboards in a central room (number)	0.1	0.2
Interactive whiteboards in classroom/resource rooms (number)	12.0	12.5
Total number of interactive whiteboards	12.1	12.7
Ratio of pupils to interactive whiteboards	26.3	26.8

Library Posts

Forty percent of pupils in Second class and 39% in Sixth were in schools in which a teacher held a post of responsibility that included library duties. At the Second class level, pupils in schools with a teacher who held such a post had a slightly lower mean reading score than those in schools without, although the difference was not significant (Table 4.14, e-Appendix Table A4.44). At Sixth class, pupils in schools with a teacher whose post included library duties had a significantly lower mean reading score than pupils in schools without. Pupils in large schools, and those in DEIS Band 1 schools were more likely than pupils in other school types to attend schools in which a post-holder had library duties (e-Appendix Tables A4.45-A4.47).

Table 4.14: Percentages of pupils in schools in which there is a teacher whose post of responsibility includes library duties and mean English reading scores, by grade level

	Second		Sixth	
	%	Reading	%	Reading
Yes*	40.3	261.5	39.0	259.2
No	59.7	266.0	61.0	**265.8**

Scores in **bold** are significantly different from the mean for the reference (*) group.

Support for Parents

Forty-one percent of pupils in Second class and 40% in Sixth attended schools in which a parent programme for English reading had been implemented in the 2013-14 school year. There were no significant differences in reading performance in NA '14 between pupils in schools that did and did not implement a programme (Table 4.15; e-Appendix Table A4.48). Programmes for reading were more likely to be implemented in medium and large schools than in small schools, and in DEIS Band 1 and 2 schools and in urban non-DEIS schools than in rural DEIS and non-DEIS schools (e-Appendix Tables A4.54, A4.57).

About thirty percent of pupils in Second and Sixth class were at a school where a parent programme for mathematics had been implemented in the 2013-14 school year. In Sixth class, the average performance of pupils in schools in which a programme had been implemented was significantly lower than in schools in which a programme had not been implemented (Table 4.15; e-Appendix Table A4.49). This finding may indicate that schools with lower average achievement are more likely to try to reach out to parents by offering such programmes. Programmes for mathematics were more likely to be implemented in large and medium schools than in small schools, and in DEIS Band 1 and 2 schools than in urban non-DEIS and rural DEIS and non-DEIS schools (e-Appendix Tables A4.54, A4.57).

Table 4.15: Percentages of pupils in schools where a parent programme for English reading and/or mathematics had/had not been implemented in the 2013-14 school year and mean achievement scores, by grade level

	Reading				Mathematics			
	Second		Sixth		Second		Sixth	
	%	Reading	%	Reading	%	Maths	%	Maths
Yes	40.8	262.9	39.7	259.2	31.3	256.9	31.0	252.6
No	59.2	264.0	60.3	265.2	68.7	266.5	69.0	**265.4**

Scores in **bold** are significantly different from the mean for the reference (*) group.

One-third of pupils in Second and Sixth classes attended schools in which a workshop or information session for English, designed to support parents in helping their children at home, had been offered in the 2013-14 school year, while about one-quarter attended schools in which a workshop or information session for mathematics had been offered (Table 4.16; e-Appendix Tables A5.50, A4.51). At Second class for reading, and at Sixth class for mathematics, average performance was lower in schools which offered a workshop or information session, compared with those that did not. Workshops and information sessions were more were likely to be organised in medium and large schools, and in DEIS Band 1 schools than in other school types (e-Appendix Tables 4.55 and 4.58).

Table 4.16: Percentages of pupils in schools where a workshop/information session for English reading and/or mathematics had/had not been implemented in the 2013-14 school year, and mean achievement scores, by grade level

	Reading				Mathematics			
	Second		Second		Second		Sixth	
	%	Reading	%	Reading	%	Maths	%	Maths
Yes*	33.3	256.0	32.0	256.9	24.3	256.1	26.1	247.4
No	66.7	**267.3**	68.0	265.6	75.7	265.9	73.9	**266.4**

Scores in **bold** are significantly different from the mean for the reference (*) group.

Almost three-quarters of pupils in Second class and two-thirds in Sixth attended schools where resources for supporting children with their English reading at home (such as reading lists or website addresses) had been shared with parents during the 2013-14 school year (Table 4.17; e-Appendix Table A4.52). Similarly, 60% of pupils in Second and 40% in Sixth were in schools in which resources for supporting children with mathematics at home had been shared (Table 4.17; e-Appendix Table A4.53). There were no significant differences in average achievement in either English reading or mathematics between schools in which resources were shared and were not shared. Furthermore, school size was not predictive of whether schools shared resources with parents for English reading or mathematics (e-Appendix Table A4.56). Schools in DEIS Bands 1 and 2, urban non-DEIS schools, and rural non-DEIS schools were similar to one another in terms of whether or not they shared resources, with fewer pupils attending schools where resources for mathematics were shared with parents, compared with English reading (e-Appendix Table A4.59).

Table 4.17: Percentages of pupils in schools where resources for English reading and/or mathematics had/had not been shared with parents in the 2013-14 school year and mean achievement scores, by grade level

	Reading				Mathematics			
	Second		Sixth		Second		Sixth	
	%	Reading	%	Reading	%	Maths	%	Maths
Yes	74.1	263.9	68.0	264.6	60.0	262.5	54.9	261.4
No	25.9	262.5	32.0	258.9	40.0	265.0	45.1	261.5

Scores in **bold** are significantly different from the mean for the reference (*) group.

Perceived Impact of Resource Shortages and other Factors on Teaching and Learning

As part of NA '14, principal teachers indicated the extent to which various factors hindered progress on teaching and learning in their school. Approximately three-fifths of pupils or more were in schools in which the following factors were viewed by principals as likely to hinder teaching and learning 'a lot' or 'to some extent' (e-Appendix Tables A4.60, A4.61):

- Large class sizes (87% of pupils)
- Shortage or inadequacy of teaching software (68%)
- Slow Internet speed (67%)
- Shortage or inadequacy of computers for teaching (66%)
- Shortage or inadequacy of classroom space (61%)

About half of pupils were in schools in which the following were viewed by principals as likely to impact to the same extent on teaching and learning:

- Lack of support for children from their parents (50%)
- Shortage of practical materials for teaching (49%)
- Low oral language proficiency of pupils (52%)

- Pupils coming to school tired (51%)

Factors perceived by principals to have a less negative effect on teaching and learning included:

- Shortage or inadequacy of reading materials (40%)
- Emphasis on use of standardised test results (32%)
- Low levels of motivation of learn among pupils (34%)
- Pupils coming to school hungry (20%)

Provision of Additional Support to Pupils

Data for this section are drawn from two sources: principals' estimates of the proportions of pupils in each school accessing support, and teachers' reports in respect of individual pupils.

Average Numbers of Support Posts

On average across schools, there are 2.4 General Allocation Model/English as an Additional Language (GAM/EAL) support posts (e-Appendix Table A4.62), with more such posts in large schools (3.8) than in medium (1.5) or small (0.9) schools (Table 4.18; e-Appendix Table A4.63). Fewer than 2% of pupils are in schools reporting that they have no officially-sanctioned GAM/EAL support post. Across all schools, there was an average of 0.4 additional, officially-sanctioned language support posts, with most such posts in large schools. When GAM/EAL and language support posts were combined, there was an average of 2.8 posts per school.

There were marginally more GAM/EAL posts in DEIS Band 1, DEIS Band 2 and urban non-DEIS schools than in rural DEIS or rural non-DEIS schools (Table 4.19; e-Appendix Table A4.64). On average, DEIS Band 1 schools had more officially-sanctioned language support posts than other school types. There were no additional language support posts in rural non-DEIS schools.

Table 4.18: Average numbers of GAM/EAL support posts and officially-sanctioned language support posts in schools, and percent of pupils in schools with no additional GAM/EAL posts, by school size (*data from Second class English reading database*)

	All Schools	Small	Medium	Large
Number of officially sanctioned GAM/EAL support posts	2.4	0.9	1.5	3.8
Percentage of pupils in schools with no GAM/EAL posts	1.9	5.5	2.8	0.0
Number of additional, officially-sanctioned language support posts	0.4	0.0	0.1	0.8
Percentage of pupils in schools with no additional, officially-sanctioned language posts	76.1	95.6	84.4	61.8
Average number of GAM/EAL and language support posts	2.8	0.9	1.7	4.6

Small = 1-100, Medium = 101-260; Large >261

Table 4.19: Average numbers of GAM/EAL support posts and officially-sanctioned language support posts in schools, and percent of pupils in schools with no additional GAM/EAL posts, by DEIS status (*data from Second class English reading database*)

	DEIS Band 1	DEIS Band 2	Urban non-DEIS	Rural DEIS	Rural non-DEIS
Number of officially sanctioned GAM/EAL support posts	3.4	2.9	3.1	0.9	1.4
Percentage of pupils in schools with no GAM/EAL posts	0.0	0.0	0.8	14.9	1.9
Number of additional, officially-sanctioned language support posts	1.2	0.6	0.6	0.1	0.0
Percentage of pupils in schools with no additional, officially-sanctioned language posts	52.5	63.8	68.5	75.5	95.1
Total number of GAM/EAL and language support posts	4.7	3.5	3.7	1.0	1.4

Numbers of Pupils Accessing Support

In NA '14, class teachers indicated in respect of each pupil selected to take part in the study whether s/he accessed learning support/resource teaching for English, language support for English, and/or learning support/resource teaching for mathematics. Across all schools, it is estimated that 12.9% of pupils in Second class, and 12.7% in Sixth accessed learning support/resource teaching in English, with more boys (14.1% in Second,

14.9% in Sixth) accessing support than girls (11.6% in Second, 10.7% in Sixth) (Table 4.20; e-Appendix Table A4.65).

It is estimated that 2.3% of pupils in Second class, and 2% in Sixth accessed language support for English, with more girls (2.7%) than boys (1.9%) accessing support at Second, and slightly more boys (2.2%) than girls (1.7%) at Sixth.

When figures for learning support/resource teaching in English were combined with those for language support, it was found that 14.7% of pupils in Second class, and 14.2% in Sixth, accessed support for English, with a small proportion accessing support for both (Table 4.20).

Table 4.20: Percentages of pupils accessing language and learning support/resource teaching for English, by grade level and gender
(*based on teachers' reports in respect of individual pupils*)

	Second	Sixth
Percentage of boys accessing learning support/resource teaching for English	14.1	14.9
Percentage of girls accessing learning support/resource teaching for English	11.6	10.7
Percentage of all pupils accessing learning support/resource teaching for English	12.9	12.7
Percentage of all boys accessing language support for English	1.9	2.2
Percentage of all girls accessing language support for English	2.7	1.7
Percentage of all pupils accessing language support for English	2.3	2.0
Percentage of all boys accessing language support **or** learning support/resource teaching for English	15.4	16.5
Percentage of all girls accessing language support **or** learning support/resource teaching for English	14.1	12.0
Percentage of all pupils accessing language support **or** learning support/resource teaching for English	14.7	14.2

At Second class and Sixth class, 10% of pupils accessed learning support/resource teaching for mathematics. Equivalent percentages of boys and girls accessed support for mathematics at both class levels (Table 4.21; e-Appendix Table A4.66).

When figures of learning/language support for English, and learning support for mathematics were compared, 5.6% of pupils in Second and 6.4% in Sixth were found to be accessing both types of support (Table 4.21).

Table 4.21: Percentages of pupils accessing learning support/resource teaching for mathematics, by grade level (*based on teachers' reports in respect of individual pupils*)

	Second	Sixth
Percentage of all boys accessing learning support/resource teaching for mathematics	9.2	9.4
Percentage of all girls accessing learning support/resource teaching for mathematics	10.6	10.6
Percent of all pupils accessing learning support/resource teaching for mathematics	9.9	10.0
Percentage of boys accessing language/learning Support for English **and** learning support/resource teaching for mathematics	5.8	6.9
Percentage of girls accessing language/learning support for English **and** of learning support/resource teaching for Mathematics	5.4	5.9
Percentage of all pupils accessing language/learning Support for English **and** of learning support/resource teaching for Mathematics	5.6	6.4

In general, school size and school disadvantaged status were broadly related to access to learning support (e-Appendix Tables A4.67 to A4.70). At Second class, for example, 13.6% of pupils in DEIS Band 1 schools were accessing learning support for English, while 10.9% in urban non-DEIS schools were accessing such support (Table 4.22), though the difference between these percentages did not reach statistical significance. Similarly, over twice as many pupils in DEIS Band 1 schools (5.3%) as in urban non-DEIS schools (2.5%) were accessing language support for English, though the difference between them was not statistically significant. A smaller percentage of pupils in DEIS band 1 schools (7.3%) attended learning support for maths than in other school types. At Sixth class, overall percentages accessing support were similar to those for Second class. However, more pupils in DEIS Band 1 schools (17.1%) accessed learning support in mathematics (e-Appendix Table A4.70).

Table 4.22: Percentages of pupils accessing learning support/resource teaching for English, language support for English and learning support for mathematics, by DEIS status, Second class

	DEIS Band 1	DEIS Band 2	Urban non-DEIS	Rural DEIS*	Rural non-DEIS
Pupils accessing learning support/resource teaching for English	13.6	9.9	10.9	---	13.2
Pupils accessing language support for English	5.3	3.5	2.5	---	1.2
Pupils accessing learning support/resource teaching for mathematics	7.3	9.0	10.0	---	9.6

*Data not included due to small number of schools from this sector in NA '14.

As might be expected, on average, pupils accessing support have significantly lower mean English reading and mathematics scores than pupils not accessing support. In Second class, for example, the mean score of pupils accessing learning support in English is 218, compared with a mean score of 271 for pupils not accessing support (Table 4.23; e-Appendix Table A4.71). Similarly, in mathematics, pupils accessing support have a mean score of 210, while those not accessing support have a mean score of 270. Pupils accessing language support for English also perform less well on reading (mean = 214) compared with their counterparts not accessing support (mean = 265). Corresponding data for Sixth class may be found in e-Appendix Table A4.72. These data confirm that, in general, pupils accessing support are in need of such support.

Pupils accessing learning or language support also tend to perform in the lower proficiency levels, compared with their counterparts not accessing support. In Second class, 22% of pupils accessing learning support in English performed below proficiency Level 1 on the overall reading scale, compared with just 3% not accessing support (Table 4.23). The finding that 29% of pupils accessing support for English perform at Level 2, compared with 33% not accessing support, suggests that the dividing line between access and lack of access is less clear at higher levels of proficiency. Similarly, 19% of pupils performing at Level 2 access learning support for mathematics, whereas 28% of pupils performing at this level are not accessing of support. Readers are referred to e-Appendix Table A4.72 for Sixth class data.

In NA '09, at Second class, 14% of pupils were accessing learning support/resource teaching for English (Eivers et al., 2010), compared with 13% in NA '14. Fifteen percent in Sixth class were accessing support/resource teaching for English in NA '09, compared with 14% in NA '14. Differences are too small to be statistically significant.

In NA'09, 10% of pupils at Second and Sixth class levels were accessing learning support/resource teaching for maths. In NA '14, 10% at each class level were accessing learning support/resource teaching.

Table 4.23: Mean achievement scores of Second class pupils accessing/not accessing learning support/resource teaching for English, language support for English and learning support/resource teaching for mathematics and percentages of these pupils performing at the lowest levels of proficiency

		< Level 1	Level 1	Level 2
Pupils accessing learning support for English	**Reading**	**%**	**%**	**%**
Yes	217.5	22.4	39.2	29.2
No	271.0	2.5	13.1	33.4
Total	264.1	5.1	16.5	32.9
		< Level 1	**Level 1**	**Level 2**
Pupils accessing language support for English	**Reading**	**%**	**%**	**%**
Yes	214.0	24.1	44.0	21.5
No	265.3	4.6	15.8	33.2
		< Level 1	**Level 1**	**Level 2**
Pupils accessing learning support for mathematics	**Maths**	**%**	**%**	**%**
Yes	210.2	28.6	41.8	18.9
No	269.7	3.6	17.0	28.0
Total	263.8	6.1	19.4	27.1

Assessment, Evaluation and Planning

This section describes assessment, evaluation, and planning at the school level. First, data are reported on the subject areas on which schools focused in the initial stages of School Self-Evaluation. Second, consideration is given to the uses to which standardised tests are put by schools. Third, principal teachers' views on the extent to which various recent initiatives, such as the *National Strategy to Improve Literacy and Numeracy*, and School Self-Evaluation, have impacted on teaching and learning are described. Fourth, target setting for English reading and mathematics at the school level is considered. Fifth, the engagement of teachers, parents, and pupils in different activities designed to support teaching and learning is considered.

Focus on English and Mathematics in School Self-Evaluation

Over three-quarters (77.4%) of pupils in Second class in NA '14 attended schools in which there was a focus on English reading/literacy in the initial stages of School Self-Evaluation, including pupils who attended schools in which there was a focus on both English reading/literacy and mathematics/numeracy (30%) (Table 4.24; e-Appendix Table A4.73). Just 23% attended schools which focused on mathematics/numeracy but not on English reading/literacy. Data for schools with pupils in Sixth class were broadly similar (Table 4.24).

Table 4.24: Percentages of pupils in schools which chose to focus on English/literacy and/or mathematics/numeracy in the initial stages of School Self-Evaluation (*data from Second class reading and Sixth class maths databases*)

	Second	Sixth
English/Literacy only	47.7	51.2
Maths/Numeracy only	22.6	20.9
Both English/Literacy and Maths/Numeracy	29.7	27.9

All primary schools are currently required to administer standardised tests of English reading and mathematics to pupils in the Second, Fourth, and Sixth classes towards the end of the school year. Schools in NA '14 were asked to indicate the uses to which they put the results of these tests. Almost all pupils attended schools in which the results of standardised tests were used to identify learning difficulties and to provide feedback to parents (Table 4.25; e-Appendix Tables A4.74, A4.75). Ninety-three percent of pupils in Second class and 87% in Sixth class were in schools in which results were used to provide feedback to the school's Board of Management. Marginally more pupils in Second class (90%) attended schools in which standardised test results were used to set school-level targets, compared with Sixth class (84%). Finally, half of pupils in Second class (50%) and just under half in Sixth (46%) attended schools in which feedback on standardised test performance was given to pupils. This may reflect a concern among schools to downplay the results of standardised tests where young children are concerned.

Table 4.25: Percentages of pupils in schools in which results of standardised tests in English and mathematics are used in different ways, by grade level (*data from Second class reading and Sixth class maths databases*)

	Second	Sixth
Feedback to pupils	50.3	46.1
Feedback to parents	98.9	95.6
Feedback to Board of Management	92.6	87.2
Identifying pupils with learning difficulties	98.9	95.6
Setting school-level targets	90.1	83.9
Informing School Self-Evaluation	97.9	92.2
Informing classroom teaching	96.4	91.0

Perceived Impact of Recent Initiatives on Aspects of Teaching and Learning

A number of national initiatives have been put in place in recent years with a view to increasing performance in literacy and numeracy. These include the *National Strategy to Improve Literacy and Numeracy* and the introduction of School Self-Evaluation. Principals of schools in NA '14 were asked to indicate the extent to which such initiatives had impacted on various aspects of teaching and learning in their school. In general, principals were positive about the effects of these initiatives. At least three in four pupils were in schools whose principals felt that the initiatives had impacted 'a lot' or 'to some extent' on interpreting the outcomes of summative assessments (87%), interpreting the outcomes of formative assessments (85%), raising teaching standards in general (83%), increasing pupils' application of reading skills across the curriculum (81%), engaging parents in children's learning (78%), and raising the literacy standards of lower-achieving pupils (74%) (Table 4.26; e-Appendix Tables A4.76, A4.77). Aspects of teaching and learning on which initiatives were perceived to have somewhat less impact included raising overall literacy standards (71%) and raising overall mathematics standards (67%). The latter finding is interesting in light of the overall improvement in performance in both domains observed nationally in NA '14. However, over one-quarter of pupils were in schools where principals felt that it was too early to judge the impact of recent initiatives on overall standards in literacy (26%) or mathematics (27%). This may indicate that principals found that, in the past, initiatives designed to improve literacy and numeracy may have been slow to make an impact.

Table 4.26: Percentages of pupils whose principal teachers indicated the extent to which various initiatives (e.g., *National Strategy to Improve Literacy and Numeracy*, School Self-Evaluation) had a positive impact on teaching and learning in their school (Second class reading database)

	A lot	To some extent	Very little	Not at all	Too early to judge
Raising overall reading literacy standards	27.2	43.4	2.4	0.7	26.3
Raising reading literacy standards of lower-achieving pupils	28.1	46.1	7.8	0.7	17.4
Increasing children's application of reading skills across the curriculum	35.7	44.9	3.1	1.6	14.7
Raising overall mathematics standards	21.3	45.5	2.5	1.5	29.2
Raising mathematics standards of lower-achieving pupils	20.6	46.6	5.8	0.7	26.4
Interpreting outcomes of formative assessment (assessment for learning)	33.2	51.3	1.8	0.7	12.9
Interpreting outcomes of summative assessment (assessment of learning)	39.1	48.2	1.8	0.7	10.1
Raising teaching standards	34.5	47.5	5.0	3.0	9.9
Engaging parents in children's learning	20.4	57.7	9.9	3.4	8.6

Target Setting for English and Mathematics

Principal teachers in NA '14 were asked whether the school had a school development or school improvement plan. Responses need to be considered in terms of where schools are at with respect to School Self-Evaluation and planning more generally. The vast majority of pupils (94%) were in schools whose principal teacher reported that the school had a school development/improvement plan (SIP) (e-Appendix Table A4.78). Principals were asked to indicate whether the SIP included written statements on a number of topics. Almost three in five pupils were in schools in which there was a SIP with school-level targets for English reading and for mathematics and statements on teaching literacy and numeracy across the curriculum (Table 4.27; e-Appendix Table A4.79). About 40% of pupils were in schools where the SIP included statements on grouping pupils for English reading and mathematics.

Table 4.27: Percentages of pupils in schools with varying content in the School Development/School Improvement Plan, by grade level
(*data from Second class reading and Sixth class maths databases*)

	Second	Sixth
School-level targets for English reading	59.1	57.8
Grouping pupils for English reading	41.5	35.8
Teaching literacy across the curriculum	59.5	58.0
School-level targets for mathematics	57.9	57.2
Grouping pupils for mathematics	41.3	36.8
Teaching numeracy across the curriculum	55.4	54.4

Principal teachers were invited to provide an example of a specific and measureable target for English and one for mathematics that were included in the school's SIP.

In the case of English, one-quarter of pupils were in schools where no target was given (Table 4.28; e-Appendix Table A4.80). In interpreting the findings here, it is important to note that not all schools had been working on School Self-Evaluation for English when NA '14 was being conducted in schools.

Twenty-three percent of pupils were in schools where a general or uncategorised target was given. They included: improving spelling, developing writing, improving handwriting, raising engagement in reading, and maintaining current standards.

Fifteen percent of pupils were in schools where principals offered specific targets for reading, usually related to performance on standardised tests. These included:

- Reduce to 18% the percentage of pupils achieving below the 16th percentile.
- Reduce the number of pupils performing at or below the 16th percentile by 3%.
- Improve pupil standardised test score average by 5%.
- Improve literacy scores in standardised tests by 2%.
- Have 93% of scores above the 16th percentile ranking from baseline score in May 2013.
- Reduce the proportion performing below the 2nd percentile from 3.6% in 2011 to 2.8% in 2014.
- Increase the percentage performing at Sten 5 or higher from 53% in 2012-13 to 57% in 2013-14.
- Increase the percentage achieving Stens 8-10 by 2%.

Fifteen percent of pupils were in schools whose principals indicated a focus on reading comprehension, but where the target tended to be general rather than specifically related to test performance. Examples include:

- Comprehension.
- Comprehension strategies, namely: predicting, connecting, comparing, inferring, and synthesising.
- Create proficient readers who are capable of acquiring new knowledge to provide infrastructure in the promotion of comprehension development.
- Comprehension skills development, production and visualisation.

Thirteen percent of pupils were in schools whose principal teachers cited multiple targets (although just one was asked for). These included:

- Reading comprehension and teaching of vocabulary.
- Guided reading in levelled groups, over 3 years to phase out class reading. Comprehension strategies. Aistear in Junior and Senior infants. Develop reading culture.
- Sustain and develop the whole school approach to reading fluency, vocabulary and comprehension. 12/13- reading and ex genres of writing. 13/14- reading explore and develop comprehension strategies.

Finally, approximately 11% of pupils were in schools where the main target was oral language. Examples include:

- The main targets in our improvement plan focus on oral language.
- Oral language: improve listening skills, answering questions, expressive language.
- Increasing pupils' performance by 2 scale score units from their baseline score in oral language.

Table 4.28: Percentages of pupils in schools with varying targets for English reading (*data from Second class reading database*)

Category	% of pupils	Example
No target given	25.1	---
General targets – miscellaneous	22.5	That each child will read a minimum of 10 books for pleasure.
Targets related to reading tests - specific	14.8	To reduce numbers in 17-50%ile and increase those in 50-84.
Reading comprehension	14.5	Comprehension strategies, namely predicting connecting, comparing, inferring, synthesising.
Multiple targets – general	12.5	Increase reading levels and improve writing levels.
Oral language	10.5	A self-evaluation of and an improvement in oral language

Fewer targets were provided for mathematics than for English. Almost 30% of pupils were in schools where no target was specified, while a further 10% were in schools whose principal teachers indicated that a SIP was under development at the time of NA '14 and targets had not yet been established (Table 4.29; e-Appendix Table A4.81).

Twenty percent of pupils were in schools in which miscellaneous general targets were mentioned. These targets included:

- Language of maths – taught as a subject – same language used in all classes.
- Basic facts, mental arithmetic.
- Develop a maths guide for parents from Junior Infants to Sixth class.
- Decrease withdrawal of small groups for maths support by 5% per year.

Twenty percent of pupils were also in schools in which problem solving was a key target, in a general sense (i.e., targets related to standardised or other tests were not mentioned). Many of these targets referred to problem solving without much elaboration, though some highlighted the importance of collaboration and language.

A third cluster of 20% of pupils were in schools in which specific targets related to performance on standardised or teacher-made tests of mathematics were documented:

- To increase the number of pupils scoring in 17-50th percentile band by 6% leading to a reduction in the 7.3% of pupils currently performing in the 3rd - 16th PR band.
- To increase the class average score on the teacher-designed test for each class in relation to obtaining the curriculum objectives for money by 2%.
- By end of year 3, the average standard score in problem solving will be 108 or greater.

Table 4.29: Percentages of pupils in schools with varying targets for mathematics (*data from Sixth class maths database*)

Category	% of pupils	Example
No target given	29.8	---
Various targets – miscellaneous	20.4	Decrease withdrawal of small groups for maths support by 5% per year.
Problem solving – general	20.1	Improve problem solving in maths.
Targets related to maths tests – specific	19.5	That 20% of children will be below the 20%ile. That 25% of children will be at or above 80%ile.
SIP currently in progress	10.1	We are currently self-evaluating maths, improvement plan to follow.

Teacher, Parent and Pupil Engagement

Principals in NA '14 responded to a series of statements relating to the engagement of teachers, parents, and pupils in various aspects of school life. At least four in five pupils were in schools in which four of five aspects of teacher engagement (job satisfaction, expectations for pupil achievement, teachers' understanding of school's targets and goals, and teachers' success in achieving school's targets and goals) were rated by the principal as being very high or high (Table 4.30; e-Appendix Tables A4.82, A4.83). Teacher morale was regarded as being very high or high by principals of two-thirds (68%) of pupils.

Parent engagement was rated less favourably by principals. Between three-fifths and two-thirds of pupils were in schools where parental support for pupil achievement (64%) and parent involvement in school activities (58%) were regarded as very high or high.

Table 4.30: Percentages of pupils whose principal teachers characterised each of several aspects of teacher, parent, and pupil engagement, as very high/high to low/very low (*data from Second class reading database*)

	Very high/high	Medium	Low/very low
Teacher-level			
Teachers' job satisfaction	79.4	18.8	1.8
Teacher morale	68.3	27.8	3.9
Teachers' understanding of school's targets and goals	88.9	11.2	0
Teachers' success in achieving school's targets and goals	85.7	13.3	1
Teachers' expectations for pupil achievement	91.7	8.3	0
Parent-level			
Parental support for pupil achievement	63.6	33.1	3.4
Parental involvement in school activities	58.4	29.2	12.4
Pupil-level			
Pupils' regard for school property	88.1	11.9	0
Pupils' desire to do well in school.	85.8	13.8	0.4

Over 85% of pupils were in schools in which pupils' regard for school property and their desire to do well in school were regarded as very high or high (Table 4.31).

Principals' Comments

At the end the School Questionnaire, principal teachers were invited to offer comments on the teaching and assessment of English reading and/or mathematics. Just under one-third of pupils (32.6%) were in schools whose principal teachers offered comments. Twenty-one percent of pupils were in schools whose principal teachers offered one comment, 10% were in schools whose principals offered 2 comments, and the remainder (2%) were in schools whose principals offered three or four comments.

Comments were categorised into themes, though there were relatively few comments relating to any given theme, reflecting the large number of issues referred to. Percentages of pupils were summed across themes, giving the percentage of all pupils in the survey whose principals offered a comment in a particular category in either the first, second, third or fourth position (individual principal teachers made no more than one comment in each category). The main comment categories were: NA '14 (principals of 5.4% of all pupils made comments in this category), CPD (5.2%), funding and resources (4.8%), programme effects (4.6%) and SIP (3.8%).

Comments relating to the National Assessments focused on their timing, the workload involved in implementing them, and challenges in completing questionnaires:

- Difficult to compute numbers accessing support due to team teaching and rotation of groups. This is a high number.
- National Assessments should not take place in May. This is a difficult time of the year with preparation for sacraments in Catholic schools.
- Differentiation is the term used in this school for group work, with groups established for project work in class.
- Advise that national assessments take place in the First and Fifth classes in the future.

Comments on CPD focused on a requirement for additional opportunities:

- Lack of CPD for teachers has had negative impact on teaching and learning of English reading and maths.
- Lack of consistent CPD across schools is a hindrance in evaluating outcomes and giving teachers a clear understanding of assessment.
- We need more CPD days as a staff.

Comments related to funding and resource issues focused on class size and on areas in which additional funding was deemed important:

- School lacks funding for ICTs and concrete materials.
- Large classes detrimental to achieving targets.
- Talented staff worn down by working to achieve targets with reduced resources/support staff and ever-increasing demands for that support.

Comments on programme effects typically focused on the benefits arising from participation in specific programmes and on a requirement for additional programmes:

- Introduction of Jolly Phonics and getting rid of class readers in favour of group reading has had enormous benefit.
- School has been involved in literacy programme since 2005, with ongoing CPD provided, which is excellent.
- Programmes used at the junior end of the school have led to increased enjoyment and results in both English reading and maths.

Comments on SSE were generally positive, and focused on benefits of SIPs or intentions to implement targets/programmes arising from SSE:

- SIP has focused all teaching staff on improving performance levels.
- As standardised test scores are, on average, high, school focuses on quality of engagement in literacy and numeracy.
- As English is already good, our focus is on Gaeilge and local history.

Comments in other categories, which were usually made by one or two principal teachers, included:

- English assessments may need to be tailored to EAL pupils, involving the reading aloud of some of the materials, as occurs with maths.
- Standardised tests results show most of our pupils are above national norms; EAL learners account for a larger proportion of lower achievers.
- Much of the language and learning support in our school is team-based and involves in-class support.

Summary

A number of school demographic variables were examined, including school location (whether urban or rural), school size, and school gender composition. None of these was related to achievement in English reading or mathematics. Overall average attendance was 94% at both Second and Sixth classes, and schools did not differ significantly on average attendance by DEIS status, though DEIS Band 1 schools had marginally lower rates than other school types.

Although mean scores on English reading at Second and Sixth classes were marginally higher in Irish-medium than in English-medium schools, differences were not statistically

significant. In the case of mathematics, differences across the two school types were also small and not statistically significant at either grade level. Due to the small number of participating Irish-medium schools, it was not possible to draw comparisons between pupils in Gaeltacht schools and scoileanna lán-Ghaeilge.

Principal teachers indicated that, on average across schools, 9.5% of pupils in Second class, and 10.0% in Sixth spoke a language other than English or Gaeilge. In Sixth class, but not Second, the mean score in English reading of pupils in schools where 10% or more spoke a first language other than English/Gaeilge (252) was significantly lower than the mean score of pupils in schools with no speakers of first languages other than English or Gaeilge (269).

Just under half of pupils (47% in Second class, 48% in Sixth) were in schools in which a room was used exclusively or partly as a school library. Almost all pupils were in schools in which there was a library in at least some classrooms, with 88% of pupils in Second class and 83% in Sixth in a school with a library in every classroom.

The average number of print books across all libraries in schools attended by pupils in Second class was 3058. Of these, just 1% were in a language other than English or Irish. Sixty-two percent of pupils were in schools with no books in languages other than English or Irish. The ratio of print books to pupils (across all libraries in the school) was 12.4 in Second class and 14.7 at Sixth. Pupils in Second class across all schools had access to an average of 16 e-book titles, though a large proportion of pupils (almost 80%) were in schools with no access to e-books.

The average ratio of pupils to computing devices was 14:1 in Second class, and 15:1 in Sixth. Across schools, almost three-quarters of computing devices available for pupil use were located in classrooms and resource rooms. Ratios were more favourable in DEIS Band 1 schools.

Forty-one percent of pupils in Second class and 40% in Sixth attended schools in which a parent programme for English reading had been implemented in the 2013-14 school year. About thirty percent of pupils in Second and Sixth classes were at a school where a parent programme for mathematics had been implemented in same school year. Almost three-quarters of pupils in Second class and two-thirds in Sixth attended schools where resources for supporting children with their English reading at home (such as reading lists or website addresses) had been shared with parents during the 2013-14 school year.

The main factors identified by school principals as impacting in a negative way on teaching and learning included large class sizes, shortage or inadequacy of teaching software, slow Internet speed, shortage or inadequacy of computers for teaching, and shortage or inadequacy of classroom space.

On average across schools, there were 2.4 General Allocation Model/English as an Additional Language support posts, with more such posts in large schools (3.8) than in medium (1.5) or small (0.9) schools. Across all schools, there was an average of 0.4

additional, officially-sanctioned language support posts, with most such posts in large schools. Just over three-quarters of schools had no additional language support posts.

Across all schools, it is estimated that 13% of pupils in Second and Sixth classes were accessing learning support/resource teaching in English, with more boys (14% in Second, 15% in Sixth) accessing support than girls (12% in Second, 11% in Sixth). It is estimated that 2.3% of pupils in Second class, and 2.0% in Sixth were accessing language support for English. At Second and Sixth classes, it is estimated that 10% of pupils were accessing learning support/resource teaching in mathematics, with similar percentages of boys and girls at both class levels. As might be expected, on average, pupils accessing support had significantly lower mean scores on English reading and mathematics than pupils not accessing support.

Over three-quarters (77.4%) of pupils in Second class in NA '14 attended schools in which there was a focus on English reading/literacy in the initial stages of School Self-Evaluation, including pupils who attended schools in which there was a focus on both English reading/literacy and mathematics/numeracy (30%). Twenty-three percent attended schools which focused on mathematics/numeracy but not on English reading/literacy. Data for schools with pupils in Sixth class were similar.

Schools reported using standardised tests of achievement for a broad range of purposes, with over 90% of pupils in schools in which such tests were used for identifying pupils with learning difficulties, setting school-level targets, informing School Self-Evaluation, providing feedback to parents, providing feedback to Boards of Management, and informing classroom teaching. Around half of pupils were in schools in which standardised test outcomes were used to provide feedback to pupils.

At least three in four pupils were in schools where principals felt that the initiatives such as the *National Strategy to Improve Literacy and Numeracy* and School Self-Evaluation had impacted 'a lot' or 'to some extent' on interpreting outcomes of summative assessments, interpreting outcomes of formative assessments, raising teaching standards in general, increasing children's application of reading skills across the curriculum, engaging parents in children's learning, and raising the literacy standards of lower-achieving pupils. Aspects of teaching and learning on which initiatives were perceived to have somewhat less impact included raising overall literacy standards and raising overall mathematics standards. Around one-quarter of pupils were in schools whose principals felt that it was too early to judge the impact of recent initiatives on pupil performance.

The vast majority of pupils (94%) were in schools whose principal teacher reported that the school had a school development/improvement plan (SIP). Almost three in five pupils were in schools in which there was an SIP with school-level targets for English reading and for mathematics and statements on teaching literacy and numeracy across the curriculum. Principals provided examples of school-level targets for literacy and numeracy. While some

of these were very specific, focusing on percentage increases in performance on standardised tests, others were more general in nature, mentioning a key area of literacy (e.g., comprehension, oral language) or numeracy (problem solving, basic facts/mental arithmetic, language/vocabulary of mathematics) on which staff were currently focused.

While principals generally rated teachers' job satisfaction, teachers' understanding of school targets and goals, and teachers expectations' for pupil achievement as 'very high' or 'high', they gave lower ratings to parental support for pupil achievement and parental involvement in school activities.

Principals' general comments relating to the teaching and learning of English or mathematics covered a broad range of topics including comments about NA '14 (especially the timing of the assessment), lack of CPD, issues around funding and resources, programme effects (which were generally viewed as positive) and aspects of SSE.

Chapter 5: Classroom and Teacher Factors

This chapter examines teacher-related factors relevant to the development of English and mathematics. It is based on responses provided by classroom teachers to the Teacher Questionnaire administered as part of NA '14. While the questionnaires administered to teachers of Second and Sixth classes included a common section seeking background information, the focus of the remaining questions at Second class was on the teaching and learning of English, while at Sixth class, it was on the teaching and learning of mathematics.

This chapter is divided into six sections. In the first, background data on teachers and classes are provided. In the second, instructional time allocated to the teaching of English and mathematics is considered. The third section address instructional practices. The fourth section addresses CPD priorities and planning for teaching and learning. The fifth section looks at resources used in teaching English and mathematics and on aspects of the supports that are available to pupils. The chapter concludes with a short summary.

This chapter contains a number of summary tables, which typically report percentages of pupils in pre-defined categories for English reading (Second) and mathematics (Sixth) as well as mean achievement scores. More detailed tables can be found in the companion e-appendix (see www.erc.ie/na2014).

Background on Teachers and Classes

This section looks at seven background factors: teaching experience, teacher work status, teacher gender, class levels taught, class sizes, educational experience of teachers, and teacher participation in CPD.

Teaching Experience, Teacher Work Status, and Gender

Twenty-six percent of pupils in Second and 18% in Sixth were taught by teachers who had 1-5 years of experience, while 21% in Second and 22% in Sixth were taught by teachers with more than 20 years' experience (Table 5.1; e-Appendix Table A5.1). In general, performance on reading and mathematics was not associated with teacher experience. However, pupils in Sixth class who were taught by teachers with more than 20 years of experience had a significantly higher mean score in mathematics than pupils taught by teachers with 1-5 years of experience. Care should be exercised in interpreting this finding on its own, as other factors may interact with teaching experience to impact on outcomes.

On average, teachers of pupils in Second class in NA '14 had 12.2 years teaching experience, while teachers of pupils in Sixth had 13.1 years (e-Appendix Table A5.2). In NA '09, teachers of pupils in Second class had just under 11 years of teaching experience and teachers of pupils in Sixth class had just over 18 years (Eivers et al., 2010). Hence, there has been no

change in the average experience of teachers of pupils in Second class since NA '09, while the average experience of teachers of pupils in Sixth class has dropped.

The finding that over one-quarter of pupils in Second and 18% in Sixth are taught by teachers with 1-5 years teaching experience is broadly consistent with PIRLS 2011, where 40% of pupils in Ireland were taught by teachers under 30 years of age, compared with 19% in Northern Ireland and 14% internationally (Clerkin, 2013).

Table 5.1: Teachers' years' experience as teachers, and mean reading and mathematics scores, by grade level

	Second			Sixth		
	%	Reading	Maths	%	Reading	Maths
1-5 years*	26.3	260.2	261.4	17.9	257.5	253.9
6-10 years	32.4	264.8	263.9	34.9	262.6	259.7
11-15 years	17.9	266.9	262.2	20.2	263.2	262.6
16-20 years	2.0	266.5	269.4	5.4	264.9	267.5
More than 20 years	21.3	264.5	265.1	21.6	267.9	**269.3**

Scores in **bold** are significantly different from the mean score of the reference (*) group.

Just over 80% of pupils in Second class, and 90% in Sixth were taught by teachers with permanent status (Table 5.2; e-Appendix Table A5.3). The remainder were taught by teachers with temporary status, or by substitute teachers. No significant achievement differences in reading or mathematics were associated with teacher status. However, pupils in Second class taught by temporary teachers had a mean reading score that was lower, by 8 points, than that of pupils taught by permanent teachers, and a mean mathematics score that was 6 points lower. Corresponding non-significant differences of 7 points (reading) and 9 points (mathematics) were observed in Sixth class.

Table 5.2: Percentages of pupils with permanent, temporary, and substitute teachers, and mean achievement scores, by grade level

	Second			Sixth		
	%	Reading	Maths	%	Reading	Maths
Permanent*	82.4	265.1	264.6	91.1	263.2	262.7
Temporary	12.4	257.6	259.0	4.7	255.9	254.0
Substitute	5.2	262.3	256.8	4.1	264.9	252.4

Scores in **bold** are significantly different from the mean score of the reference (*) group.

In NA '09, 16% of pupils in Second class, and 6% in Sixth were taught by temporary or substitute teachers (Clerkin & Gilleece, 2010) – marginally less than in NA '14.

In NA '14, just over 9% of pupils in Second class and 32% in Sixth were taught by male teachers (Table 5.3; e-Appendix Table A5.4). There was no association between teacher

gender and average pupil performance. Proportions taught by male teachers in NA '09 (10% in Second, 31% in Sixth; Clerkin & Gilleece, 2010) are similar to those in NA '14.

Table 5.3: Percentages of pupils with male and female teachers and mean achievement scores, by grade level and domain

	Second			Sixth		
	%	Reading	Maths	%	Reading	Maths
Male	9.3	265.6	266.7	31.9	262.0	262.0
Female	90.7	263.8	263.0	68.1	263.9	261.6

Class Levels Taught and Class Size

Sixty-nine percent of pupils in Second class and 72% in Sixth were in single-grade classes. Around 1% of pupils at each grade level were taught by teachers who taught four grade levels (Table 5.4; e-Appendix Table A5.5). The links between single-/multi-grade classes and achievement are not straightforward. Second class pupils who were taught by teachers responsible for three class levels had a significantly lower mean mathematics score than those in single-grade classes. Pupils in Sixth class who were taught by teachers responsible for four grade levels (fewer than 1% of pupils in NA '14) had significantly higher mean scores in reading and mathematics than pupils of teachers of single-grade classes, while Sixth class pupils taught by teachers responsible for two grade levels had a significantly higher mean reading score than pupils of teachers of single-grade classes.

Table 5.4: Percentages of pupils whose teachers teach varying numbers of class levels, and mean reading and mathematics scores, by grade level

	Second			Sixth		
	%	Reading	Maths	%	Reading	Maths
One*	69.2	263.8	264.6	72.2	260.5	261.4
Two	23.6	264.9	262.3	22.4	**269.4**	260.9
Three	5.8	259.9	**249.6**	4.6	267.0	263.9
Four	1.4	258.3	273.6	0.9	**291.9**	**304.8**

Scores in **bold** are significantly different from the mean score of the reference (*) group.

The average class size in single-grade Second classes was 25.4 pupils, while in single-grade Sixth classes, it was 25.9 (Table 5.5). The average number of Second-class pupils in multi-grade classes was 12.8, while the average number in Sixth class was 13.4. No associations were found between average class size and average achievement in English reading or mathematics (e-Appendix Table A5.7). Overall average class sizes were smaller for DEIS Band 1 schools at Second (20.5 pupils) and Sixth (21.0), and in DEIS Rural schools (21.4) at Sixth class (e-Appendix Table A5.8).

Table 5.5: Percentages of pupils attending single- and multi-grade classes and mean class size, by grade level

	Second		Sixth	
	%	Class size	%	Class size
Single*	69.5	25.4	71.8	25.9
Multi	30.5	25.0	28.2	25.3
Total	100.0	25.3	100.0	25.8

In NA '09, the average overall class size for Second and Sixth classes was 25.0 (Eivers et al., 2010). Hence, class sizes were broadly similar in NA '09 and NA '14.

Qualifications, CPD, and Additional Responsibilities

Ninety-one percent of pupils in Sixth class were taught by teachers who indicated that they had completed a course in mathematics education as part of their initial teacher education (Table 5.6; e-Appendix Table A5.9). This finding is unexpected in that all providers of initial teacher education at primary level are required to provide coursework in numeracy (Teaching Council, 2011).

Twenty percent of pupils were taught by teachers who indicated that they had studied mathematics a subject in a degree course or equivalent (Table 5.6). Again, this may be an overestimate, with some teachers, perhaps, indicating that they had studied mathematics as a degree subject, when in fact they had studied mathematics education or mathematics for teaching (a course offered by some colleges of education). In TIMSS 2011 in Ireland, 9% of pupils were taught by teachers who reported that maths was a main area of study during their third-level education (Clerkin, 2013). In NA '14, no differences in average mathematics achievement were observed between pupils of teachers who had completed a mathematics education course, and pupils of teachers who had not, or between pupils of teachers who had completed mathematics as a degree subject and pupils of teachers who had not.

Table 5.6: Percentages of Sixth class pupils with teachers who reported that they had studied mathematics education in initial teacher education, and percentages with teachers who reported that they had studied mathematics in a degree course, and mean mathematics scores

	Mathematics Education		Mathematics as Degree Subject	
	%	Maths	%	Maths
Yes*	90.6	261.0	20.2	263.4
No	9.4	267.0	79.8	261.4
Total	100.0	261.5	100.0	261.8

Scores in **bold** are significantly different from the mean score of the reference (*) group.

Twelve percent of pupils in Second and Sixth classes were taught by teachers who had completed a Masters and/or Ph.D. degree related to their work as teachers (Table 5.7; e-Appendix Table A5.10). There were no differences in the reading or mathematics performance of pupils whose teachers had attained these additional qualifications and of pupils whose teachers had not attained them. In interpreting these outcomes, it should be noted that the advanced degrees completed by teachers may not have related directly to the teaching of reading or mathematics.

Table 5.7: Percentages of pupils whose teachers had an additional qualification (Masters or Ph.D., related to their work as teachers) and mean achievement scores, by grade level

	Second			Sixth		
	%	Reading	Maths	%	Reading	Maths
Yes*	12.3	263.3	263.4	11.7	263.1	260.2
No	87.7	264.0	263.3	88.3	263.0	262.0

Scores in **bold** are significantly different from the mean score of the reference (*) group.

In NA '14, continuing professional development (CPD) was defined as including attendance at courses, participation in school-related activities related to English or mathematics (though no distinction was made between activities facilitated by an internal or external person/persons), and online activities. On average, teachers of pupils in Second class reported completing 21.4 hours of CPD related to English in the two years prior to NA '14 being administered in schools, with 13 hours of this completed as part of a summer course, and the remainder during the school year (Table 5.8; e-Appendix Table A5.11). In summer, more teachers availed of online CPD than any other model of delivery, while during the school year, in-school activities (related to the teaching of English) constituted the most popular format.

On average, teachers of pupils in Sixth class attended 17 hours of CPD on the teaching and learning of mathematics in the two years prior to NA '14 (Table 5.9; e-Appendix Table A5.12). Again, more time on average was devoted to online CPD for mathematics than to other forms of delivery in summer. Overall time allocated to CPD was lower for maths among teachers at Sixth (16.9 hours) than for English among teachers at Second (21.4).

Table 5.8: Average numbers of hours of CPD* attended by Second class teachers on the teaching of English in the two years prior to NA '14

	Regular school year	Summer	Total
Attend external CPD on teaching English	2.4	3.1	5.6
Participate in in-school activities related to teaching of English	5.4	0.5	5.8
Online CPD for English	0.3	9.1	9.4
Other forms of CPD for English	0.4	0.2	0.5
Total CPD	8.5	12.9	21.4

*CPD was defined as excluding undergraduate or postgraduate coursework.

Table 5.9: Average numbers of hours of CPD* attended by Sixth class teachers on the teaching of mathematics in the two years prior to NA '14

	Regular school Year	Summer	Total
Attend external CPD on teaching mathematics	2.0	3.1	5.1
Participate in in-school activities related to teaching of maths	3.9	0.4	4.3
Online CPD for mathematics	0.8	6.0	6.8
Other forms of CPD for maths	0.6	0.2	0.7
Total CPD	7.2	9.7	16.9

*CPD was defined as excluding undergraduate or postgraduate coursework.

Just over 20% of pupils in Second class were taught by teachers who had availed of no CPD in English in the two years prior to NA '14. A similar proportion in Sixth class were taught by teachers who had availed of no CPD in mathematics (Table 5.10; e-Appendix Table A5.13). This outcome is surprising given the extensive planning for English and mathematics that schools have engaged in in recent years. No differences in average performance were observed between pupils whose teachers had or had not participated in CPD. This may relate to a range of issues, including the relative needs of teachers availing or not availing of CPD, the levels of engagement of teachers in CPD, and the extent to which they implement what they have learned.

Table 5.10: Percentages of pupils whose teachers reported that they had attended some CPD versus no CPD in English (Second) or mathematics (Sixth) in the two years prior to NA '14, and mean achievement scores, by grade level

	Second		Sixth	
	%	Reading	%	Maths
Some CPD*	79.8	264.0	79.8	261.3
No CPD	20.2	263.6	20.2	263.6

Scores in **bold** are significantly different from the mean score of the reference (*) group.

In Ireland, 37% of pupils in Fourth class in PIRLS 2011 were taught by teachers who had not availed of any CPD in English in the two years prior to that assessment. However, in that study, professional development was defined as attending seminars and workshops. As noted above, participating in CPD is more defined more broadly in NA '14 and includes in-school activities relating to teaching and learning English or mathematics.

Thirteen percent of pupils in Second class were taught by teachers who had additional responsibility for English within their schools, while 9% of pupils in Sixth class were taught by teachers with additional responsibility for mathematics (Table 5.11; e-Appendix Table A5.14). Pupils' average performance in English reading and mathematics was not associated with whether or not their teachers had additional responsibilities for these curricular areas.

Table 5.11: Percentages of pupils whose teachers have an additional responsibility for English (Second) or mathematics (Sixth) and mean achievement scores

	Second		Sixth	
	%	Reading	%	Maths
Yes*	12.7	263.6	8.6	264.9
No	87.3	264.0	91.4	261.5
Total	100.0	263.9	100.0	261.8

Scores in **bold** are significantly different from the mean score of the reference (*) group.

In NA '09, 4.7% of pupils in Second class were taught by teachers who held a post of responsibility in English while 9.2% of pupils in Sixth class were taught by teachers who held a post in mathematics (Eivers et al., 2011). In NA '14, teachers were asked about additional responsibility rather than a post of responsibility. Hence, data across the two studies are not directly comparable.

Time Allocated to Teaching Reading and Mathematics

Teachers of pupils in Second class in NA '14 reported allocating an average of 294 minutes per week to teaching English (Table 5.12; e-Appendix Table A5.15), while teachers of pupils in Sixth class reported allocating 283 minutes per week to the teaching of mathematics to pupils in Sixth class (Tables 5.13; e-Appendix Table A5.16). Teachers also reported on the allocation of time to the teaching of English and mathematics across the curriculum. Teachers of pupils in Second class reported that they spent 149 minutes per week on average on teaching English across the curriculum and teachers of pupils in Sixth class reporting that they spent 31 minutes per week on teaching mathematics across the curriculum. Care should be exercised in interpreting time allocation to teaching English and mathematics across the curriculum, as teachers may vary in their interpretation of what this entails.

Table 5.12: Average time allocated to the teaching of English in Second class, during class time and across the curriculum

	Second		
	Minutes/week	Min.	Max.
Subject class time	294.3	120.0	450.0
Time in other subject areas	149.2	0.0	990.0
Total time	438.2	165.0	1290.0

Table 5.13: Average time allocated to the teaching of mathematics in Sixth class, during class time and across the curriculum

	Sixth		
	Minutes/week	**Min.**	**Max.**
Subject class time	283.2	100.0	540.0
Time in other subject areas	30.9	0.0	250.0
Total time	314.1	200.0	600.0

In NA '09, teachers of pupils in Second class reported allocating 53 minutes per day (265 minutes per week) to the teaching of English and teachers of pupils in Sixth class reported allocating 52 minutes per day (260 minutes per week) to the teaching of mathematics. As part of the implementation of the *National Strategy to Improve Literacy and Numeracy*, a Circular (0056/2011) issued to schools advised that time allocated to language (English and Gaeilge combined) should increase by one hour to 8.5 hours per week (4.5 hours to the L1 of the school) for pupils in First to Sixth classes, and time allocated by schools to mathematics should increase to 4 hours and 10 minutes per week. Schools could make provision for this additional time by allocating it to teaching literacy and numeracy across the curriculum.

The data on instructional time gathered in NA '14 indicates that instructional time in English classes has increased since NA '09 from 265 minutes per week to 294 minutes (i.e., by 29 minutes to give 4 hours and 54 minutes per week). This is broadly in line with what was envisaged by the circular (i.e., an increase from 4 hours in L1 schools to 4.5 hours), even without taking into account any additional time allocated to teaching English across the curriculum. Similarly, instructional time in mathematics at Sixth class is now 283 minutes per week, compared with 260 minutes in NA '09, and exceeds the 4 hours and 10 minutes envisaged in Circular 0056/2011, again without taking any additional time allocated to teaching mathematics across the curriculum into account.

Four-fifths of pupils in Second class in NA '14 were taught by teachers who reported that they were satisfied with the allocation of teaching time to English, while teachers of 68% in Sixth were satisfied with the allocation of teaching time to mathematics (Table 5.14; e-Appendix Table A5.17). It is notable that just over one-quarter of pupils in Sixth class were taught by teachers who deemed that instructional time allocated to maths was insufficient. No significant differences in either English or mathematics were observed between the mean scores of pupils whose teachers indicated differing levels of satisfaction with the allocation of teaching time in these areas.

Table 5.14: Percentages of pupils with teachers indicting varying levels of satisfaction with time allocated to teaching English (Second) and mathematics (Sixth) and mean achievement scores

	Second		Sixth	
	%	English	%	Maths
More than sufficient	8.7	259.8	6.5	265.4
About right*	81.8	265.2	68.1	261.3
Insufficient	9.4	257.4	25.4	262.2

Scores in **bold** are significantly different from the mean score of the reference (*) group

Instructional and Assessment Practices in English and Mathematics

This section looks at instruction and assessment in English and mathematics. Instructional issues that are considered include the organisation of lessons, the range of materials used, teachers' confidence in implementing a range of instructional strategies, and teachers' use of additional programmes to support teaching and learning. Assessment issues include frequency of use of standardised and non-standardised assessments.

Grouping for Instruction

Seventy percent of pupils in Second class were in classes in which whole-class teaching was implemented in most English lessons, while 56% were in classes in which individual or independent work was used with the same frequency (Table 5.15). Sixteen percent of pupils were in classes in which group reading involving similar-ability groups was implemented in most lessons, while 12% were in classes in which paired work was implemented with this frequency. Almost half of pupils were in classes in which team teaching with a support teacher was used in some or most lessons. In all, 30% of pupils were in classes whose teachers reported that at least one form of group work was implemented in most lessons, and 9% were in classes in which some form of team teaching was implemented with the same frequency (e-Appendix Tables A5.18 to A5.20). Frequency of group work and team teaching was not associated with reading performance.

While the use of whole-class teaching and independent work in English in some or most lessons in Second class was similar in NA '09 and NA '14, there was an increase in the use of team teaching with a support teacher (34% of pupils in NA '09, and 47% in NA '14 were in classes where this occurred at least sometimes) (see Clerkin & Gilleece, 2010).

Whole-class teaching was the most common format for teaching mathematics, with 85% of sixth class pupils in classes in which this grouping was practised in most lessons (Table 5.16; e-Appendix Table A5.21). Individual (independent) work was also extensive with 71% of pupils engaged in this type of work in most lessons. The most frequently implemented forms of grouping involved similar-ability groups (21% of pupils were taught by teachers who implemented this in most lessons) and paired work (20%). Team teaching with a support teacher was implemented in at least some lessons by teachers of 40% of pupils.

Table 5.15: Percentages of Second class pupils with teachers indicting varying frequencies with which they organise English classes using various groupings

	Most lessons	Some lessons	Rarely or never
Whole-class teaching	69.7	28.4	1.9
Small group work – similar ability	16.4	67.6	16.0
Small group work – mixed ability	6.6	80.3	13.1
Small group work – pairs	12.0	73.9	14.1
Individual (independent) work	55.9	42.3	1.8
Team teaching with a class teacher	2.3	20.4	77.3
Team teaching with a support teacher	8.1	39.5	52.4

In all, 35% of pupils were in classes whose teachers reported that at least one form of group work was implemented in most mathematics lessons, and 19% were in classes in which some form of team teaching was implemented with the same frequency (e-Appendix Tables A5.22, A5.23). Frequency of use of group work was not associated with mathematics performance. Sixth class pupils in classes in which at least one form of team teaching is implemented in most lessons had a significantly lower mean mathematics score than that of pupils in classes in which team teaching is not used in most lessons.

Table 5.16: Percentages of Sixth class pupils with teachers indicting varying frequencies with which they organise mathematics classes using various groupings

	Most lessons	Some lessons	Rarely or never
Whole-class teaching	84.8	14.1	1.1
Small group work – similar ability	21.2	64.5	14.3
Small group work – mixed ability	8.9	71.0	20.1
Small group work – pairs	19.9	71.9	8.1
Individual (independent) work	71.4	27.2	1.4
Team teaching with a class teacher	7.0	14.6	78.4
Team teaching with a support teacher	15.5	24.3	60.2

As with English reading in Second class, use of whole-class teaching and individual (independent) work in some or most lessons was broadly similar for mathematics in Sixth class in NA '09 and NA '14. On the other hand, there was a small increase in the use of paired work in most lessons (from 12.0% in NA '09 to 20% in NA '14) (see Clerkin & Gilleece, 2010). Team teaching with a support teacher in at least some lessons has also increased, from 29% of pupils in NA '09 to 40% in NA '14. The current study does not provide information on the impact of increased team teaching involving class and support teachers on the performance of lower-achieving pupils, or on teaching and learning in general in classrooms.

Materials Used in English and Mathematics Classes

Just over three-quarters of pupils were in Second classes where published reading schemes were used on most days to teach English, while two in five pupils were in classes in which workbooks or worksheets were used with the same frequency (Table 5.17; e-Appendix Table A5.24).

Table 5.17: Percentages of Second class pupils taught by teachers who used selected reading materials with varying degrees of frequency in English classes

	Most days	Once or twice a week	Once or twice a month or less
Published reading schemes / materials	77.7	20.3	1.9
Children's literature / novels (*additional to reading schemes*)	26.7	49.4	24.0
Informational texts *(e.g., description, biography)*	1.8	41.3	56.9
Narrative texts (*e.g., stories*)	21.4	59.8	18.8
Reference materials (*e.g., encyclopaedia*)	3.2	24.0	72.7
'Real-life' texts or documents (*e.g., newspaper articles, maps, menus*)	1.3	10.0	88.8
Texts authored by children (*e.g., stories, captions, poems)*	2.5	19.8	77.6
Workbooks or worksheets	41.6	50.8	7.6
E-books	6.1	12.1	81.8
Other digital texts (*e.g., webpages)*	8.2	32.7	59.1

Narrative texts and children's literature were also widely used. On the other hand, fewer than 10% of pupils were in classrooms in which e-books, other digital texts, real-life texts or texts authored by children were used in most lessons. It is also noteworthy that a majority of pupils (57%) used information texts in English classes no more often than once or twice a month.

In an analysis of performance differences, two frequency categories were created (at least weekly, twice-monthly or less). For most text types, no achievement differences were observed between pupils who used various text types at least weekly, and those who used them less often (e-Appendix Tables A5.25 to A5.34). However, pupils whose teachers reported using reference materials and digital texts at least weekly had significantly higher mean scores than pupils whose teachers reported doing so less often (e-Appendix Table A5.29 and A5.34).

Notwithstanding the frequent use of reading schemes, there was some self-selection of reading materials by pupils, with teachers reporting that just over three-quarters of pupils in Second class were allowed to read books of their own choosing during reading lessons every

day or on most days (Table 5.18; e-Appendix Table A5.35). Pupils who read books of their own choosing during reading lessons on a daily basis had a higher mean score than those who did so on most days or a few times a month.

Table 5.18: Percentages of Second class pupils with teachers indicating varying frequencies with which pupils read books of their own choosing during reading classes and mean reading scores

	Second	
	%	Reading
Every day*	34.8	270.4
Most days	41.2	**262.2**
A few times a month	18.0	**255.8**
Rarely or never	5.9	261.3

Scores in **bold** are significantly different from the mean score of the reference (*) group.

In general, the frequency of use of various reading materials by teachers of pupils in Second class is similar in NA '09 and NA '14. For example, in NA '09, 70% of pupils were taught by teachers who used published reading schemes/materials on a daily basis (Clerkin & Gilleece, 2010), compared with 78% in 2014. Similarly, 48% in NA '09 were taught by teachers who used workbooks/worksheets on a daily basis, compared with 42% in NA '14. Differences are too small to reach statistical significance. Frequent use of digital texts has not increased either. In NA '09, 7% of pupils were taught by teachers who used digital texts on a daily basis, while in NA '14, 6-8% were in classes where e-books and/or other digital texts were used daily.

In NA '14, textbooks were also the most commonly-used resource in mathematics classrooms, with over 90% of pupils in classrooms where these were used on a daily basis (Table 5.19, e-Appendix Table A5.36). Worksheets and ICTs/digital resources were used in the classrooms of at least 35% of students on most days. No data were gathered on whether ICTs/digital resources were used by teachers or pupils, or both. Calculators and real-life materials (such as timetables) were used in the classrooms of about 10% of pupils on most or all days. Forty percent of pupils were in classrooms in which calculators were used once or twice a month or less often.

In an analysis of performance differences, two frequency categories were created (at least weekly, twice-monthly or less; see e-Appendix Tables A5.37-A5.45). Just one difference was statistically significant. Pupils who used table books in mathematics lessons at least weekly performed less well (by 7 score points) than those who used them twice-monthly or less often.

Table 5.19: Percentages of Sixth class pupils taught by teachers who used selected materials with varying degrees of frequency in mathematics classes

	Most or all days	Once or twice a week	Once or twice a month or less
	%	%	%
Textbooks	91.5	8.1	42.0
Workbooks/worksheets	44.4	39.2	48.7
ICTs / digital resources	35.3	38.4	16.3
Mathematical diagrams	25.8	41.2	26.3
Mathematics games	19.4	39.2	0.4
Table books	17.7	20.2	62.1
Calculators	11.6	46.4	41.3
Real-life materials (e.g., timetables, weights)	9.8	41.5	32.9
Manipulatives	2.1	24.4	73.5
Textbooks	91.5	8.1	42.0

There are no substantive differences in the frequency with which most materials and resources for teaching mathematics are used since NA '09 (see Clerkin & Gilleece, 2010,). However, the percentages of pupils in classrooms in which calculators are used at least weekly has increased from 43% to 58% (see Clerkin & Gilleece, 2010).

In 2014, 57% of pupils in Sixth class were in classrooms in which calculators were used to check answers at least weekly, while 18% were in classrooms in which they were never used for this purpose (Table 5.20; e-Appendix Table A5.47). About 40% were in classes in which calculators were used for routine calculations at least weekly, while 36% were in classrooms where they were never used for this purpose (e-Appendix Table A5.46). Calculators were used relatively infrequently for purposes such as developing number concepts and estimation skills. There are no associations with the frequency of calculator usage and mathematics performance when calculators are used to do routine calculations and to check answers (e-Appendix Tables A5.46, A5.47). However, students who used calculators in most or all lessons to develop number concepts had a significantly lower mean score (by 15 score points) than those who never did so (e-Appendix Table A5.48). In addition, students who use calculators in most or all lessons to develop estimation skills had a significantly lower mean score than those who used them for this purpose once or twice a week, once or twice a month, or rarely or never (e-Appendix Table A5.49). Again, this indicates that some teachers may use calculators as they seek to develop the mathematics skills of lower-achieving pupils.

Since NA '09, there has been a small increase in the proportion of pupils in classrooms in which calculators are used to check answers at least weekly, from 50% to 57% (see Clerkin & Gilleece, 2010). Other uses of calculators have not changed in their frequency.

Table 5.20: Percentages of Sixth class pupils whose teachers indicated varying frequencies with which calculators were used in mathematics classes for specified purposes

	Most or all lessons	Once or twice a week	Once or twice a month	Rarely or never
Checking answers	18.5	38.7	25.1	17.6
Routine calculations	7.8	31.6	24.4	36.2
Developing number concepts (e.g., number sequences)	6.1	15.2	40.0	38.6
Developing estimation skills	4.6	27.6	45.3	22.5

Teachers' Confidence in Teaching Aspects of English and Mathematics

A majority of pupils in Second class were taught by teachers who expressed themselves to be 'very confident' in teaching reading to higher-achieving pupils, teaching reading comprehension strategies, teaching literacy skills across the curriculum, teaching the process of writing, increasing pupils' motivation and engagement, teaching understanding of vocabulary, teaching reading fluency, building children's prior knowledge, and leading a discussion around a text to increase understanding (Table 5.21). Areas in which teachers of one-third or fewer pupils expressed themselves to be very confident were using ICTs to teach English, setting targets to improve overall performance in English, and working with parents to raise children's literacy levels.

No associations were found between teachers' confidence and pupil performance except in the case of teaching understanding of vocabulary, where the mean score of pupils taught by teachers who were 'very confident' was significantly higher than the mean score of pupils taught by teachers who were 'not confident' (e-Appendix Tables A5.50 to A5.64).

NA '09 reported on teachers' confidence levels in four aspects of the teaching of English that were also examined in NA '14: teaching high achievers in reading (57% of pupils were taught by teachers who were very confident in NA '09); teaching reading skills in other subject areas (i.e., across the curriculum) (45%); and working with lower-achieving pupils in reading (39%) and using ICTs to teach English (18%) (Clerkin & Gilleece, 2010). Hence, NA '14 shows no change in teachers' confidence in teaching higher achievers, and some improvement (about 10% points) in teachers' confidence in teaching reading skills across the curriculum, working with lower-achieving pupils, and using ICTs to teach English.

The aspects of teaching mathematics with which teachers felt most confident were teaching mathematical language (with 72% of pupils taught by teachers who were 'very confident'), teaching numeracy across the curriculum (70%), and encouraging children to talk about their mathematical thinking (63%) (Table 5.22; e-Appendix Tables A5.65 to A5.73). Just over half of pupils were taught by teachers who were very confident about teaching mathematical reasoning and problem solving. Areas in which teachers felt relatively less

confident were setting targets to improve mathematics performance, and using ICTs to teach mathematics. Just one performance comparison was statistically significant. Pupils taught by teachers who were very confident about encouraging children to talk about their mathematical thinking had a significantly lower mean score than pupils of teachers who were not confident. Care needs to be exercised in interpreting this finding, however, as the latter group comprised just 1% of pupils.

Table 5.21: Percentages of Second class pupils taught by teachers who expressed varying degrees of confidence in relation to teaching aspects of English

	Very confident	Somewhat confident	Not confident
Teaching higher-achieving pupils in reading	58.1	39.1	2.8
Working with lower-achieving pupils in reading (including identifying difficulties)	48.1	49.2	2.8
Teaching reading comprehension strategies	60.2	37.2	2.6
Teaching literacy (reading) skills across the curriculum	58.8	41.2	0.0
Using ICTs to teach English	27.1	55.7	17.2
Setting targets to improve overall performance in reading	31.3	60.6	8.0
Developing children's oral language in English classes	49.0	49.1	1.9
Developing children's oral language in other classes	48.0	50.1	1.9
Teaching the process of writing	50.7	45.5	3.8
Working with parents to raise children's literacy levels	27.9	60.3	11.7
Increasing pupils' motivation and engagement	53.4	46.1	0.4
Teaching understanding of vocabulary	64.3	34.0	1.8
Teaching reading fluency	57.4	40.7	1.9
Building children's prior/concept knowledge related to a topic	56.1	43.9	0.0
Leading discussion around a text to extend children's understanding (dialogic reading)	60.9	37.9	1.2

Table 5.22: Percentages of Sixth class pupils taught by teachers who expressed varying degrees of confidence in relation to teaching aspects of mathematics

	Very confident	Somewhat confident	Not confident
Teaching mathematical language	71.6	28.4	.0
Teaching numeracy across the curriculum	69.5	29.4	1.1
Encouraging children to talk about their mathematical thinking	63.1	35.6	1.3
Teaching children to reason mathematically and to solve problems	52.7	44.8	2.5
Identifying pupils' learning difficulties in mathematics	51.4	44.7	3.9
Extending the mathematical understanding of higher-achieving pupils	48.5	49.0	2.5
Working with children who have learning difficulties in mathematics	48.5	49.0	2.5
Setting targets to improve performance in mathematics	42.3	54.4	3.3
Using ICTs to teach mathematics	41.5	45.6	12.8

There were differences in the aspects of teaching mathematics about which teachers were asked to rate their confidence in NA '09 and NA '14, meaning that valid comparisons cannot be drawn across the two years.

Teachers' Beliefs about Teaching and Learning Mathematics

As part of the Teacher Questionnaire, teachers of pupils in Sixth class were asked to indicate (on a five-point scale from strongly agree to strongly disagree) their level of agreement with a series of statements relating to the nature of mathematics, and the teaching and learning of mathematics. The statements were adapted from work involving preservice teachers by Charalambous (2008).

The statements that received highest levels of agreement from teachers were: "to do well, pupils must learn facts, principles and formulas in maths" (mean = 3.9; Table 5.23; e-Appendix Table A5.74), "the most important issue is not whether the answer to any maths problem is correct, but whether pupils can explain their answers" (3.9) and "in learning maths, pupils must master skills and topics at one level before moving on" (3.8). Hence, while teachers generally supported the view that learning mathematics requires structures and sequence, they also saw benefit in pupils explaining their answers (an activity consistent with constructivist approaches to teaching and learning).

Statements on which teachers most strongly disagreed included: "If pupils get into arguments about ideas or procedures in maths class, it can impede their learning of maths" (2.0), and "because older children can reason abstractly, the use of models and other visual aids becomes less necessary as pupils progress through primary school" (2.3). However, it is

notable that between 56% and 59% of pupils are taught by teachers who neither agreed nor disagreed with these statements.

Items on which teachers showed greatest differences were those with mean scores around 3.0. These include "If primary school pupils use calculators, they won't learn the maths they need to know" (2.7), "teachers should follow the maths textbook that is used in their school", and "the range of ability in most classes makes whole-class teaching in maths virtually impossible" (2.8). The response of teachers to the calculator item suggests that there is still some uncertainty around the value of calculators in teaching and learning mathematics. Uncertainty around the items dealing with textbooks and variation in ability in classes may arise because teachers often follow class textbooks, and engage in whole-class teaching, but may have doubts about doing so.

A principal components analysis was conducted on the teacher beliefs data, and four factors, explaining almost 50% of the variance in responses, were obtained (e-Appendix Tables A5.75-A5.78). The factors can be described as:

- A view of mathematics as rule-based, and teaching and learning mathematics as structured and textbook-driven.
- A view of mathematics as rule-based, and teaching and learning mathematics as constructivist, discussion-based and related to the needs of pupils.
- A view of mathematics as requiring natural ability, and teaching and learning as constructivist, though fewer models or concrete materials are available as pupils develop.
- Mathematics as requiring natural ability, and teaching and learning as structured and abstract in nature.

Neither factors nor responses to individual belief items were significantly associated with pupils' mathematics performance. This underlines the complexity in the relationship between teacher beliefs and pupil performance, and the fact that other important variables, such as mathematical knowledge for teaching, may intervene.

Table 5.23: Percentages of Sixth class pupils whose teachers indicated varying levels of agreement with statements on learning mathematics

	Strongly Agree	Agree	Dis-agree	Neither Agree/ Dis-agree	Strongly disagree	Mean*
To do well, pupils must learn facts, principles and formulas in maths	16.9	65.0	8.0	10.1	0.0	3.9
The most important issue is not whether the answer to any maths problem is correct, but whether pupils can explain their answers	26.4	46.4	8.3	18.5	0.4	3.9
In learning maths, pupils must master topics and skills at one level before going on	20.7	53.1	11.6	13.5	1.1	3.8
Many pupils who struggle with word problems cannot read the problems, but know the underlying mathematics	12.6	50.0	16.5	19.2	1.6	3.6
Teachers should not necessarily answer students' questions but should let them puzzle things out themselves.	10.9	43.3	15.0	29.9	0.8	3.5
When pupils can't solve problems, it's usually because they can't remember the right formula or rule	3.6	29.2	32.4	27.0	7.8	2.9
The range of ability in most classes makes whole-class teaching in maths virtually impossible	7.2	21.4	39.8	25.6	6.1	2.8
If primary school pupils use calculators, they won't learn the maths they need to know	7.2	21.4	39.8	25.6	6.1	2.7
Teachers should follow the maths textbook that is used in their school	1.2	22.0	30.2	36.1	10.5	2.7
Maths is a subject in which natural ability matters a lot more than effort	3.3	16.1	52.9	23.3	4.5	2.6
Because older children can reason abstractly, the use of models and other visual aids becomes less necessary as pupils progress through primary school	1.7	12.1	56.1	16.4	13.6	2.3
If pupils get into arguments about ideas or procedures in maths class, it can impede their learning of maths	1.8	7.3	59.1	5.6	26.3	2.0

* 5 = strongly agree; 4 = agree; 3 = neither agree nor disagree; 2: disagree; and 1: strongly disagree. Hence, a higher mean score indicates stronger agreement.

Assessment of English and Mathematics

Standardised tests

Fifty-nine percent of pupils in Second class in NA '14 were taught by teachers who reported that one standardised test of English reading had been, or would be, administered during the 2013-14 school year (not including the English reading test administered as part of NA '14, while 4% were taught by teachers who administered three or more standardised tests (Table 5.24; e-Appendix Table A5.79). There were no differences in reading performance among pupils to whom tests were administered with varying degrees of frequency. This may suggest that other tests administered by teachers (such as diagnostic tests) may be as effective as extra standardised tests in providing additional information about pupils' learning.

Table 5.24: Percentages of Second class pupils whose teachers reported varying frequencies of administering standardised tests of reading and mean English reading scores

	Second	
	%	Reading
Once*	59.3	264.5
Twice	35.5	263.4
Three or more	3.6	261.3
Not assessed	1.5	261.3

Scores in **bold** are significantly different from the mean score of the reference (*) group.

At Sixth class, 83% of pupils were taught by teachers who reported that one standardised test of mathematics had been, or would be, administered during the 2013-14 school year (not including the standardised mathematics test administered as part of NA '14) (Table 5.25). Teachers of just 2% of pupils indicated that a test would not be administered. There were no significant differences in mathematics performance between students taking 2, 3 or no standardised tests, compared with those taking one (e-Appendix Table A5.80); the 16-point difference in favour of those taking no standardised test, compared with those taking one, is not large enough to reach statistical significance.

In NA '09, 72% of pupils were taught by teachers who reported that one standardised test had been (or would be) administered, and 10% by teachers across grade levels who reported that no test had been administered (Eivers et al., 2010). Roughly similar proportions of pupils in NA '09 were taught by teachers reporting two (15%) and three (3%) administrations.

Table 5.25: Percentages of Sixth class pupils whose teachers reported varying frequencies for the administration of standardised tests of maths and mean maths scores

	Sixth	
	%	Maths
Once*	83.0	262.3
Twice	11.5	255.8
Three or more	3.7	260.7
Not assessed	1.8	278.7

Scores in **bold** are significantly different from the mean score of the reference (*) group.

Non-standardised assessments

Teachers also reported on the frequency with which they used a range of non-standardised classroom assessments to assess English reading, with teacher-designed tests, documented observations and self-assessment by children being used most frequently (at least weekly by teachers of 41%, 29% and 29% of pupils, respectively) (Table 5.26; e-Appendix Table A5.81). Assessment strategies that were seldom used included computer-based tests (teachers of 87% of teachers never used them), curriculum profiles (61%), published rubrics (75%), teacher-designed rubrics (56%) and pupil conferences (49%).

Table 5.26: Percentages of Second class pupils taught by teachers who reported using each of several non-standardised assessment methods in English lessons with varying degrees of frequency

	Second				
	At least weekly	Monthly	Once a term	Once or twice a year	Never
Teacher-designed tests	41.0	25.9	25.4	5.5	2.3
Teacher-designed checklists	21.3	32.3	28.2	12.1	6.2
Documented observations	28.8	25.3	28.5	12.5	4.9
Published progress tests or checklists	5.2	10.9	27.0	30.3	26.7
Self-assessment by children	29.0	31.5	13.4	11.7	14.3
Curriculum profiles	1.7	14.6	14.0	9.2	60.5
Portfolios	6.5	23.9	22.8	12.3	34.5
Diagnostic tests	1.0	4.0	13.4	60.3	21.2
Computer-based tests	0.2	0.4	1.8	11.0	86.6
Error analysis of oral reading	13.0	11.4	12.9	25.9	36.7
Teacher-designed rubrics	2.7	15.6	11.5	14.2	56.0
Published rubrics	1.0	2.1	6.9	15.4	74.5
Student conferences	9.8	15.2	13.2	12.7	49.1

In NA '09, 76% of Second class pupils were taught by teachers who reported using error analysis in English lessons at least monthly (Clerkin & Gilleece, 2010). This dropped to 24% in NA '14. On the other hand, teachers of 46% of Second class pupils in NA '09 reported using documented observations in English lessons at least monthly, compared with 54% of Second class pupils in NA '14. Similarly, portfolios were used at least monthly by teachers of 21% of Second class pupils in NA '09, and by teachers of 30% of Second class pupils in NA '14. Curriculum profiles (for which First Steps was given as an example) tended to be underused in both NA '09 and NA '14.

The most commonly-used non-standardised assessments of mathematics in Sixth class were teacher-designed tests (44% of pupils were in classes in which these tests were used at least weekly), error analysis (42%) and self-assessment by pupils (41%) (Table 5.27; e-Appendix Table A5.82). Relatively little use was made of documented observations, reflective journals or computer-based tests. Published progress tests were used by teachers of about one half of pupils once a term. Diagnostic tests were used by teachers of one-fifth of pupils at least once a term.

The frequency of use of non-standardised assessments of mathematics once a month or more often was almost identical in NA '09 and NA '14 (see Clerkin & Gilleece, 2010).

Table 5.27: Percentages of Sixth class pupils taught by teachers who reported using each of several non-standardised assessment methods in mathematics lessons with varying degrees of frequency

	Sixth				
	At least weekly	Monthly	Once a term	Once or twice a year	Never
Teacher-designed tests	43.6	42.8	11.9	1.1	.5
Error analysis	42.4	10.2	8.3	13.3	25.9
Self-assessment by pupils	40.9	21.3	17.7	10.5	9.6
Documented observations	19.0	29.5	24.0	14.5	13.0
Teacher-designed checklists	17.7	33.6	21.8	12.0	14.8
Portfolios	4.9	11.7	13.1	8.9	61.4
Published progress tests	4.7	16.7	30.7	29.7	18.1
Reflective journals	3.4	3.1	3.6	7.3	82.5
Computer-based tests	3.2	6.5	5.2	14.6	70.5
Diagnostic mathematics tests	0.9	6.0	11.6	63.9	17.5

Initiatives to Improve Aspects of Literacy and Numeracy

Teachers of pupils in Second class were asked to indicate the frequency with which they implemented specified literacy initiatives. Caution is urged in interpreting the outcomes, as no account was taken of the extent to which teachers adhered to programme guidelines

during implementation, or indeed, if teachers were aware that programmes such as Reading for Fun and Write to Read are based on specified procedures and generally include some level of CPD. In any event, Reading for Fun, Paired Reading and Jolly Phonics were the reading initiatives implemented most often by teachers, with about half or more of pupils in classrooms in which these programmes were used on a weekly basis or more often (Table 5.28; e-Appendix Table A5.83). Programmes that were used at least weekly by teachers of between 10% and 20% of pupils included First Steps Writing (19%), First Steps Reading (12%), First Steps Oral Language (10%) and Literacy Lift Off /Power Hour (10%). Thirty-one percent of pupils were taught by teachers who reported using other programmes. The most common of these were DEAR (Drop Everything and Read), Building Bridges (a reading comprehension strategy instruction programme), and Guided Reading/Guided Reading PM. Also mentioned were Letterland, Newell Phonics, Reader's Theatre and Hands On Phonics.

Table 5.28: Percentages of Second class pupils taught by teachers who reported using each of several reading initiatives with varying degrees of frequency

	Second				
	At least weekly	Monthly	Once a term	Once or twice a year	Never
First Steps – Reading	11.9	8.4	1.9	4.9	72.8
First Steps – Writing	18.6	7.5	3.9	3.6	66.4
First Steps – Oral Language	9.6	9.1	1.1	5.4	74.8
Literacy Lift Off/Power Hour	9.6	3.4	3.6	5.6	77.9
Write to Read	5.8	6.7	0.2	3.2	84.1
Jolly Phonics	49.3	8.7	0.9	3.7	37.4
Paired Reading	50.7	21.1	12.4	7.8	8.0
Reading for Fun	77.6	5.6	1.8	1.2	13.8
Other	31.3	2.7	1.3	3.0	61.6

An analysis of the frequency with which programmes were implemented across different categories of schools found that First Steps Writing was implemented by teachers of 67% of pupils in DEIS Band 1 schools, 38% in DEIS Band 2 schools, and 14% in urban non-DEIS schools (e-Appendix Tables A5.84 to A5.92). On the other hand, Jolly Phonics was implemented by teachers of at least 40% of pupils in all school categories (both DEIS and non-DEIS).

Teachers of pupils in Sixth class were asked to indicate the frequency with which they implemented different initiatives designed to improve the teaching and learning of mathematics. As with English, it was not possible to ascertain if teachers implemented official versions of the programmes listed, or adapted them for their own use. Paired Maths was the most frequently implemented programme (33% were in classrooms in which this was implemented at least monthly), followed by Maths for Fun (11%) (Table 5.29; e-Appendix Table A5.93). Pupils of 10% of teachers were in classrooms in which 'other' programmes had

been implemented. These included: Maths Eyes, Maths Trails, Maths Week, and Brain Snack. Under the 'other' category, some teachers mentioned activities did not constitute a formal programme such as use of ICTs and team teaching.

Table 5.29: Percentages of Sixth class pupils taught by teachers who reported using each of several reading initiatives with varying degrees of frequency

	Sixth		
	At least monthly	**A few times a year**	**Never**
Paired Maths	33.1	12.7	54.2
Maths for FUN	11.2	8.5	80.2
Maths Recovery	5.6	3.2	91.2
Ready, Steady, Go Maths	0.8	2.6	96.6
JUMP Maths	0.0	1.3	98.7
Other	9.9	3.7	86.4

The categories 'at least weekly' and 'at least monthly' were aggregated into 'at least monthly or more often', while the categories 'once a term' and 'once or twice a year' were collapsed to 'a few times a year'. This was necessitated by the small percentages in some categories.

CPD Priorities and Planning

Priorities for CPD

This section addresses teachers' priorities for CPD in English and mathematics. It does not examine how teachers identify their CPD needs, nor the uses they make of knowledge and skills gleaned through participation in CPD.

Teachers indicated their priorities for CPD needs for English (Second class) and mathematics (Sixth), by listing up to three priorities. Priorities were categorised and imported into the pupil databases. At Second class, 44% of pupils were taught by teachers who identified development of writing as one of their three priority topics (Table 5.30; e-Appendix Table A5.94). Dimensions of writing development referred to by teachers included creative writing, the writing process, writing genres, development of an English writing plan, and engaging boys in writing. Twenty-nine percent of pupils were taught by teachers who listed reading comprehension/comprehension strategies as a priority area. Unlike writing, teachers tended not to elaborate on the comprehension strategies or teaching processes about which they wished to learn more. Twenty-seven percent of pupils were taught by teachers who indicated oral language as a priority area. Aspects of oral language referred to by teachers included: the First Steps oral language programme, developing confidence in speaking about a topic, structuring the teaching of oral language, and addressing difficulties with oral language. Similar percentages of pupils (23% in each case) were taught by teachers who identified assessment and addressing learning difficulties as CPD needs. Aspects of assessment referred to by teachers included target setting outside the context of standardised tests, use of profiles for all aspects of English, self-assessment, goal setting, and selection and use of non-

standardised tests. Under addressing learning differences, teachers mentioned remediating learning difficulties, differentiation, addressing dyslexic difficulties, teaching children with speech problems, working with gifted children, and supporting children with special education needs. Eighteen percent of pupils were taught by teachers who mentioned ICT as a CPD need. Like reading comprehension strategies, most teachers did not elaborate on specific CPD needs within the ICT category.

Initiatives and programmes (17%) included reference to various intervention programmes not already covered under oral language or writing. These included Guided Reading, First Steps reading, teaching English throughout the curriculum, Write to Read and Literacy Lift Off. Eleven percent or fewer were in classes whose teachers mentioned specific basic processes such as spelling, phonics/word identification and fluency.

The 'Other' category comprised a variety of needs including meeting with teachers from other schools, reflecting on lessons and on children's work in a collaborative setting to benchmark performance (as against traditional planning sessions), learning practical hands-on methods, and implementing team teaching.

Table 5.30: Percentages of Second class pupils taught by teachers who selected various priority topics for CPD in English

	Second*
Development of Writing	43.7
Comprehension/ Comprehension Strategies	28.9
Oral Language	26.7
Assessment	23.2
Addressing learning differences	23.1
ICT	18.4
Initiatives and Programmes	16.5
Spelling	10.6
Fluency	9.6
Phonics/Word Identification/Phonemic Aw.	8.7
Vocabulary	7.4
Parents	1.7
Motivation and Engagement	1.2
Other	19.5

*Six percent of pupils were taught by teachers for whom no data were provided on this item

In NA '09, 48% of pupils in Second class were taught by teachers who selected writing development as one of their top three CPD priorities (Eivers et al., 2010) – slightly more than in NA '2014 (44%). More pupils in NA '09 were taught by teachers who identified

phonics/phonological awareness as a need (24%, compared with 9% in NA '14). In NA '09, 10% of pupils were taught by teachers who identified vocabulary/oral language (combined) as a priority. In NA '14, where these elements were separated out, 27% of pupils were taught by teachers who referred to oral language, and 7% by teachers who mentioned vocabulary. Assessment also featured more strongly in NA '14 (23%) than in NA '09 (9%). Hence, in NA '14, teachers were more likely to identify assessment, language, and comprehension needs than their counterparts in NA '09.

Teachers of pupils in Sixth class listed up to three CPD needs in the area of mathematics. Again, these were coded into broad categories, and the percentage selecting a topic in each category was calculated. Over half of pupils were taught by teachers who selected problem solving / reasoning as a priority area (Table 5.31; e-Appendix Table A5.95). Specific priorities within this category included reference to problem solving across strands, solving real-world problems, and identifying effective strategies for teaching problem solving.

Just over thirty percent of pupils were taught by teachers who identified CPD in ICT as a priority need. Specific priorities within this category included teaching mathematics through the use of ICTs, effective use of interactive whiteboards to teach mathematics, and using ICT to make mathematics relevant to real life. Thirty percent of pupils were taught by teachers who identified specific mathematics content strands, substrands, or their components as areas of need. These included algebra, 3-D shapes, fractions and decimals, long division, place value, indices, number theory data and chance, ratio and percentages. One in six pupils were taught by teachers who identified needs relating to mathematics activities, resources, and games, including mathematics games for lateral thinking, use of manipulatives, more interactive approaches to teaching, and mathematical puzzles. Among the needs identified by teachers under the category 'working with children of varying abilities' (17% of pupils) were differentiation, and strategies for working with gifted and talented children. Assessment and recording (11%) included general approaches to assessment in mathematics, and informal approaches and methods for identifying progression. The 'other' category (16% of pupils) included courses for renewing teachers' own mathematical knowledge, more opportunities for consulting with peers, and more effective use of in-school time available for CPD (rather than for other staff-orientated purposes).

Teachers in NA '14 indicated their agreement with three statements relating to how CPD might be provided. Fifty-eight percent of pupils in Second class were taught by teachers who strongly agreed that they would benefit from external CPD on the teaching of English, while just 4% of pupils were taught by teachers who disagreed (Table 5.32; e-Appendix Table A5.96). Just 21% of pupils in Second were taught by teachers who strongly agreed that they would benefit from taking online courses on the teaching of English, while 17% were taught by teachers who disagreed. Finally, just 4% were taught by teachers who strongly agreed that that all their CPD needs in English could be met at school level. Thus, teachers seem to

prefer a variety of CPD formats, with a particularly high level of support for external CPD in a face-to-face context.

Table 5.31: Percentages of Sixth pupils taught by teachers who selected various priority topics for CPD in mathematics

	Sixth*
Problem solving / reasoning	51.8
ICT	31.2
Specific maths content (Strand/strand unit)	29.7
Maths activities / manipulatives /resources / games	17.1
Working with children of varying abilities / differentiation	13.9
Assessment, Recording	10.7
Conceptual development/abstract thinking/strategic thinking	8.2
Planning for maths / target setting	7.1
Programme/approach	7.0
Mental arithmetic/facts/tables	6.9
Learning difficulties	5.2
Post-primary, secondary maths/project maths	4.1
Language/vocabulary	3.5
Team teaching	2.8
Maths across the curriculum	1.4
Other	16.4

*Six percent of pupils were taught by teachers for whom no data were provided on this item.

Table 5.32: Percentages of Second class pupils taught by teachers who indicated varying levels of agreement with statements relating to the format of CPD in English

	Second		
	Strongly Agree	Agree	Disagree
I would benefit from external CPD in the teaching of English provided face-to-face	58.3	38.0	3.7
I would benefit from taking online courses on the teaching of English	20.7	62.1	17.2
All my CPD needs in English can be met at school level (e.g., in school planning meetings)	3.5	27.7	68.9

Teachers of pupils in Sixth class responded in a similar manner to their colleagues in Second class, with over half of pupils taught by teachers who strongly agreed that they would benefit from external CPD (Table 5.33; e-Appendix Table A5.97). There was somewhat weaker support for online courses, though over three-quarters of pupils were taught by teachers who 'agreed' or 'strongly agreed' that they would benefit from such courses. An additional question at Sixth class asked teachers if they would benefit from a course to

improve their own understanding of the mathematics they teach. Here, 22% 'strongly agreed' that they would benefit, while 45% 'agreed'.

Table 5.33: Percentages of Sixth class pupils taught by teachers who indicated varying levels of agreement with statements relating to the format of CPD for mathematics

	Sixth class		
	Strongly Agree	**Agree**	**Disagree**
I would benefit from external CPD in the teaching of mathematics provided face-to-face	53.4	40.9	5.6
I would benefit from taking online courses on the teaching of mathematics	19.2	57.2	23.6
All my CPD needs in mathematics can be met at school level (e.g., in school planning meetings)	7.1	45.0	32.9
I would benefit from a course to improve my understanding of the mathematics I teach	22.1	45.0	32.9

Target Setting for English and Mathematics

Although much of the focus on target setting in recent years has been at school level (for example, as part of School Self-Evaluation), it was of interest to understand how teachers set targets for English reading and mathematics, and which factors impacted on the targets they set. Teachers of pupils in Second were asked to indicate how they established targets for teaching English, while their counterparts in Sixth class were asked the same question with respect to mathematics. Fifty-five percent of pupils in Second class were taught by teachers who mainly set class-level targets based on school-level targets, while a further 23% were taught by teachers who mainly set class-level targets that were independent of school-level targets (Table 5.34; e-Appendix Table A5.98). One-fifth of pupils were taught by teachers who did not establish class-level targets.

At Sixth class, one-quarter of pupils were taught by teachers who did not set targets, while 43% were taught by teachers who mainly based their targets on school-level targets (e-Appendix Table A5.99). Almost one-quarter of pupils were taught by teachers who did not set class-level targets for maths.

Table 5.34: Percentages of pupils taught by teachers who indicated varying approaches to setting class-level targets for English reading (Second class) and mathematics (Sixth)

	Second*	**Sixth****
I mainly set class-level targets based on school-level targets.	55.0	43.4
I mainly set class-level targets independent of school-level targets.	25.5	31.4
I do not set class-level targets.	19.5	24.0

*9.6% were taught by teachers for whom responses were missing (English).

**7.3% were taught by teachers for whom responses were missing (mathematics).

Teachers of both Second and Sixth class pupils were also asked about sources of influence on their setting of targets. Table 5.35 is based on the responses of teachers who indicated that they set class-level targets. The strongest influence on teachers' class-level targets at both grade levels was the assessed needs of pupils, with 67% of Second class pupils taught by teachers who indicated that assessed needs impacted on their targets 'to a great extent', and 63% in Sixth (also see e-Appendix Tables A5.100 and A5.101). School-level targets also had a somewhat greater impact on target setting for English at Second class (53% of pupils) than at Sixth (42%) for maths. Other sources mentioned by teachers of pupils in Second class as having an impact on targets included: graded readers, First Steps continua, and parent/pupil surveys. Other sources mentioned by teachers of pupils in Sixth class included: targets are set in relation to each topic; targets are based on a variety of post-primary entrance exams; and targets set out in a report of a Whole School Evaluation (WSE).

Table 5.35: Percentages of pupils taught by teachers who indicated varying levels of impact from various sources on targets set for pupils, by grade and domain

	Second- English		Sixth- Maths	
	To a great extent	To some extent	To a great extent	To some extent
National targets in National Strategy	23.1	46.2	15.7	49.6
School-level targets to improve literacy/numeracy	52.5	39.9	41.9	43.7
Assessed needs of pupils in class	66.8	29.0	62.9	31.3
Other	4.2	29.2	31.1	32.5

Based on teachers who indicated that they mainly set class-level targets based on school-level targets or independent of them

Teachers of pupils in Second class who indicated that they set targets were invited to provide examples of class-level targets for English that they had set in the current year, while teachers of pupils in Sixth were invited to provide targets for mathematics. Since many teachers who indicated that they set targets did not provide examples, percentages are not given here.

In English at Second class, the majority of targets provided by teachers were in the areas of comprehension strategies, writing, specific targets related to reading tests, word reading/phonics, reading in general (specific targets not given), and graded readers. A number of aspects of English, including spelling, vocabulary, confidence/engagement, and grammar were under-represented among the targets proposed by teachers.

Examples of targets relating to comprehension strategies included: Students will summarise text by identifying main points; answering 5 questions accurately based on a narrative or information piece; all students correctly use comprehension process motions to demonstrate understanding; and focusing on a different comprehension strategy each month – e.g., visualisation. Examples of writing targets include: enable child to write recounts and reports; write two or more sentences that are related in meaning, adhere to grammar and

punctuation; explicit focus on writing genres; and reread to check for capital letters and full stops. Targets related to reading tests included: we aim to have all children above the 30th percentile; to increase reading levels by 5%; and to move children on Stens 1-4 into the middle. A target related to graded readers was: All pupils not attending learning support will read Level 28 PM reader.

The targets for mathematics given by teachers of pupils in Sixth class were mainly in the areas of problem solving, specific mathematics topics, mental maths (maths facts), curriculum, attitudes, engagement and confidence, and mathematics vocabulary/discourse.

Targets for problem solving included engaging pupils with the RUDE or RUCSAC problem solving strategies, daily problem solving from sources outside class textbook, completing a problem of the week, solving problems related to VAT, and raising performance on problem solving subtests. Targets relating to specific mathematics topics included converting between 12- and 24-hour times, accurately measuring angles with a protractor, using negative numbers, changing fractions to percentages, and dividing a decimal number by a decimal number, with and without a calculator. Targets based on maths facts included achieving 18 out of 20 on daily mental maths challenges, improving speed and accuracy of mental maths, developing strategies to work out calculations, and spending 10 minutes per day on mental maths. Targets linked to performance on standardised tests included improving standardised scores by a minimum of 5% per child, 75% of pupils to achieve between Sten scores 8-10, achieving the same pattern of Sten scores as last year, and achieving a class average above 80%.

Resources and Support

This section looks at the resources used by teachers to teach English and mathematics, and the delivery of learning support programmes.

Classroom Resources

Library Resources

According to teachers in Second class, the average number of library books in their class was 258 (Table 5.36; e-Appendix Table A5.102). This translates to an average ratio of 10.6 books per pupil. Just 1% of books were in languages other than English or Gaeilge, with 78.8% of pupils in classes in which there were no books in other languages.

An average of 30.3 books were added to classroom libraries in the 2013-14 school year. However, one-quarter of pupils were in classrooms where there were no new books.

Over two-thirds of books in classrooms were fiction books, while 19% were non-fiction, and 9% were reference books. Fewer than 3% of books fell into the 'other' category.

In NA '09, the ratio of books to pupils in classroom libraries was 10.1:1 at Second class – just below the estimate of 10.6 in NA '14. Also in NA '09, fiction comprised two-thirds of books at Second class, 21% were non-fiction, and 11% were described as reference (Eivers et al., 2010).

Table 5.36: Data (mean) on classroom libraries in Second class

	Second
Number of books in class library	255.7
Ratio of books to pupils	10.6
Percent of books in languages other than English / Gaeilge	1.0
Percent of pupils in classes with no books in other languages	78.8
Number of new books added since September 2013	30.3
Percent of pupils in classrooms with no new books	25.5
Percent of books that are new	12.8
Types of Books in Class Library	
Percent of Books – Fiction	69.0
Percent of Books – Non-fiction	19.2
Percent of Books – Reference	9.3
Percent – Other	2.5

Data on classroom library books were broadly similar in NA '09, when the ratio of books to pupils was 10.1. The proportions of fiction, non-fiction, and reference books were also about the same in NA '09 as in NA '14 (Eivers et al., 2010, Figure 5.6).

Technology

Teachers were asked about the availability of 6 ICT resources in their classrooms. Two-thirds of pupils in Second class were in classrooms with computing devices available for pupil use, while 90% were in classes with interactive whiteboards (Table 5.37; e-Appendix Table A5.103). Just over one-quarter were in classrooms in which e-books were available, while 95% had broadband Internet. Thirteen percent were in classrooms in which all six ICT resources were available. Figures were similar for pupils in Sixth class (Table 5.37; e-Appendix Table A5.104).

Table 5.37: Percentages of pupils in classrooms with various ICT resources, by grade level

Resource	Second	Sixth
Computers/computing devices for pupils' use	67.8	68.8
An interactive whiteboard	89.5	87.1
A digital projector (linked to computer)	70.5	73.0
Electronic books (e-books for pupils)	26.7	---
Digital camera/video camera	68.2	65.7
Broadband Internet	95.1	94.7

Teachers were asked about the frequency of use of selected ICT devices and software during lessons. Teachers of pupils in Second class answered with respect to English lessons, and teachers of pupils in Sixth class answered with respect to mathematics lessons. While computing devices were used by teachers of over three-quarters of pupils at least weekly at both class levels, around one-quarter of pupils used computing devices with the same frequency (Table 5.38).

Table 5.38: Percentages of pupils in classrooms in which various ICT devices are used in most or all lessons or once or twice a week, by grade level and domain

	Second - English		Sixth - Maths	
	Most or all lessons	Once or twice a week	Most or all lessons	Once or twice a week
Computers/computing devices by the teacher	40.1	37.1	45.2	27.4
Computers/computing devices by pupils	2.0	22.2	6.3	22.9
Interactive whiteboard	47.1	31.1	50.8	26.2
Digital projector	26.9	27.8	35.1	16.3
Digital camera/video recorder	0.5	2.5	1.3	1.1
Software to teach subject	2.4	20.5	8.9	23.5
Internet to plan lessons	16.5	35.8	17.5	34.6
Internet to deliver lessons	7.0	33.2	10.1	28.0

About one-quarter of pupils were taught by teachers who used software to teach English and mathematics weekly, or more often. At both English at Second class, and mathematics at Sixth, more pupils were taught by teachers who used the Internet to plan lessons at least weekly than were taught by teachers who used the Internet to deliver lessons. Digital cameras were rarely used to support the teaching of English or mathematics.

Learning Support

At Second class, the most common form of learning support for English involved withdrawal in small groups, with 87% of pupils in classes in which this form of support was available, and, in the case of 23%, was the only form of support provided (Table 5.39; e-Appendix Table A5.105). Just under half of pupils in Second were in classes in which in-class support was available, though just 2% were in classes in which this was the only form of support. Fifty-six percent of pupils in Second class were in classes in which individual withdrawal was available, with 7% in classes in which this was the only form of support. Data were broadly similar for Sixth class mathematics, with 45% of pupils in classes where some in-class support was provided, 78% in classes where withdrawal in a group was practised, and 49% where at least some pupils were withdrawn individually (e-Appendix Table A5.106).

Table 5.39: Percentages of pupils in receipt of various forms of learning support for English, by grade level and domain

	Second – Reading	Sixth – Maths
In-class support	47.1	45.2
In-class support only	2.3	9.3
Withdrawal from class – in a group	86.7	77.8
Withdrawal from class – in a group, only	22.6	27.8
Withdrawal from class – individually	56.2	48.6
Withdrawal from class – individually, only	6.9	4.3
No additional support provided	2.1	5.7

In NA '09, it was estimated that 3% of pupils in Second class (English) and 9% in Sixth class (mathematics) were in classes where no additional support was accessed. Hence, the figure for English reading in NA '14 is similar to that for NA '09, while marginally fewer pupils in NA '14 (6%) are in classes where no support in mathematics is availed of, compared with 9% in NA '09 (Clerkin & Gilleece, 2010).

There are increases in the provision of in-class support. In NA '09, 7% of pupils in Second (English) and 11% in Sixth (mathematics) were in classes where in-class support was provided (see Clerkin & Gilleece, 2010). In NA '14, 47% in Second (English) and 45% in Sixth (maths) were in classes where in-class support was provided.

Teachers indicated the extent to which they perceived that there was cohesion between pupils' class programmes and their learning support/resource programmes. Forty-two percent of pupils in Second class were in classes in which class and support programmes for English were seen to be coherent to 'a great extent', while a similar proportion were in classes in which they were seen be coherent 'to some extent' (Table 5.40; e-Appendix Table A5.107). At Sixth class, 55% were in classes with teachers who viewed class and support programmes in mathematics as being coherent 'to a great extent' (Table 5.40; e-Appendix Table A5.108).

Table 5.40: Percentages of pupils whose teachers perceived varying levels of coherence between classroom and learning support/resource programmes, by grade level

	Second – Reading	Sixth – Maths
A great extent	42.0	54.6
Some extent	46.3	37.0
Little or none	11.8	8.3

In NA '09, 47% of pupils in Second class and 46% in Sixth thought that classroom and learning support programmes were coherent to a great extent (Eivers et al., 2010). Teachers in NA '09 were not asked to answer separately with respect to English or mathematics, as they were in NA '14.

Comments of Teachers

At the end of the Teacher Questionnaires, teachers of pupils in Second class were invited to make comments on the teaching, learning, and assessment of English, while teachers of pupils in Sixth class were invited to comment on these areas in the context of mathematics. The teachers of 17% of pupils in Second class and 30% in Sixth class made at least one comment. Hence, particular care should be exercised in interpreting teachers' comments, as they may not be representative of the views of all teachers who responded to the survey.

Almost 4% of pupils in Second class were taught by teachers who commented on multi-ability classes, multi-class teaching, or class size (Table 5.41; e-Appendix Table A5.109). Most of these comments described how multi-grade classes and large classes presented a significant challenge to the teaching of reading in general, assessing pupils' reading skills, and addressing their individual needs. For example, one teacher noted that "Class sizes hugely impact the teaching of maths and English; it is next to impossible to give each child individual attention/help on a regular basis". Almost 4% were taught by teachers who also commented on instructional strategies for reading. These included requests for support in implementing programmes such as First Steps, station teaching, and team teaching. The value of PM readers was also mentioned. Under programme development/outcomes (3.6%), teachers called for more specific school-level/class-level targets for English as well as better linkages across classes within schools. Under time/curriculum overload (3%), teachers referred to a lack of time to teach and assess English, often referring to time issues, large class sizes, and variation in ability or language proficiency within classes. The remaining categories are based on the responses of fewer than 3% of teachers.

Table 5.41: Percentages of Second class pupils whose teachers made comments on the teaching and learning of English, by comment category

Comment Category	Second Example of Comments	%
At least one comment provided	---	17.1
Multi-ability classes, multi-class teaching, class size	Many ideas are difficult to put into place in a small school like this - 3 classes with 27 children is very demanding.	3.8
Instructional strategies for reading (library, levelled readers, reading schemes)	We have found that station/team teaching works well in English. This has not been implemented at senior level yet.	3.7
Planning/outcomes	More specific targets would make school/class planning more effective and less open to interpretation.	3.6
Time/Curriculum overload	The struggle with teaching English continues to be the problem of an already over packed curriculum and time constraints due to many other demands on the teaching day.	3.0
Assessment	Too much emphasis on formal assessment of English to the detriment of Gaeilge.	2.6
Resources (e.g., library, levelled readers, reading schemes)	Reading schemes (commercial) are too easy and of little interest to children. Hard to source 30+ novels.	2.4
Interest, engagement and motivation	Pupils enjoy reading and listening to teacher reading stories, I think that pupils love books and we have very good interest levels in reading in all classes.	2.3
English as a second language	We have 50% non-national students in our class. English language ability and standard varies hugely depending on the child and their background.	1.3
Promoting Literacy at Home	Promoting literacy at home to children and parents who most require it is a significant challenge.	1.0
Continuing professional development	More CPD needs to be offered to all staff, where initiatives are being rolled out in schools. I am also quite concerned/frustrated that while new initiatives are being rolled out non - DEIS schools have no funding.	0.6
Paperwork/recording	Time allocated to paperwork could be more fruitfully allocated to teaching and learning.	0.5
Writing	The description circle is an extremely beneficial intervention for writing during Literacy Lift Off.	0.3
Other	I feel the teaching and assessment of English is done very well in our school. We have any resources we need.	0.6

As with Second class, care should be exercised in interpreting comments provided by teachers of pupils in Sixth class, as less than one-third of teachers offered comments. As noted in Table 5.42 (and e-Appendix Table A5.110), teachers' comments relating to mathematics fell into eight broad categories, of which time/curriculum overload, issues relating to syllabus/textbooks, and 'other' were the most frequent.

Most comments in the category of time/curriculum overload (8.7% of pupils were taught by teachers who provided comments categorised in this way) related to lack of time to teach mathematics, and the fact that teachers were pressured to teach a broad curriculum, and therefore could not allocate sufficient time to maths. Comments in the area of curriculum/textbooks (6.2% of pupils) included issues about the coherence between curriculum at primary and post-primary levels, with some teachers expressing an interest in better preparing pupils for mathematics at post-primary level, e.g. by learning more about Project Maths. The impact of textbooks was also commented on, and it was noted that the presentation of problems in textbooks was often formulaic, and did not lead to transfer of learning across problems. It was also asserted that the mathematics curriculum was insufficiently challenging, and that expectations should be raised. Under assessment/target setting (4.6%), teachers noted the additional time required to engage in formative assessment and pupil self-assessment. One teacher suggested that one hour and 20 minutes per day should be allocated to mathematics classes to cover the full range of teaching and assessment activities. Another teacher questioned why there was not an emphasis on process as well as product when scoring standardised tests. Yet another noted that pressures that target setting at class level might put on children, including increased emphasis on standardised tests. Under mixed and multi-ability classes/class size (4.4%), teachers referred to the challenges of implementing the mathematics curriculum under often difficult circumstances, with these challenges often linked to shortages of resources. Under teaching strategies/initiatives (4.4%), teachers noted the dearth of teaching strategies available for the senior classes at primary level, compared with the junior classes, and called for the extension of programmes implemented in junior classes. Teachers covered a broad range of issues under the 'other' category (6.2%), including problem solving, motivation and interest, and the sharing of ideas and skills across schools.

Table 5.42: Percentages of Sixth class pupils whose teachers made comments on the teaching and learning of mathematics, by comment category

Comment Category	Sixth	
	Example of Comments	%
At least one comment provided	---	30.2
Time/curriculum overload	The curriculum is overloaded. I would love to be able to give more time to the teaching and assessment of maths; Not enough time to thoroughly teach maths in curriculum - particularly with those of lower abilities	8.7
Curriculum/ textbooks	In general too much emphasis on text books there should be no text book until at least 2nd class; I would like to see more correlation between what pupils do in 6th class maths and what they do in first year secondary school as I feel that important elements of computation and problem solving are lost; Bíonn an-tionchar ag na leabhair téacs mata ar mhúineadh an ábhair. Ach is droch nós é sin uaireanta mar bíonn easpa samhlaíochta ag teastáil do na ceisteanna sna leabhair, toisc go mbíonn patrún á leanúint ag formhór na gceisteanna. [Textbooks have a strong influence on the teaching of maths; But this can be a bad thing sometimes as questions in the textbooks do not demand imaginative thinking as most questions follow a set pattern.]	6.2
Assessment/target setting	There is too much emphasis based on standardised test scores, considering it is not a sealed test. Standardised tests are too open to manipulation by teachers; Maths has been dumbed down a lot and yet achievements are declining. We must raise expectations.	4.6
Mixed ability classes/multi-classes/class size	Within a multi-class setting it is very difficult to cater for each class and then for the varying levels within each class; In a multiclass setting with 3 or more classes the teaching of maths is extremely difficult.	4.4
Teaching strategies/initiatives	We need more specific programmes for teaching maths at senior levels (equivalent of junior programmes but at a senior level)	4.4
Continuing professional development	Greater emphasis needs to be placed on upskilling teachers on the many ways to approach maths; Maths is an area of the curriculum where you as a teacher need to feel confident. CPD aids this; There is a lack of incentive to take further education to improve maths teaching. Our staff are continuously upskilling and learning new ideas and teaching methods. Staff share ideas and there is a very positive atmosphere.	4.3
Resources/support	Airgead ag teastáil ón rialtas chun achmhainní áirithe a fháil gan a bheith 'just' ag rá go dtí múinteoiri seo straitéis éigin agus ar aghaidh libh [Funding needed from government to purchase certain resources, instead of telling teachers, here is a strategy, go and implement it]	3.1
Other	Problem solving is an area where children often fall down in their assessment, as they find it difficult to apply the mathematical concepts and skills learned to a real-life problem.	6.2

Summary

Average overall class sizes in NA '14 were 25.3 in Second and 25.8 in Sixth. These are marginally higher than in NA '09 (25.0 at both levels).

On average, teachers of pupils in Second class reported participating in 21 hours of CPD related to English in the two years prior to NA '14, while teachers in Sixth class reported participating in 17 hours related to maths. For teachers at both class levels, about one-quarter of CPD hours were based on in-school activities relating to the teaching of English and mathematics, while over 40% of CPD hours were online.

Thirteen percent of pupils in Second class were taught by teachers who had additional responsibility for English within their schools, while 9% of pupils in Sixth class were taught by teachers with additional responsibility for mathematics. Pupils' average performance in English reading and mathematics was not associated with whether or not their teachers had additional responsibilities for these curricular areas.

Teachers of pupils in Second class in NA '14 reported allocating an average of 294 minutes per week to teaching English, while teachers of pupils in Sixth class reported allocating 283 minutes per week to the teaching of mathematics. Teachers also reported on the allocation of time to the teaching of English across the curriculum, with teachers of pupils in Second class reporting that they spent 149 minutes per week on teaching English across the curriculum and teachers of pupils in Sixth class reporting that they spent 31 minutes per week on teaching mathematics across the curriculum. Instructional time for English at Second class has increased by an average of 29 minutes per week since NA '09, and, for mathematics at Sixth, it has increased by 23 minutes, without taking account of additional time allocated to teaching literacy and numeracy across the curriculum.

Seventy percent of pupils in Second class in NA '14 were in classes in which whole-class teaching was implemented in most English lessons, while 84% in Sixth class were in classes where this form of grouping was practised in most lessons. Almost half of pupils (48%) in Second class were in classes in which team teaching with a support teacher was used in some or most English lessons, while 40% of pupils in Sixth class were in classes where this form of teaching was implemented with the same frequency. This form of team teaching has increased at both class levels since NA '09.

Just over three-quarters of pupils were in Second classes where published reading schemes were used on most days to teach English, while two in five pupils were in classes in which workbooks or worksheets were used with the same frequency. Fewer than 10% of pupils were in classrooms in which e-books, other digital texts, real-life texts or texts authored by children were used in most lessons. Fifty-seven percent of pupils were in classes where information texts in English classes were used once or twice a month, or less often. Notwithstanding the widespread use of reading schemes, 35% were in classes where pupils

read books of their own choosing on a daily basis. In general, the frequency with which teachers used various reading materials was similar in NA '09 and NA '14.

Textbooks were the most commonly-used resource in mathematics classrooms, with over 90% of pupils in classrooms where these were used on a daily basis. Worksheets and ICTs/digital resources were used in the classrooms of at least 35% of students on most days. There has been an increase since NA '09 in the proportion of pupils using calculators at least once a week. The most common purpose for which calculators were used was checking answers.

A majority of pupils in Second class were taught by teachers who expressed themselves to be 'very confident' in teaching reading to higher-achieving pupils, teaching reading comprehension strategies, teaching literacy skills across the curriculum, and teaching the process of writing. Areas in which teachers of one-third or fewer pupils expressed themselves to be very confident were using ICTs to teach English, setting targets to improve overall performance in English, and working with parents to raise children's literacy levels.

At Sixth class, at least two-thirds of pupils were taught by teachers who felt very confident in teaching mathematical language, teaching numeracy across the curriculum, and encouraging children to talk about their mathematical thinking. Just over half of pupils were taught by teachers who were very confident about teaching mathematical reasoning and problem solving. Areas in which teachers felt relatively less confident were setting targets to improve mathematics performance and using ICTs to teach mathematics.

The most frequently used non-standardised assessment tools at Second class were teacher-designed tests, documented observations, and self-assessment by children. Assessment tools that were used infrequently included computer-based tests, curriculum profiles, published rubrics, teacher-designed rubrics, and pupil conferences. The most commonly-used non-standardised assessments of mathematics in Sixth class were teacher-designed tests, error analysis, and self-assessment by pupils. Relatively little use was made of documented observations, reflective journals, or computer-based tests.

Reading for Fun, Paired Reading, and Jolly Phonics were the reading initiatives implemented most often by teachers, with about half of pupils in Second class in classrooms in which these programmes were used on a weekly basis or more often. Other widely-used programmes included DEAR (Drop Everything and Read), Building Bridges, and Guided Reading/Guided Reading PM.

Compared with English, relatively little use was made by teachers of supplementary programmes in mathematics. Paired Maths was the most frequently implemented programme.

For teachers of pupils in Second class, the key priority for CPD in English was the development of writing, with teachers of 40% of pupils identifying this as important.

Comprehension strategies, oral language, assessment, and addressing learning differences were identified as being priority areas by teachers of at least one-quarter of pupils.

Over one-half of pupils in Sixth class were taught by teachers who selected problem solving / reasoning as a priority area for CPD. This was followed by ICT (30%), and specific mathematics strands, strand units, or their components (30%). At both Second and Sixth class levels, the preferred mode for delivery of CPD was external, face-to-face delivery, with fewer teachers indicating a preference for online courses. At Sixth class, one in five pupils was taught by a teacher who indicated that they would benefit from a course to improve their understanding of the mathematics they teach.

Two-thirds of pupils in Second class were in classrooms with computing devices available for pupil use, while 90% were in classes with interactive whiteboards. Just over one-quarter were in classrooms in which e-books were available, while 95% had broadband Internet. There were similar levels of access to resources at Sixth class.

Computing devices were used by teachers of over three-quarters of pupils at least weekly for English lessons at Second class and mathematics lessons at Sixth. One-quarter of pupils used computing devices during lessons in these subjects with the same frequency.

At Second class, the most common form of learning support for English involved withdrawal in small groups, with 87% of pupils in classes in which this from of support was available. Just under half of pupils in Second were in classes in which in-class support was available, while 46% were in classes where individual support was available. At Sixth class, 45% of pupils in mathematics classes where some in-class support was provided, 78% in classes where withdrawal in groups was practised, and 49% where at least some pupils were withdrawn individually. Provision of in-class support has increased substantially since NA ’09.

Chapter 6: Pupil Factors

This chapter outlines various characteristics of pupils who participated in NA'14 and considers their mathematics and reading achievement in light of these characteristics. Data are drawn from pupil responses to the Second class and Sixth class pupil questionnaires. At Second class, the main focus of the questionnaire was on reading; at Sixth class, mathematics was the primary focus. The chapter consists of seven main sections. First, pupil background characteristics are considered. Second, pupil homework practices are described. Third, pupil attitudes towards school, towards reading and mathematics, and towards themselves as readers and mathematicians, are presented. Fourth, pupils' literacy-related behaviours, both in school and at home, are outlined. Fifth, pupils' use of strategies when reading, and Sixth class pupils' use of strategies when solving mathematical problems, are described. Sixth, pupil engagement in extracurricular activities is outlined. Finally, pupil use of technology at home is considered. Throughout, pupil characteristics are related to reading and mathematics achievement. Where available, trends in pupil factors from NA '09 to NA '14 are considered. More detailed tables can be found in the companion e-Appendix (www.erc.ie/na2014).

Pupil Background

At both grade levels, pupils were asked a series of questions about their home and family backgrounds. A large majority of Second class (90%) and Sixth class (88%) pupils were born in Ireland. Second class pupils *not* born in Ireland had reading and mathematics mean scores that were significantly lower than those of their Irish-born counterparts. At the Sixth class level, pupils born outside of Ireland had a mean reading score that was significantly lower than those born in Ireland; however, there was no significant difference between the mean mathematics scores of those born in Ireland and those not (Table 6.1; e-Appendix Table A6.1). In NA '09, 14% of Second class pupils and 15% of Sixth class pupils were born outside Ireland, and differences in achievement between these pupils and those born in Ireland were significant only for reading.

Table 6.1: Pupil place of birth and mean achievement scores, by grade level

	Second			Sixth		
	%	Reading	Maths	%	Reading	Maths
Born in Ireland*	90.3	266.2	265.7	88.3	265.2	262.3
Not born in Ireland	9.7	**246.9**	**251.9**	11.7	**251.2**	260.2

Scores in **bold** are significantly different from the mean score of the reference (*) group.

Nearly all pupils at the Second class (93%) and Sixth class (98%) levels spoke English at home. The mean English reading scores of these pupils were significantly higher than those who spoke no English at home (at both grade levels). In relation to mathematics, the mean score of Second class pupils who spoke no English at home was significantly lower than that of those who did, while at Sixth class, there was no significant difference (Table 6.2; e-Appendix Table A6.2). A minority of Second class (16%) and Sixth class (14%) pupils spoke Irish at home. The mean English reading and mathematics scores of these pupils were significantly higher than the mean scores of those who did not speak Irish at home. Similar proportions of pupils (14% at Second class; 12% at Sixth) reported speaking a language other than English or Irish at home. At both grade levels, the mean English reading scores of these pupils were significantly lower than those who did not speak another language at home. No significant differences were found in the corresponding mean mathematics scores of these subgroups (Table 6.2; e-Appendix Table A6.3).

Table 6.2: Home languages of pupils and mean achievement scores, by grade and domain

		Second			Sixth		
		%	Reading	Maths	%	Reading	Maths
English	Yes*	93.4	265.7	264.9	97.8	264.9	262.3
	No	6.6	**241.2**	**249.8**	2.2	**232.6**	256.5
Irish	Yes*	16.0	274.2	274.5	13.9	282.7	281.5
	No	84.0	**262.0**	**262.0**	86.1	**260.4**	**258.8**
A different language	Yes*	13.9	251.8	258.7	12.1	250.3	263.7
	No	86.1	**266.2**	264.9	87.9	**265.3**	261.7

Scores in **bold** are significantly different from the mean score of the reference (*) group.

Pupils were also asked to specify which language they spoke *most often* at home. This language was English for 91% of Second class pupils and 92% of Sixth class pupils (representing little change from NA '09, where 90% of Second class and 94% of Sixth class pupils spoke mostly English at home). Just 1% of Second class and fewer than 1% of Sixth class pupils spoke mostly Irish at home. For 9% of Second class pupils and 7% of Sixth class pupils, a language other than English or Irish was the language they spoke most often at home. At Second class, pupils who most often spoke a language other than English or Irish at home had significantly lower English reading and mathematics scores than pupils who spoke mostly English at home. At Sixth class, pupils who spoke mostly Irish at home had significantly higher mean reading scores than those who spoke mostly English, who in turn had significantly higher scores than those who spoke mostly a different language at home. Mean mathematics scores of those who spoke either Irish or a different language were not found to differ significantly from the mean score of Sixth class pupils who spoke mostly English at home (Table 6.3; e-Appendix Table A6.4).

Table 6.3: Language spoken most often in pupils' homes and mean achievement scores, by grade level

	Second			Sixth		
	%	Reading	Maths	%	Reading	Maths
English*	90.6	266.3	265.3	92.3	265.2	262.1
Irish	1.0	279.8	271.0	0.4	**289.3**	284.8
A different language	8.5	**239.3**	**248.7**	7.3	**239.7**	259.2

Scores in **bold** are significantly different from the mean score of the reference (*) group.

Homework

A large majority (93%) of Second class pupils reported that they did English homework on most school days. The mean reading score of these pupils did not differ significantly from the mean scores of pupils who reported doing so less frequently. Fewer Second class pupils (81%) reported doing mathematics homework on most school days. The mean mathematics score of these pupils was significantly higher than that of the 5% of Second class pupils who said that they hardly ever did mathematics homework, but did not differ significantly from the mean score of the 15% of Second class pupils who said they did mathematics homework twice or three times per week (Table 6.4; see e-Appendix Table A6.5 for Sixth class data).

Table 6.4: Frequency of English and mathematics homework and mean achievement scores, Second class

		Second class		
		%	Reading	Maths
English homework	Most school days*	93.2	265.2	
	2 or 3 times a week	5.5	261.2	
	Hardly ever	1.2	244.0	
Maths homework	Most school days*	80.7		266.1
	2 or 3 times a week	14.8		266.6
	Hardly ever	4.6		**245.2**

Scores in **bold** are significantly different from the mean score of the reference (*) group.

Second class pupils were further asked to specify the frequency with which they did particular English homework activities. Frequency with which pupils answered questions in their English workbooks was not significantly related to reading scores. Pupils who said that they learned English spellings on most days (92%) had a significantly higher mean reading score than pupils who said they did so on some days (8%), than those who never did so (fewer than 1%). Pupils who said that they read a book for homework on some days (18%) had a significantly lower mean reading score than those who said they did so most days (79%). Pupils who said they used a computer or computing device during homework on most school days (7%) had a significantly lower mean reading score than pupils who did so on

some days (30%), and those who never did so (63%). Pupils who indicated that they wrote a story for homework on some days (53%) had a significantly higher mean reading score than the 7% of pupils who said they did so on most days (Table 6.5; e-Appendix Table A6.6).

Table 6.5: Frequency of English homework activities and mean reading scores, Second class

		Second Class	
		%	Reading
Answer questions in English workbook	Most days*	31.6	262.1
	Some days	46.6	266.3
	Never	21.8	265.2
Learn English spellings	Most days*	91.7	265.8
	Some days	7.5	**252.2**
	Never	0.8	**232.7**
Read a book	Most days*	78.9	266.9
	Some days	18.2	**256.4**
	Never	2.9	249.8
Use a computer	Most days*	7.1	243.5
	Some days	29.6	**268.5**
	Never	63.3	**265.1**
Write a story	Most days*	7.1	251.0
	Some days	52.8	**265.9**
	Never	40.1	264.8

Scores in **bold** are significantly different from the mean score of the reference (*) group.

Sixth class pupils were asked to indicate the frequency with which they engaged in a range of behaviours while doing mathematics homework (Table 6.6; e-Appendix Table A6.7). Fifty-nine percent of pupils said that they sometimes asked for help when doing mathematics homework. These pupils had a higher mean mathematics score than pupils who said they did so often (19%) and pupils who said they always did so (7%), but a significantly lower mean mathematics score than pupils who never asked for help (15%). Similarly, pupils who never asked someone to check their answers (33%) had a significantly higher mean mathematics scores than pupils who sometimes did so, with pupils who sometimes did so having a significantly higher mean mathematics score than pupils who did so often (18%) or always (13%). These findings appear to indicate that lower-achieving pupils need more homework support and are more likely to seek it than higher-achieving pupils. Just 2% of Sixth class pupils said that they always use a calculator while doing mathematics homework, while 8% said they did so often. Both of these groups had mean mathematics scores that were significantly lower than the mean score of pupils who said they did so sometimes (45%). The mean score of pupils who sometimes used a calculator during homework did not differ significantly from the mean score of pupils who never did so (46%). A similar pattern was found for the frequency of pupils' use of equipment or materials at home (e.g. weighing

scales, measuring tape, etc.) to solve problems, reflecting, perhaps, that pupils who struggle with mathematics are more likely to make use of concrete resources to aid them with their homework than those who have less difficulty. Pupils who never used a computer while doing mathematics homework (68%) had a significantly higher mean mathematics score than that of those pupils who sometimes did so (26%), who in turn had a higher mean score than those who did so often (5%) and those who always did so (2%). It is possible that those pupils who find mathematics homework difficult are more likely to seek help on the Internet or to use the calculator on their computer than are higher-achieving pupils.

Table 6.6: Pupil practices during maths homework and mean mathematics scores, Sixth class

		Sixth Class	
		%	Maths
Ask someone for help	Always	7.3	**221.4**
	Often	18.5	**246.0**
	Sometimes*	58.8	266.2
	Never	15.4	**286.1**
Ask someone to check your answers	Always	12.8	**244.6**
	Often	18.0	**253.5**
	Sometimes*	36.1	263.5
	Never	33.1	**272.6**
Use a calculator	Always	2.2	**228.8**
	Often	7.6	**244.0**
	Sometimes*	44.9	262.4
	Never	45.9	266.8
Use a computer/computing device	Always	1.7	**228.5**
	Often	4.8	**242.1**
	Sometimes*	25.6	259.0
	Never	67.9	**266.0**
Use things at home to help solve problems (e.g. weighing scales, measuring tape)	Always	3.0	**230.1**
	Often	9.7	**249.5**
	Sometimes*	37.8	263.8
	Never	49.5	266.0

Scores in **bold** are significantly different from the mean score of the reference (*) group.

Pupils at both grade levels were asked whether they attended additional lessons in English or mathematics, outside of school. Just 6% of Second class and 4% of Sixth class pupils attended additional lessons in English (e-Appendix Table A6.8). These pupils had significantly lower mean scores than pupils who did not attend additional lessons. Similarly, the 8% of Second class pupils and 5% of Sixth class pupils who attended additional lessons in mathematics had significantly lower mean mathematics scores than those of pupils who did not attend such lessons (see e-Appendix Table A6.9). It is possible that additional support is more likely to be sought by parents for pupils who are experiencing difficulty with reading or mathematics.

Pupil Attitudes

At both grade levels, pupils' attitudes towards reading were explored. Second class pupils were asked to indicate whether they agreed (yes/no) with a number of attitudinal statements about reading. The majority of pupils (89%) agreed that they liked reading, and these pupils significantly outperformed those pupils who did not. An even higher proportion of Second pupils (95%) agreed that they really wanted to do well at reading. The 5% of those who disagreed with this statement had a significantly lower mean reading score than those who agreed. Pupils who disagreed that their teacher thinks they are good at reading (7%) also had a significantly lower mean reading score than other pupils. Pupils' agreement that they like to tell their family about what they are reading was not related to reading achievement, although pupils who disagreed that they liked to talk to their *friends* about what they are reading had a slightly higher (by four points) mean reading score than those who liked to do so (a statistically significant difference). A high proportion of Second class pupils (93%) agreed that they like to read when they are reading about things in which they are interested. These pupils had a significantly higher mean reading score than those who did not agree (Table 6.7; e-Appendix Table A6.10).

Table 6.7: Pupil attitudes towards reading and mean reading scores, Second class — component items

		Second Class	
		%	Reading
I like reading	Yes*	88.5	267.2
	No	11.5	**240.9**
I really want to do well at reading	Yes*	94.7	264.8
	No	5.3	**251.2**
My teacher thinks I am good at English reading	Yes*	93.4	266.0
	No	6.6	**239.2**
I like to tell my family about what I am reading	Yes*	70.2	264.6
	No	29.8	263.1
I like to read about things I am interested in	Yes*	92.7	265.6
	No	7.3	**246.6**
I like to talk to my friends about what I am reading	Yes*	47.3	262.0
	No	52.7	**266.1**

Scores in **bold** are significantly different from the mean score of the reference (*) group.

Second class pupils were also asked whether they felt that they were good at reading. Over half (58%) of pupils rated themselves as very good at reading. These pupils had a significantly higher mean score on the reading test (by 19 points) than those pupils who indicated that they were 'OK' at reading and those who felt they were not so good at reading (outperforming those pupils by 48 points) (Table 6.8; e-Appendix Table A6.11).

Table 6.8: Pupils' assessment of their own reading ability and mean reading scores, Second class

	Second	
	%	Reading
Very good*	57.6	273.6
OK	37.8	**254.5**
Not so good	4.6	**225.8**

Scores in **bold** are significantly different from the mean score of the reference (*) group.

Sixth class pupils were also asked to respond to a series of statements relating to reading and indicate their level of agreement with each statement on a five-point scale from strongly agree to strongly disagree. Principal component analysis of responses to these statements indicated the presence of three underlying scales: pupil enjoyment of reading, pupil self-concept relating to reading, and pupil willingness to expend effort on reading (see e-Appendix Tables A6.12 to A6.14). Pupil self-concept was significantly positively correlated with reading scores, but the correlation was weak to moderate (r = 0.19). Enjoyment of reading and willingness to expend effort on reading were both significantly moderately positively correlated with reading (r = 0.29 and r = 0.31, e-Appendix Table A6.15). These correlation coefficients are similar in magnitude to those found in NA '09. Gender differences in scores on these scales were also explored (e-Appendix A6.16). No significant gender difference was found on the reading self-concept scale. However, girls scored significantly higher on enjoyment of reading, while boys scored significantly higher on willingness to expend effort on reading[7]. Table 6.9 summarises responses to a sample of the individual items on the enjoyment of reading scale, with response categories collapsed to 'agree', 'not sure' and 'disagree'.

[7] This should be interpreted with caution, given the small number of items on this scale.

Table 6.9: Pupil enjoyment of reading and mean reading scores, Sixth class — component items

		Sixth Class	
		%	Reading
I like reading	Agree*	74.8	271.3
	Not sure	14.0	**242.5**
	Disagree	11.1	**239.1**
Reading is boring	Agree*	13.1	236.3
	Not sure	14.6	**253.0**
	Disagree	72.3	**270.9**
I only read if I have to	Agree*	17.9	233.5
	Not sure	11.3	**254.8**
	Disagree	70.9	**272.7**
I feel happy if I get a book as a present	Agree*	60.2	271.7
	Not sure	18.9	**257.5**
	Disagree	20.8	**245.9**

Scores in **bold** are significantly different from the mean score of the reference (*) group.

Three-quarters of Sixth class pupils agreed that they liked reading, and these pupils had a significantly higher mean reading score than those who disagreed (11%) and those who were not sure (14%). Just 13% of Sixth class pupils agreed that reading is boring, with these pupils having a significantly lower score than the 15% who were not sure (lower by 17 points) and the 72% who disagreed that reading is boring (a 35 point difference) (e-Appendix Table A6.17). As shown in Table 6.10 (see also e-Appendix Table A6.18), Sixth class pupils who agreed that they did not like reading something when the words are too difficult (36%) had a significantly lower mean reading score than those who were not sure (17%) and those who disagreed (47%). Similarly, pupils who agreed that complicated stories are no fun to read (37%) were significantly outperformed in reading by those who disagreed (45%) and by those who were not sure (18%).

Table 6.10: Pupil willingness to expend effort on reading and mean reading scores, Sixth class — component items

		Sixth Class	
		%	Reading
I don't like reading something when the words are too difficult	Agree*	36.4	245.8
	Not sure	16.9	**262.5**
	Disagree	46.7	**277.9**
Complicated stories are no fun to read	Agree*	36.6	248.8
	Not sure	18.2	**261.7**
	Disagree	45.1	**276.7**

Scores in **bold** are significantly different from the mean score of the reference (*) group.

In Table 6.11, responses to items relating to pupil self-concept in relation to reading are summarised (see also e-Appendix Table A6.19). A similar proportion of Sixth class pupils agreed that they were good readers (62%) as agreed that they knew that they would be good at reading next year (61%). These pupils significantly outperformed pupils who were not sure and those who disagreed with each of these statements. Pupils who agreed that they learned more from reading than most other pupils in the class (23%) had a higher mean reading score than those who were not sure (55%) and those who disagreed (23%). Pupils who agreed that they could understand the most difficult school books they were asked to read had a significantly higher mean reading score than that of pupils who were not sure (35%) and those who disagreed (21%). Finally, the 44% of pupils who agreed that their teacher thinks that they are good readers had a significantly higher mean reading score than those who were not sure (50%) and those who disagreed (6%).

Table 6.11: Pupil reading self-concept and mean reading scores, Sixth class

		Sixth Class	
		%	Reading
I know I will be good at reading next year	Agree*	61.0	268.9
	Not sure	34.1	**259.0**
	Disagree	4.9	**230.9**
I am a good reader	Agree*	62.3	274.7
	Not sure	29.2	**249.3**
	Disagree	8.6	**231.7**
I learn more from reading than most other pupils in the class	Agree*	22.7	273.6
	Not sure	54.7	**266.1**
	Disagree	22.6	**247.3**
I can understand the most difficult school books I am asked to read	Agree*	43.6	277.9
	Not sure	35.3	**257.1**
	Disagree	21.1	**245.1**
My teacher thinks I am a good reader	Agree*	43.6	274.9
	Not sure	50.3	**257.7**
	Disagree	6.1	**234.4**
It is important for me to do well at reading	Agree*	83.5	264.7
	Not sure	11.4	259.6
	Disagree	5.1	257.4

Scores in **bold** are significantly different from the mean score of the reference (*) group.

Sixth class pupils were also asked to indicate their level of agreement (on a five-point scale from strongly agree to strongly disagree) with a series of statements relating to attitudes to and engagement in mathematics. From these, an underlying scale assessing pupils' self-concept in relation to mathematics was indicated (see e-Appendix Tables A6.20 to A6.22).

There was a significant, moderate to strong, positive correlation between scores on this scale and mathematics scale scores (r = 0.52, e-Appendix Table A6.23). Table 6.12 displays responses to a sample of the individual items on the scale (with response categories collapsed from five to three; for all items, see e-Appendix Table A6.25).

Just over a fifth of pupils (21%) agreed that they were not very good at maths. These pupils had a mean score that was 21 scale score points lower than those who were not sure (24%) and 51 points lower than those who disagreed that they were not good at maths (55%), differences that were statistically significant. Over half of pupils (512%) agreed that maths is one of their best subjects. These pupils had a significantly higher mean mathematics score than those who were not sure (19%) and those who disagreed (30%), by 25 and 45 points, respectively. Nearly two-thirds of pupils (66%) agreed that they get good marks in mathematics, and these pupils significantly outperformed those who said they were not sure (25%) and those who disagreed (9%), by 33 points and by 54 points, respectively. Similar patterns were found between reading achievement and responses to the statements 'I learn maths quickly' and 'In maths class, I understand even the hardest problems' (e-Appendix Table A6.25). Sixth class boys had significantly higher scores on the mathematics self-concept scale than did Sixth class girls (e-Appendix Table A6.24).

Table 6.12: Self-concept in relation to mathematics and mean mathematics scores, Sixth class — component items

		Sixth class	
		%	**Maths**
I am not very good at maths	Agree*	21.4	229.3
	Not sure	23.5	**250.3**
	Disagree	55.1	**280.4**
I get worried when I have to do maths homework	Agree*	13.0	228.5
	Not sure	11.1	**241.1**
	Disagree	75.9	**271.4**
I get good marks in maths	Agree*	65.7	275.7
	Not sure	25.0	**242.6**
	Disagree	9.4	**221.9**
Maths is one of my best subjects	Agree*	50.8	280.7
	Not sure	19.1	**255.6**
	Disagree	30.0	**235.3**

Scores in **bold** are significantly different from the mean score of the reference (*) group.

Two-thirds of Sixth class pupils (66%) agreed that they enjoyed learning new things in mathematics lessons. These pupils had a significantly higher mean mathematics score than the 14% who disagreed, outperforming them by 12 scale score points (e-Appendix Table A6.26).

In addition to eliciting information on attitudes towards reading and mathematics, pupils were asked about education more generally. At the Second class level, pupils were asked about their attitude towards school. Second class pupils who did not like school had significantly lower mean reading and mathematics scores than pupils who did like school. Highest mean scores were found among pupils who reported that they were not sure whether or not they liked school, in both domains (Table 6.13; e-Appendix Table A6.27). The proportion of Second class pupils who liked school was higher in NA '14 (58%) than in NA '09 (49%).

Table 6.13: Pupils' liking of school and mean achievement scores, Second class

	Second Class		
	%	Reading	Maths
Yes, I like school*	57.5	264.2	263.3
Not sure	28.3	**271.5**	**272.8**
No, I don't like school	14.2	**249.7**	**250.3**

Scores in **bold** are significantly different from the mean score of the reference (*) group.

At the Sixth class level, pupils were asked to indicate the stage to which they would like to continue in education. Pupils who said that they would like to attend college or university had significantly higher mean scores in both domains than pupils who wished to stop at the Leaving Certificate level, who wished to leave education after the Junior Certificate, and who indicated that they did not know for how long they would like to remain in education (Table 6.14; e-Appendix Table A6.28). In NA '14, 83% of pupils aspired to attend college or university, compared to 75% in NA '09. Additionally, Sixth class pupils were asked to indicate how long they *expected* that they would stay in education. Almost three-quarters (73%) of pupils expected that they would attend college or university (compared to 67% in NA '09). The mean reading and mathematics scores of these pupils were significantly higher than those of pupils who expected to leave the education system at an earlier stage, and of those who indicated that they did not know (16%) (see e-Appendix Table A6.29).

Table 6.14: Pupils' aspirations for educational attainment and mean achievement scores, Sixth class

	Sixth Class		
	%	Reading	Maths
College or University*	82.6	270.5	268.3
Leaving Certificate	5.1	**232.8**	**230.1**
Junior Certificate	1.4	**211.3**	**211.8**
Don't know	11.0	**232.9**	**237.7**

Scores in **bold** are significantly different from the mean score of the reference (*) group.

Reading Practices

Pupils were asked about the frequency with which they read (alone or with others) at home. Second class pupils who never read with at home with a parent (24%) scored significantly higher on the reading test than those who did so on most days (33%). This may suggest that, by Second class, higher-achieving pupils are more likely to be reading independently than with a parent. Indeed, pupils who read books on their own for fun on most days (46%) significantly outperformed their peers who did so only on some days (40%), and those pupils who never did so (14%). However, the 20% of Second class pupils who read magazines or comics on their own for fun on most days scored significantly *lower* in reading than pupils who did so only some days (33%) and also than pupils who never did so (48%) (Table 6.15; e-Appendix Table A6.30), suggesting that the type of material which children are reading matters in relation to reading achievement.

Table 6.15: Frequency of reading activities in the home and mean reading scores, Second class

		Second Class	
		%	Reading
Read with parent	Most days*	33.4	259.2
	Some days	42.7	263.5
	Never	23.9	**272.7**
Read with another adult at home (e.g. grandparent)	Most days*	31.6	262.1
	Some days	46.6	266.3
	Never	21.8	265.2
Read books on own for fun	Most days*	45.5	275.7
	Some days	40.1	**258.7**
	Never	14.3	**243.8**
Read magazines or comics on own for fun	Most days*	19.6	257.6
	Some days	32.5	**268.8**
	Never	47.9	**263.9**

Scores in **bold** are significantly different from the mean score of the reference (*) group.

Sixth class pupils who spent less than 30 minutes reading for enjoyment on an ordinary day (40%) had a significantly lower mean reading score than those of pupils who read for longer. Similarly, pupils who read for enjoyment for less than 30 minutes per day on a weekend day (50%) had a significantly lower mean reading score than those of pupils who spent more time reading at weekends (Table 6.16; e-Appendix Table A6.31).

Table 6.16: Amount of time spent reading for enjoyment and mean reading scores, Sixth class

		Sixth Class	
		%	Reading
Time spent reading for enjoyment on an ordinary day	Less than 30 mins.	39.5	246.1
	30 – 1 hour	38.3	**268.2**
	1 – 2 hours	14.6	**282.1**
	2 hours or more	7.7	**296.1**
Time spent reading for enjoyment on a weekend day	Less than 30 mins.	50.3	248.8
	30 – 1 hour	29.3	**269.5**
	1 – 2 hours	11.9	**286.1**
	2 hours or more	8.6	**299.5**

Scores in **bold** are significantly different from the mean score of the reference (*) group.

Sixth class pupils were also asked to specify the frequency with which they read different types of reading material. Pupils who read magazines or comics, newspapers, social media, email or Internet every day or most days had mean reading scores that did not differ significantly from the mean scores of pupils who did so less frequently. Three-quarters (75%) of Sixth class pupils hardly ever read electronic books. These pupils had a significantly lower mean reading score than pupils (6%) who did so every day or most days. Pupils who said they hardly ever read information books (40%) had a significantly lower mean reading score than the 7% of pupils who did so every day or most days (Table 6.17; e-Appendix Table A6.32).

Table 6.17: Frequency of reading activities in the home on an ordinary day and mean reading scores, Sixth class

		Sixth Class	
		%	Reading
Magazines or comic books	Every day or most days *	6.3	257.1
	Once/twice a week	20.7	258.3
	A few times a month	22.0	266.1
	Hardly ever	51.0	265.6
Stories or novels	Every day or most days *	43.1	280.0
	Once/twice a week	23.5	**260.1**
	A few times a month	17.3	**250.5**
	Hardly ever	16.1	**239.2**
Information books	Every day or most days *	6.7	270.3
	Once/twice a week	21.7	266.0
	A few times a month	31.8	269.2
	Hardly ever	39.8	**256.8**
Newspapers	Every day or most days *	7.9	254.2
	Once/twice a week	19.5	263.8
	A few times a month	21.3	272.3
	Hardly ever	51.4	261.8
Emails and Internet	Every day or most days *	39.3	263.4
	Once/twice a week	26.9	266.8
	A few times a month	13.8	268.0
	Hardly ever	20.0	257.5
E-books	Every day or most days *	5.9	276.0
	Once/twice a week	8.3	264.6
	A few times a month	10.6	270.6
	Hardly ever	75.1	**262.0**
Social media	Every day or most days *	42.6	260.1
	Once/twice a week	14.3	263.4
	A few times a month	6.3	260.2
	Hardly ever	36.9	268.3

Scores in **bold** are significantly different from the mean score of the reference (*) group.

Pupils at both grade levels were also asked about their use of libraries. Second class pupils who did not borrow books from a public library (37%) had a significantly lower mean reading score than those who did (Table 6.18; e-Appendix Table A6.33).

Table 6.18: Pupils' borrowing of books from a public library and mean reading scores, Second class

		Second Class	
		%	Reading
Borrow books from a library outside school	Yes*	63.3	272.7
	No	36.7	**250.5**

Scores in **bold** are significantly different from the mean score of the reference (*) group.

Sixth class pupils who hardly ever borrowed books from a class or school library (33%) and those who did so a few times a month (33%) had significantly higher mean reading scores than that of pupils who did so once or twice a week (Table 6.19). There may be several explanations for this finding. It is possible that lower-achieving readers are encouraged to borrow books more frequently by their teachers than their higher-achieving peers. Additionally, pupils who have better access to books in the home environment (found to be related to achievement in many studies; see Chapter 7) may be less likely to borrow books from the class or school library. However, those who borrowed books from a *local* library once or twice a week (11%) had a mean reading score that did not differ significantly from the mean scores of pupils who did so either more frequently or less frequently (Table 6.19; e-Appendix Table A6.34).

Table 6.19: Frequency of borrowing library books and mean reading scores, Sixth class

		Sixth Class	
		%	Reading
Borrow books from class/school library	Every day or most days	6.6	258.4
	Once/twice a week*	27.1	257.9
	A few times a month	33.3	**267.9**
	Hardly ever	33.0	**265.1**
Borrow books from a local library	Every day or most days	1.5	258.9
	Once/twice a week*	11.2	264.6
	A few times a month	34.3	270.7
	Hardly ever	53.1	259.0

Scores in **bold** are significantly different from the mean score of the reference (*) group.

Pupils were asked about their use of different strategies while reading. Second class pupils were asked whether they often used a range of strategies when they saw a new word in their English reader. Pupils who said they often skipped the word (14%), tried to sound it out (84%), used a picture to figure it out (59%) and those who said they often asked someone for help (62%) had significantly lower mean reading scores than pupils who said that they did not use these strategies often (Table 6.20; e-Appendix Table A6.35).

Table 6.20: Pupil practices upon encountering a new word while reading and mean reading scores, Second class

		Second Class	
		%	Reading
Skip the word	Yes*	14.1	240.5
	No	85.9	**268.2**
Try to sound it out	Yes*	84.4	262.2
	No	15.6	**274.8**
Use the words around it to figure it out	Yes*	47.6	262.2
	No	52.4	266.2
Use the picture to figure it out	Yes*	58.6	256.9
	No	41.4	**274.7**
Ask someone for help	Yes*	62.2	259.3
	No	37.8	**272.6**

Scores in **bold** are significantly different from the mean score of the reference (*) group.

As highlighted in Table 6.21, Second class pupils who ask themselves questions while reading in order to see if they understand the story score significantly lower than pupils who do not. It may be the case that good readers also ask themselves questions during reading, without realising that they are doing so. Thinking about what the story might be about before starting to read it, and comparing oneself to people in the story, were unrelated to reading scores (e-Appendix Table A6.36).

Table 6.21: Pupil practices while reading a story alone and mean reading scores, Second class

		Second Class	
		%	Reading
Think about what the story might be about before starting	Yes*	69.2	264.1
	No	30.8	264.4
Ask yourself questions to see if you understand the story	Yes*	39.5	257.7
	No	60.5	**286.4**
Compare the people in the story to yourself	Yes*	47.6	262.2
	No	52.4	266.2

Scores in **bold** are significantly different from the mean score of the reference (*) group.

At Sixth class, pupils were asked about things they do before starting to read. Pupils who always read the title before reading a story or poem (63%) scored significantly higher on the reading test than those who only do so sometimes (13%). Pupils who often make guesses about what will happen before they start reading (25%) scored more highly than those who sometimes do so (46%), while those who always (21%) or often (31%) think

about what they are going to read before they start reading significantly outperformed those who sometimes do so (33%). Frequency of asking questions before reading was not significantly related to reading achievement (Table 6.22; e-Appendix Table A6.37).

Table 6.22: Pupil practices before reading in English class and mean reading scores, Sixth class

		Sixth Class	
		%	Reading
I make some guesses about what will happen	Always	11.6	267.5
	Often	25.4	**271.9**
	Sometimes*	45.7	259.4
	Never	17.4	259.9
I think about what I am going to read	Always	21.0	**268.9**
	Often	30.7	**266.6**
	Sometimes*	33.0	259.6
	Never	15.3	258.8
I ask questions I would like answered	Always	13.6	264.4
	Often	19.9	265.1
	Sometimes*	35.9	264.3
	Never	30.6	261.8
I read the title to see what the story (or poem) is about	Always	63.3	**268.2**
	Often	17.5	260.2
	Sometimes*	13.1	253.7
	Never	6.1	246.1

Scores in **bold** are significantly different from the mean score of the reference (*) group.

Pupils in Sixth class were also asked about the frequency with which they use a range of practices *while* they are reading. Pupils who always or often try to work out what will happen next in a story had significantly higher reading scores than those who do so sometimes. No significant associations with achievement were found with frequency of a pupil checking to see if they understand what has happened so far, seeing if they can answer questions they asked before they started reading, or re-reading parts that they do not understand (see e-Appendix Table A6.38).

Sixth class pupils were also asked what they did *after* finishing reading (e.g. comparing the story to other stories they had read, checking to see if they had found out what they wanted to). For none of the practices asked about did the mean scores for any of the groups (always/often/never) differ from the mean reading score of the reference group (sometimes) (see e-Appendix Table A6.39).

Mathematics Practices

Sixth class pupils were asked to indicate the frequency with which they engaged in a range of practices during mathematics lessons at school (Table 6.23; e-Appendix Table A6.40).

Pupils who said that they sometimes did maths tests (32%) had a significantly lower mean mathematics scores than pupils who said that they did so often (45%), but higher than the 21% who said they always did so and the 2% who never did so.

Sixth class pupils who sometimes used a calculator in maths lessons (65%) had a significantly higher mathematics score than those who often did so (9%). Just 1% of pupils said that they always used a computer or computing device in mathematics lessons, and these pupils scored significantly lower on the mathematics test than those who sometimes did so (22%). Nearly three-quarters (72%) of Sixth class pupils said that they never used a computer in maths lessons. Pupils who said that they always (3%) or often (15%) used maths equipment (e.g. weighing scales, measuring tape) had significantly lower mean mathematics scores than those pupils who did so sometimes (55%).

Almost half of Sixth class pupils (48%) said that they always talk about a maths problem in class before doing it on their own. These pupils had a significantly lower mean mathematics score than those who sometimes did so (16%), who in turn had a significantly lower mean score than those who did so often (34%).

Pupils who always estimate the answer to a sum before doing it (5%) had a significantly lower mean score than those who sometimes did so (51%). Over half (58%) of pupils said that they sometimes worked in a pair or small group during mathematics lessons. These pupils significantly outperformed those who always did so (4%) and those who never did so (21%).

The 5% of Sixth class pupils who never explained to the teacher how they got the answer to a question had a significantly lower mean mathematics score than pupils who sometimes did so (30%).

The 69% of Sixth class pupils who never use a table book had a significantly higher mean mathematics score than pupils who sometimes did so (22%).

Table 6.23: Frequency of activities during maths lessons at school and mean mathematics scores, Sixth class

		Sixth Class	
		%	Maths
I use a calculator	Always	1.1	241.0
	Often	8.5	**243.8**
	Sometimes*	68.2	265.9
	Never	22.2	259.4
I use a computer/computing device	Always	0.9	**234.3**
	Often	5.4	264.6
	Sometimes*	21.8	262.0
	Never	71.9	262.7
I estimate the answer to a sum before doing it	Always	5.1	**237.4**
	Often	21.6	263.1
	Sometimes*	50.9	265.8
	Never	22.4	**259.3**
I work in a pair or small group	Always	4.0	**232.2**
	Often	17.4	263.2
	Sometimes*	58.0	265.8
	Never	20.5	**257.7**
I use maths equipment (e.g. weighing scales, measuring tape) to solve problems	Always	2.8	**235.9**
	Often	14.7	**257.9**
	Sometimes*	55.1	265.1
	Never	27.4	262.2
I do a maths test	Always	20.8	**251.4**
	Often	45.4	**268.6**
	Sometimes*	31.9	261.5
	Never	1.9	**247.8**
We talk about a maths problem before doing it on our own	Always	48.0	**254.1**
	Often	33.8	**271.2**
	Sometimes*	15.5	267.2
	Never	2.7	267.2
I explain to the teacher how I got the answer to a question	Always	30.1	259.9
	Often	35.0	267.4
	Sometimes*	29.9	261.9
	Never	5.0	**246.1**
I begin my homework in class	Always	2.5	255.8
	Often	5.7	264.7
	Sometimes*	30.9	262.9
	Never	60.9	262.1
I do a sum on the board in front of the class	Always	2.5	**233.9**
	Often	12.0	259.7
	Sometimes*	59.8	264.0
	Never	25.8	262.2
I use a table book	Always	3.8	230.0
	Often	4.7	233.8
	Sometimes*	22.4	245.0
	Never	69.2	**271.6**

Scores in **bold** are significantly different from the mean score of the reference (*) group.

Sixth class pupils were asked to indicate their level of agreement (on a five-point scale from strongly agree to strongly disagree) with a number of statements about mathematics. Pupils who agreed that they went through examples again and again to help them remember (62%) had a significantly lower mean mathematics score than those who disagreed (18%) and those who were not sure (20%). Those who disagreed that they try to understand new ideas in maths by thinking about what they already know (8%) scored significantly lower on the mathematics test than those who agreed that they did this (72%) (Table 6.24; e-Appendix Table A6.41).

Table 6.24: Practices and strategies used when doing mathematics and mean mathematics scores, Sixth class

		Sixth Class	
		%	Maths
I often think about how I can use maths in everyday life	Agree*	62.6	265.3
	Not sure	23.2	**256.1**
	Disagree	14.2	258.1
I often think of other ways to get the answer to a problem	Agree*	72.0	265.0
	Not sure	16.3	**253.1**
	Disagree	11.7	257.5
I learn as much maths as I can off by heart	Agree*	65.2	263.3
	Not sure	21.4	261.2
	Disagree	13.4	258.6
I try to understand new ideas in maths by thinking about what I already know	Agree*	71.7	264.1
	Not sure	20.0	258.8
	Disagree	8.3	**254.6**
I go through examples again and again to help me remember	Agree*	62.3	258.0
	Not sure	20.0	**263.6**
	Disagree	17.7	**275.8**
I try to remember every step when doing a problem	Agree*	83.7	261.8
	Not sure	10.7	260.1
	Disagree	5.6	272.2

Scores in **bold** are significantly different from the mean score of the reference (*) group.

Extracurricular Activities

Pupils at both grade levels were asked about their involvement in a range of activities outside of (either before or after) school. Second class pupils were asked to indicate the frequency with which they engaged in the activities (most days/some days/never), while Sixth class pupils were asked to indicate the amount of time spent doing each activity on each school day (more than two hours/1-2 hours/less than an hour/no time).

At Second class, frequency of watching television (or videos/DVDs) was not related to achievement scores in reading or maths. Pupils who said they played computer games on

most days (31%) had a significantly lower mean reading score than pupils who said they did so on some days (42%) and those pupils who never did so (27%), and a significantly lower mean mathematics score than those who said they did so on some days. Pupils who used the Internet on some days (44%) had significantly higher mean reading and mathematics scores than those who did so on most days (26%). Pupils who said they never used the Internet (30%) had mean reading and mathematics scores that did not differ significantly from those who did so on most days (Table 6.25; e-Appendix Table A6.42).

Second class pupils who said they did jobs at home on most days (40%) had significantly higher mean reading and mathematics scores than those who never did so (12%), but did not differ significantly from those who did so on some days (48%).

Pupils who read a book for fun most days (42%) had a mean reading score that was significantly higher than the mean scores of pupils who did so on some days (43%) and who never did so (15%). Conversely, pupils who read a magazine or a comic for fun most days (17%) had a significantly *lower* mean reading score than pupils who did so on some days (36%) and pupils who never did so (47%) (Table 6.25).

There were no significant differences in the mean reading scores of pupils who played sports on most days (52%) and those who did so less frequently; however, pupils who never played sports (10%) had significantly lower mean mathematics scores than those who did so on most days. Pupils who attended clubs or activities on most school days (30%) had significantly lower mean reading and mathematics scores than those who did so on some days (42%), but a significantly higher mean reading score than pupils who never did so (28%) (Table 6.25).

Pupils who played with friends after school on most school days (59%) had significantly lower mean reading and mathematics scores than pupils who did so on some days (35%), and a significantly lower mean reading score than pupils who never did so (6%). Pupils who played by themselves on most days (27%) had mean reading and mathematics scores that did not differ significantly from those of pupils who did so on some days (42%), but were significantly higher than those of pupils who never played by themselves (31%).

Table 6.25: Frequency of engagement in after-school activities and mean achievement scores, Second class

		Second		
		%	Reading	Maths
Watch TV/videos/ DVDs	Most days*	39.5	262.8	262.7
	Some days	53.3	266.3	266.5
	Never	7.2	264.5	265.5
Play games on computer or console	Most days*	31.2	255.8	257.3
	Some days	42.2	**270.0**	**271.0**
	Never	26.6	**266.0**	263.1
Use the Internet	Most days*	26.4	258.3	257.0
	Some days	44.1	**268.5**	**270.2**
	Never	29.5	264.1	263.2
Do jobs at home	Most days*	39.6	262.2	263.5
	Some days	48.1	**268.1**	268.5
	Never	12.3	258.5	**253.2**
Read a book for fun	Most days*	42.3	272.0	
	Some days	43.1	**262.5**	
	Never	14.6	**249.3**	
Read magazine or comic for fun	Most days*	17.4	250.8	
	Some days	35.6	**269.5**	
	Never	47.1	**266.4**	
Play sports	Most days*	52.4	263.3	267.3
	Some days	37.3	267.8	263.9
	Never	10.4	259.8	**254.3**
Go to activities or clubs	Most days*	30.4	262.7	262.6
	Some days	42.0	**271.4**	**271.1**
	Never	27.6	**256.5**	257.2
Play with friends	Most days*	58.8	260.5	261.9
	Some days	34.9	**269.7**	**268.5**
	Never	6.3	**272.7**	266.0
Play by yourself	Most days*	27.3	268.8	265.9
	Some days	42.0	267.6	269.6
	Never	30.7	**256.5**	**256.9**

Scores in **bold** are significantly different from the mean score of the reference (*) group.

Sixth class pupils who spent more than two hours per day watching television, videos or DVDs (15%) had significantly lower mean mathematics and reading scores than pupils who spent 1-2 hours per day doing so (44%). Sixth class pupils who played games on a computer

or console for 1-2 hours per day (23%) had mean reading and mathematics scores that were significantly lower than those who did so for less than an hour (33%) and those who spent no time doing so (29%); they also had significantly higher mean scores than pupils who spent more than two hours playing computer games (15%). The proportion of Sixth class pupils who spend no time playing computer games has risen considerably, from 9% in NA '09 to 29% in NA '14, although this possibly reflects a shift in the way young people play games (e.g. away from computers/consoles, towards mobile devices), rather than an actual change in the frequency with which pupils play electronic games. Pupils who spent more than two hours per day using the Internet had significantly lower mean scores in both domains than pupils who spent 1-2 hours doing so (these pupils did not differ significantly from those who used the Internet for less time), while those pupils who spent no time using the Internet had a significantly lower mean mathematics score than pupils who spent 1-2 hours doing so (Table 6.26; e-Appendix Table A6.43).

Sixth class pupils who spent 1-2 hours doing jobs (28%) at home had significantly higher mean scores in reading and mathematics than pupils who spent more than two hours doing so (9%), and significantly lower mean scores than those who spent less than an hour doing jobs at home (31%). However, Sixth class pupils who spent no time doing jobs at home (7%) had a significantly lower mean mathematics score than that of pupils who spent 1-2 hours doing so.

Pupils who spent more than two hours per day reading a book for fun (9%) had a significantly higher mean score than those who did so for 1-2 hours (24%), who in turn had a significantly higher mean score than that of pupils who spent less than an hour (44%) or no time (7%) reading a book for fun each day. However, the 2% of pupils who spent 1-2 hours reading a magazine or comic for fun each day had a significantly lower mean reading score than that of pupils who did so for less than an hour (33%) and that of pupils who spent no time on this (57%).

One-third (33%) of Sixth class pupils spent upwards of two hours per day playing sports. These pupils had significantly lower mean reading and mathematics scores than those who played sports for 1-2 hours per day (42%). Pupils who spent 1-2 hours per day at clubs or activities (41%) had significantly higher achievement in both domains than those who spent more than two hours doing so (19%), and a significantly higher mean mathematics scores than that of those who no time doing so (31%). Those who spent less than an hour per day at activities or clubs had a significantly higher mean reading score than that of those who spent 1-2 hours doing so. Pupils who spent more than two hours each day on a different hobby (20%) also had lower mean scores in both domains than those of pupils who spent 1-2 hours at these (35%).

Sixth class pupils who spent more than two hours per day playing with friends after school (40%) had significantly lower reading and mathematics scores in both reading and mathematics than those who spent 1-2 hours doing so (30%), while those pupils who spent

less than an hour playing with friends (19%) had a significantly higher mean mathematics score than those pupils who spent 1-2 hours doing so.

Table 6.26: Amount of time spent engaging in after-school activities and mean achievement scores, by domain, Sixth class

		Sixth		
		%	Reading	Maths
Watch TV/videos/ DVDs	2 hours +	15.0	**257.7**	**253.1**
	1-2 hours*	44.2	266.2	265.0
	Less than an hour	34.5	262.7	262.8
	No time	6.4	263.3	259.7
Play games on computer or console	2 hours +	14.9	**249.9**	**248.4**
	1-2 hours*	23.4	258.4	256.7
	Less than an hour	32.6	**268.2**	**268.9**
	No time	29.0	**270.1**	**266.3**
Use the Internet	2 hours +	32.5	**258.2**	**254.7**
	1-2 hours*	29.2	266.9	265.3
	Less than an hour	31.0	267.2	269.0
	No time	7.3	259.3	**253.7**
Do jobs at home	2 hours +	8.8	**241.4**	**241.9**
	1-2 hours*	28.4	260.4	261.1
	Less than an hour	56.2	**271.8**	**265.8**
	No time	6.6	241.3	**241.0**
Read a book for fun	2 hours +	8.9	**287.5**	
	1-2 hours*	24.3	275.0	
	Less than an hour	44.2	**263.5**	
	No time	22.6	**242.4**	
Read magazine or comic for fun	2 hours +	2.0	247.9	
	1-2 hours*	8.2	253.0	
	Less than an hour	32.8	**264.1**	
	No time	57.1	**265.8**	
Play sports	2 hours +	33.3	**252.5**	**254.8**
	1-2 hours*	42.2	270.0	269.0
	Less than an hour	15.8	269.8	264.8
	No time	8.8	265.2	**253.2**
Go to activities or clubs	2 hours +	19.2	**260.0**	**257.1**
	1-2 hours*	40.8	270.6	269.3
	Less than an hour	9.5	**275.6**	273.0
	No time	30.5	253.4	**252.6**
Play with friends	2 hours +	39.6	**251.0**	**249.7**
	1-2 hours*	31.3	269.0	267.7
	Less than an hour	18.6	275.6	**276.0**
	No time	10.5	275.9	269.9

Table 6.26: Continued

		Sixth		
		%	Reading	Maths
Play by yourself	2 hours +	9.9	261.7	259.7
	1-2 hours*	16.8	268.2	267.1
	Less than an hour	35.6	269.6	268.6
	No time	37.7	**256.9**	**255.1**
Take part in a hobby (not already mentioned above)	2 hours +	20.3	**255.1**	**253.7**
	1-2 hours*	35.4	264.5	263.7
	Less than an hour	20.4	271.2	269.3
	No time	23.9	263.4	260.8

Scores in **bold** are significantly different from the mean score of the reference (*) group.

Technology in the Home

Pupils at both grade levels were asked to indicate whether they had home access to a range of technologies. At both Second and Sixth class levels, a vast majority of pupils (95% at Second class; 97% at Sixth) had home access to a computer (or tablet). Those pupils who did not had mean reading scores that were significantly lower than the mean scores of those who did; at Sixth class, those with a computer at home also scored significantly higher in mathematics than their peers who did not (Table 6.27; e-Appendix Tables A6.44, A6.45). At both grade levels, pupils who did not have a television in their bedrooms had significantly higher mean reading and mathematics scores than those who did. The proportions of pupils with televisions in their bedroom fell from 53% of Second class pupils and 62% of Sixth class pupils in NA '09, to 43% of Second class pupils and 48% of Sixth class pupils in NA '14. Just over one-third of Second class pupils in NA '14 owned a mobile phone or smartphone. Pupils who did not own a mobile phone or smartphone had significantly higher mean reading and mathematics scores than their counterparts who did. At Sixth class, 93% of pupils had a mobile phone or smartphone and, at this grade, phone ownership was not related to achievement in either domain. Similarly, Second class pupils who owned a personal music player (58%) had significantly lower mean scores in reading and mathematics than those pupils who did not; at Sixth class, there were no significant differences in achievement scores by ownership of a personal music player. Second class pupils who had Internet access at home (92%) and Sixth class pupils who had broadband Internet at home (94%) had mean scores in both domains that were significantly higher than the mean scores of pupils who did not. Sixth class pupils who did not have a calculator at home (7%) had a mean mathematics score that was significantly lower than those who did.

Table 6.27: Access to technology in the home and mean achievement scores, by grade and domain

		Second			Sixth		
		%	Reading	Maths	%	Reading	Maths
Computer or tablet	Yes*	94.8	264.9	264.8	97.2	264.6	263.2
	No	5.2	**255.2**	255.4	2.8	**232.5**	**228.7**
Games console	Yes*	81.0	264.2	265.4	92.6	264.0	262.9
	No	19.0	265.2	260.4	7.4	259.7	**254.9**
Internet	Yes*	92.1	265.4	265.6			
	No	7.9	**251.4**	**249.3**			
Broadband Internet	Yes*				93.9	265.3	263.8
	No				6.1	**241.3**	**237.9**
TV in bedroom	Yes*	42.5	250.1	251.1	47.8	249.4	248.0
	No	57.5	**274.8**	**274.0**	52.3	**276.7**	**275.1**
Calculator	Yes*				92.9	265.4	264.2
	No				7.1	**241.7**	**237.3**
Mobile / smartphone	Yes*	33.9	254.0	256.0	93.1	263.7	262.0
	No	66.1	**269.5**	**268.5**	6.9	262.6	263.6
Personal music player	Yes	57.6	261.7	261.7	76.0	264.0	262.4
	No	42.4	**268.1**	**267.6**	24.0	262.8	261.5

Scores in **bold** are significantly different from the mean score of the reference (*) group.

Summary

A number of pupil background variables, such as country of birth and language of the home, were related to achievement in NA '14. At both Second and Sixth class, pupils who spoke mostly English at home had significantly higher mean reading scores than those who spoke mostly a different language (excluding Irish) at home. In mathematics, Second class pupils who mostly spoke a different language at home (other than Irish) had a significantly lower mean score than those who spoke mostly English. At Sixth, those who spoke mostly English at home had no advantage in mathematics over those who did not.

A number of attitudinal variables were also found to be related to achievement. At Second class, liking school was related to both reading and mathematics achievement, while at Sixth class, educational expectations and aspirations were significantly related to achievement in both domains. At Second class, liking reading and wanting to do well at it were related to reading achievement; at Sixth class, favourable attitudes towards reading, higher reading confidence, and willingness to expend effort on reading were associated with higher reading scores. At Sixth class, mathematics self-concept was significantly related to mathematics achievement.

Several pupil behaviours were also significantly associated with pupil achievement. Reading for enjoyment was related to higher reading achievement in some contexts (e.g. reading alone rather than with someone at Second class, reading books rather than comics/magazines at Sixth). Generally, pupils who engaged in extracurricular activities with moderate frequency, or for a moderate amount of time per day, had higher achievement scores than those who spent much more or much less time doing so.

More frequent use of calculators, computers, concrete materials, as well as more frequent requests for help and for checking of answers amongst Sixth class pupils was associated with lower mean mathematics achievement. At Second class, use of reading strategies upon encountering a new word, such as trying to sound the word out, trying to figure out its meaning from context, etc. were associated with lower mean reading achievement. It is possible that such mathematics and reading practices are encouraged in, or taught more explicitly to, lower-achieving pupils, with a view to supporting their learning but that, ultimately, pupils need to work without these supports.

Finally, some characteristics of the home environment were significantly related to pupil achievement. For example, having access to some types of technology at home was associated with higher achievement (e.g. having a computer at home), while access to other types was associated with lower achievement (e.g. having a television in the bedroom).

Chapter 7: Home and Family Factors

This chapter describes the family characteristics and home environments of pupils participating in the 2014 National Assessments of English Reading and Mathematics (NA '14). The chapter draws primarily on data obtained from the questionnaires completed by parents and guardians of the Second and Sixth class pupils who participated in NA '14. The chapter contains five main sections. First, some basic information about questionnaire respondents is presented. Second, demographic characteristics of the families of participating pupils at each grade level are outlined. Third, aspects of pupils' home environments, such as home atmosphere and parental support for homework, are considered. Fourth, parents' perceptions of their children's progress in literacy and numeracy are outlined, including parental evaluations of their children's English and mathematics performance, as well as parents' concerns about particular aspects of their children's English (Second class) and mathematics (Sixth class) performance. Fifth, parents' views on their children's school, school resources, and their own interaction with the school are presented. Throughout the chapter, aspects of the family and home profile are related to pupil achievement. The chapter concludes with a brief summary. More detailed tables can be found in the companion e-Appendix (www.erc.ie/na2014).

Questionnaire Respondents

At Second class, 88% of questionnaires for parents and guardians were completed by women, and at Sixth class, 85% of questionnaire respondents were female. At both grade levels, over 98% of questionnaires were completed by those describing themselves as the parents of the children who brought home the questionnaire, with very small proportions completed by guardians, grandparents, or 'other'. Accordingly, the term 'parents' will be used henceforth to refer to questionnaire respondents.

Parents were asked to indicate the highest level of education they had completed to date. Table 7.1 shows the educational attainment of the parents who responded to the questionnaire, and mean pupil achievement scores in English and mathematics (e-Appendix Tables A7.1 and A7.2). Across domains and grade levels, children whose parents' highest level of education was primary school or Junior Certificate (or equivalent) had mean scores that were significantly lower than the mean scores of children of parents in the reference group (those with a third-level certificate or diploma). Additionally, children of parents with a third-level degree and children of parents with post-graduate degrees scored significantly higher than children of parents with a certificate or diploma, in both domains.

Table 7.1: Responding parents' educational attainment and pupil achievement scores, by grade level

	Second			Sixth		
	%	Reading	Maths	%	Reading	Maths
Primary school	2.9	**229.9**	**227.3**	3.3	**219.7**	**214.4**
Inter or Group or Junior Cert	7.7	**239.6**	**238.8**	10.0	**243.3**	**239.0**
Leaving Cert (General or Vocational)	12.7	257.8	259.4	16.3	**255.2**	260.5
Leaving Cert (Applied)	3.3	**241.9**	**248.9**	4.4	**253.9**	254.8
Apprenticeship or PLC	9.7	**255.6**	**260.1**	9.3	261.6	261.5
Third-level Certificate or Diploma (not degree)*	29.3	266.6	265.6	27.2	268.7	267.5
University Degree or Postgraduate Diploma	22.4	**284.0**	**282.1**	19.4	**281.3**	**276.8**
Master's Degree or Doctorate	8.3	**284.7**	**285.1**	6.9	**290.2**	**287.8**
Other	3.7	259.8	263.6	3.2	256.5	263.1

Scores in **bold** are significantly different from the mean score of the reference (*) group.

Family Characteristics

English was reported as the main language of the home by 91% of parents of Second class pupils, and by 92% of parents of Sixth class pupils. Fewer than 1% of parents of pupils at each grade level reported that Irish was the main language spoken at home, while 8% at each grade level reported speaking a language other than English or Irish. At the Second class level, pupils who spoke mostly English at home had significantly higher mean reading and mathematics scores than those who spoke a language other than English or Irish (Table 7.2; e-Appendix Table A7.3). At Sixth class, pupils from English-speaking homes scored significantly higher on the overall reading scale than those from homes where neither English nor Irish was spoken, while the small minority who spoke Irish as the main language of the home had the highest mean reading score. However, those Sixth class pupils who spoke Irish or another language at home had mean mathematics scores that did not differ significantly from those of pupils from English-speaking homes (Table 7.2; e-Appendix Table A7.4).

A majority of pupils lived in homes where at least one parent was employed (86% of pupils at each grade level). These proportions remain largely unchanged from NA '09, when 86% of Second class pupils and 87% of Sixth class pupils lived in homes where at least one parent was in employment. In NA '14, pupils with at least one employed parent scored significantly higher than those without, with gaps in scores ranging from 20 points (Second class mathematics) to 32 points (Sixth class mathematics). Similar proportions of pupils at each grade level lived in two-parent households (81% at Second, 78% at Sixth). Pupils from one-

parent homes scored significantly lower than pupils from two-parent households, at both grade levels and in both domains. Pupils with three siblings or fewer (93%) scored significantly higher than those with four or more siblings in both English reading and mathematics (Table 7.2; e-Appendix Tables A7.3 and A7.4).

Pupils in families where at least one parent held a medical card (36% at Second class, 37% at Sixth) scored significantly lower than others, with reading and mathematics scores that were between 21 and 26 points lower than children whose parents were not medical card holders. Parents were also asked to rate their families' financial situations on a scale from 'very poor' to 'very well off'. At both grade levels, 79% of parents rated their families as 'average' in this regard. Pupils whose parents rated their families as well off or very well off scored significantly higher than those whose families were rated as average, in both reading and maths, at both grade levels. Conversely, pupils at each grade level whose parents described their families as poor or very poor scored significantly lower in English reading than pupils whose parents rated their families as average. Second class pupils from poor or very poor families also had significantly lower mean mathematics scores than pupils from financially 'average' families.

7.2 Family characteristics and mean pupil achievement scores, by grade level

		Second			Sixth		
		%	Reading	Maths	%	Reading	Maths
Parent employed	Yes*	85.8	269.6	269.2	85.8	268.5	268.4
	No	14.2	**245.2**	**249.6**	14.2	**239.7**	**236.6**
Lone parent	Yes	19.1	**249.7**	**252.9**	21.9	**250.2**	**246.8**
	No*	80.9	269.5	268.9	78.1	268.6	268.6
Medical card	Yes	35.8	**250.0**	**249.4**	37.1	**244.1**	**244.0**
	No*	64.2	274.7	275.1	62.9	276.0	274.9
No. of siblings	0 to 3*	92.8	267.2	267.3	89.7	266.7	266.2
	4 or more	7.2	**246.4**	**250.2**	10.3	**243.3**	**243.0**
Language spoken at home	English*	91.3	267.5	266.5	91.5	266.1	263.7
	Irish	0.9	269.1	250.0	0.5	**283.1**	292.5
	Other	7.8	**240.6**	**254.3**	7.9	**242.6**	261.4
Financial standing	Poor	8.2	**246.4**	**244.2**	8.7	**251.1**	249.3
	Average*	78.8	264.3	264.8	79.2	262.7	262.0
	Well off	13.1	**286.4**	**285.7**	12.1	**283.6**	**284.4**

Scores in **bold** are significantly different from the mean score of the reference (*) group.

Home Atmosphere and Resources

Pupil achievement can be related to elements of *home atmosphere*; namely, whether or not parents create an environment in the home which is supportive of academic achievement. One indicator of such an atmosphere, found to be related to achievement in several previous

studies (including NA '09), is the number of books in the home. In NA '14, the number of books in the home was significantly associated with reading and mathematics performance (Table 7.3; e-Appendix Tables A7.5 and A7.6). For example, Sixth class pupils whose parents reported that there were more than 500 books in their homes had a mean reading score that is 87 points higher than those whose parents report not having any books at home. The magnitude of the differences in mean scores between those with the least amount of books and those with the most is slightly greater for reading than for mathematics, at both grade levels.

Table 7.3: Number of books in the home and mean pupil achievement scores, by grade level

	Second			Sixth		
	%	Reading	Maths	%	Reading	Maths
None	1.0	**211.1**	**216.7**	1.5	**212.0**	**210.3**
1-10	6.7	**228.1**	**234.4**	9.4	**228.8**	**234.3**
11-50*	23.5	249.5	254.1	22.6	249.0	252.9
51-100	23.2	**261.8**	**262.4**	21.6	**261.0**	**262.6**
101-250	21.0	**275.1**	**271.5**	20.8	**275.3**	**272.4**
251-500	15.6	**286.9**	**283.6**	15.0	**283.8**	**276.8**
More than 500	9.1	**292.7**	**290.3**	9.1	**298.7**	**291.3**

Scores in **bold** are significantly different from the mean score of the reference (*) group.

Out-of-school exposure to books is not limited to the home, and 73% of Second class parents and 77% of Sixth class parents reported that the child about whom they were answering the questionnaire was a member of a public library. Second and Sixth class pupils with library membership significantly outperformed those pupils who were not members of libraries, in both reading and mathematics. At Second class, 77% of pupils lived in homes where at least one family member is a library member; 76% of Sixth class pupils did so. Again, pupils from these homes scored significantly higher, on average, in both reading and mathematics than did pupils from homes without any library members (Table 7.4; e-Appendix Tables A7.7 and A7.8).

Table 7.4: Library membership of pupils and family members, and mean pupil achievement scores, by grade level

		Second			Sixth		
		%	Reading	Maths	%	Reading	Maths
Child themselves	Yes*	73.1	271.2	270.1	76.8	267.9	266.8
	No	26.9	**249.4**	**252.6**	23.2	**252.0**	**253.2**
At least one family member	Yes*	77.2	268.8	268.4	76.2	267.9	266.8
	No	22.8	**253.9**	**255.2**	23.8	**252.7**	**253.5**

Scores in **bold** are significantly different from the mean score of the reference (*) group.

As mentioned in Chapter 3, parental modelling of school- or literacy-related behaviours has been posited as a powerful way in which parental involvement in education influences pupil

achievement. As such, parents responding to the questionnaire were asked to report the frequency with which they themselves read for pleasure in the home. Children of parents who reported reading for pleasure every day or almost every day scored significantly higher on the Second and Sixth class reading tests than children of parents who reported reading for pleasure less frequently (Table 7.5; e-Appendix Tables A7.9 and A7.10).

Table 7.5: Frequency with which parent reads for his/her own pleasure, and mean pupil achievement scores, by grade level

	Second			Sixth		
	%	Reading	Maths	%	Reading	Maths
Every day/almost every day*	52.2	270.0	268.7	52.3	270.9	270.4
Once or twice a week	24.2	**262.0**	265.0	24.1	**262.5**	265.5
Once or twice a month	13.3	**263.4**	**261.7**	12.9	**253.8**	**266.7**
Never/hardly ever	10.3	**254.4**	**258.1**	10.6	**256.3**	**257.0**

Scores in **bold** are significantly different from the mean score of the reference (*) group.

Parents were also asked to report whether their child used or had access to a range of educational resources at home. A large majority of pupils had home access to broadband Internet (83% at Second class, 88% at Sixth). Just over one-third of pupils had access to electronic books (34% of Second class pupils, 37% of Sixth class pupils). At both grade levels, 87% of parents reported that their children had a quiet place to do homework. A slightly higher proportion of Second class pupils (79%) used or had access to educational games at home than at the Sixth class level (72%). A large proportion of pupils at each grade level had access to reference books at home (78% at Second class, 83% at Sixth). Second and Sixth class pupils who had home access to educational games, Broadband, reference books and a quiet place to do homework had significantly higher mean English reading and mathematics scores than pupils whose parents reported that they could not access these resources at home. Access to electronic books was significantly related to reading scores at both Second and Sixth class, and to mathematics performance at Sixth class (Table 7.6; e-Appendix Tables A7.11 and A7.12).

Table 7.6: Percentages of pupils who use or have access to educational resources at home and mean pupil achievement scores, by grade level

		Second			Sixth		
		%	Reading	Maths	%	Reading	Maths
Educational games	Yes*	78.9	268.2	268.2	71.9	266.8	266.4
	No	21.1	**249.5**	**249.4**	28.1	**255.5**	**253.9**
Electronic books	Yes	34.1	268.7	267.2	36.8	273.8	271.2
	No*	65.9	**263.4**	264.3	63.2	**258.0**	**258.6**
Broadband Internet	Yes*	82.5	268.0	267.9	87.7	265.8	265.2
	No	17.5	**245.2**	**245.5**	12.3	**235.3**	**233.6**
Quiet place to do homework	Yes*	87.1	266.4	266.7	87.2	266.0	265.1
	No	12.9	**250.0**	**246.6**	12.8	**234.9**	**239.2**
Reference books	Yes*	77.9	269.7	269.5	83.4	266.7	266.1
	No	22.1	**243.2**	**244.7**	16.6	**241.8**	**240.2**

Scores in **bold** are significantly different from the mean score of the reference (*) group.

Parents were asked to report how frequently their children need help with English homework and with mathematics homework. As shown in Table 7.7 (see also e-Appendix Tables A7.13 and A7.14), at both grade levels, just under a third of parents reported that their children never or hardly ever need help with mathematics homework. Similarly, 35% of Second class pupils had parents who reported that they never or hardly ever need help with English homework; this rises to approximately half of pupils at the Sixth class level. Pupils whose parents reported that they never or hardly ever need help with homework significantly outperformed pupils who need help daily, weekly, or monthly. This was found for pupils at both grade levels, and in both domains.

Table 7.7: Frequency with which parents report that their children need help with homework, and mean pupil achievement scores, by grade level

		Second			Sixth		
		%	Reading	Maths	%	Reading	Maths
Needs help with English homework	Never/hardly ever*	35.0	286.8	281.2	50.4	281.2	276.0
	Once/twice a month	23.5	**272.6**	**271.5**	26.9	**258.8**	**260.8**
	Once/twice a week	24.7	**252.7**	**257.3**	16.4	**241.5**	**245.6**
	Almost every day	16.8	**230.0**	**236.8**	6.2	**214.4**	**225.0**
Needs help with maths homework	Never/hardly ever*	30.7	282.9	291.9	32.6	281.6	288.8
	Once/twice a month	26.5	**273.5**	**274.5**	31.7	**271.5**	**267.3**
	Once/twice a week	27.0	**256.9**	**252.3**	25.2	**249.6**	**246.0**
	Almost every day	15.8	**233.0**	**222.8**	10.6	**226.8**	**219.0**

Scores in **bold** are significantly different from the mean score of the reference (*) group.

Parents were also asked to report how confident they felt at helping their children with English and mathematics homework. At both grade levels, fewer parents felt very confident in providing help with mathematics homework than felt very confident in helping with English homework (Table 7.8; e-Appendix Tables A7.15 and A7.16). This was particularly marked at Sixth class, where one in five parents reported that they felt not very, or not at all, confident in providing mathematics homework assistance. Mean test scores differed significantly by level of parental confidence, with 39-point gaps between the mean reading scores of pupils whose parents were very confident helping with English homework and those whose parents were not at all confident, at both grade levels. The mean mathematics score of Sixth class pupils whose parents were very confident helping with mathematics homework was 25 points higher than of those whose parents are not at all confident, while the largest gap (44 points) was found between the maths scores of Second class pupils whose parents felt very confident in providing mathematics homework assistance, and those who felt not at all confident doing so.

Table 7.8: Parental confidence in providing homework assistance, and mean pupil achievement scores, by grade level

		Second			Sixth		
		%	Reading	Maths	%	Reading	Maths
Confidence helping with English homework	Very*	74.8	272.6	270.3	57.0	274.3	270.1
	Fairly	21.8	**247.4**	**253.1**	36.4	**255.1**	**257.1**
	Not very	2.9	**221.7**	**233.8**	5.7	**232.3**	**244.9**
	Not at all	0.5	**233.7**	**248.0**	1.0	**235.4**	244.5
Confidence helping with maths homework	Very*	69.4	272.1	272.9	36.9	277.9	276.3
	Fairly	26.1	**253.2**	**252.1**	43.6	**260.6**	**260.9**
	Not very	3.9	**235.5**	**232.6**	16.1	**244.8**	**251.2**
	Not at all	0.6	**228.2**	**211.5**	3.4	**245.4**	**251.3**

Scores in **bold** are significantly different from the mean score of the reference (*) group.

Parents were also asked about their use of the Internet when providing homework assistance to their children. For English, one-quarter of Second class parents and 39% of Sixth class parents indicated that they or their partner had used the Internet in the past three months to find information they needed to help their child with homework. For mathematics, 11% of Second class parents and 20% of Sixth class parents reported that they or their partner had done so.

The majority of parents reported confidence in their ability to find, on the Internet, the information they need to help their children with English and mathematics homework (Table 7.9; e-Appendix Tables A7.17 and A7.18). One in five Sixth class parents, however, indicated that they were not confident in their ability to find information on the Internet needed to help their children with their mathematics homework.

Table 7.9: Parental confidence in finding on the Internet that information which they need to help their children with homework, by grade level

		Second	Sixth
English Homework	Very	55.7	50.1
	Fairly	33.7	37.4
	Not very	7.5	9.2
	Not at all	3.0	3.3
Mathematics Homework	Very	53.0	42.2
	Fairly	34.5	37.6
	Not very	9.1	14.8
	Not at all	3.4	5.3

The vast majority of parents were satisfied with the amount of homework assigned to their children, with 88% of Second class parents and 84% of Sixth class parents reporting that they believed that their children were given about the right amount of English homework, and 85% of Second class and 83% of Sixth class parents believing that their children got about the right amount of homework in mathematics. Of the remainder, parents were more likely to say that their children were given too little homework than too much (at both grade levels and in both domains; see e-Appendix Tables A7.19 and A7.20).

Parents reported that their Second class children spent an average of 17 minutes per day on English homework, and 14 minutes per day on mathematics homework. At Sixth class, pupils were reported to spend, on average, 32 minutes on English homework and 31 minutes on mathematics homework. At Second class, there is a significant moderate negative correlation between the number of minutes children spend per day on maths homework and children's mathematics scale scores (Second class: $r = -.25$). Similarly, at Second class, there is a weak to moderate, statistically significant negative correlation between time spent on English homework and English reading scale scores ($r = -.21$). However, there is no correlation between time spent on English reading homework and reading scores at the Sixth class level ($r = 0.01$), nor between the time per day spent on maths homework and pupils' mathematics scores ($r < 0.01$) (see e-Appendix Tables A7.21 and A7.22).

At both grade levels, small proportions of parents reported that they had attended a course or information evening aimed at helping their child with English (7% at Second class, 5% at Sixth) and mathematics (6% at Second class, 5% at Sixth). Mean scale scores for pupils whose parents had attended such courses were not significantly different from those of pupils whose parents had not (e-Appendix Tables A7.23 and A7.24).

Three-quarters of Second class parents (76%) indicated that they would attend a course or information evening for parents aimed at helping their children with English, were one organised by their child's school, and 79% reported that they would attend such a course for mathematics. Similar proportions of Sixth class parents indicated that they would attend such courses for English (71%) and for mathematics (75%) (e-Appendix Table A7.25).

Second class parents were asked to indicate their level of agreement with a series of statements about their home practices with their children (on a five-point scale from strongly agree to strongly disagree). Over 90% of parents agreed or strongly agreed with each of the individual statements (Table 7.10; e-Appendix Table A7.26). Children whose parents strongly agreed that they set aside time on most days for their children to read for fun (42%) had significantly higher mean reading scores than those whose parents agreed (47%), did not know (4%), or disagreed (6%). Children whose parents strongly agreed that they set rules with their child for his or her behaviour at home (61%) had a significantly higher mean reading score than pupils whose parents agreed (36%) and those whose parents who strongly disagreed (fewer than 1%), outperforming the latter group by 97 scale score points. Children whose parents strongly agreed that they agree rules with their

children with respect to completing homework (65%) had a significantly higher mean score than the third of pupils (33%) whose parents agreed with this statement. Broadly similar patterns were found for mathematics achievement (e-Appendix Table A7.26)

Table 7.10: Parent home practices and mean reading scores, Second class

	Strongly agree*		Agree		Don't know		Disagree		Strongly disagree	
	%	Read	%	Read	%	Read	%	Read	%	Read
I set aside time for my child to read for fun or enjoyment on most days	42.3	279.7	47.3	**256.5**	4.4	**245.5**	5.6	**253.7**	0.3	238.2
I agree rules with my child for his or her behaviour at home	61.3	270.3	36.3	**259.1**	1.5	248.8	0.8	251.4	0.1	**173.0**
I agree rules with my child about completing homework	64.5	270.0	33.0	**257.6**	1.1	248.9	1.1	269.9	0.3	260.3

Scores in **bold** are significantly different from the mean score of the reference (*) group.

Parent Perceptions, Attitudes, Concerns, and Expectations

Parents were asked to rate their children's ability on each of four dimensions of language: English reading, spelling, writing, and oral language. A majority of parents at each grade level rated their children as being very good at reading, spelling, and oral language; parents were slightly less likely to rate their children as being very good at writing. Parents' evaluations of their children's performance were related to their children's actual reading performance, with pupils whose parents rated them as very good on each of the dimensions scoring significantly higher on the overall English reading scale than pupils whose parents rated them as good, a bit weak, or weak (Table 7.11; e-Appendix Table A7.27).

Similarly, parents were asked to rate their children's mathematics performance as it relates to: tables or facts, sums, and word problems. Parents were less likely to rate their children as very good at aspects of mathematics performance than they were for English. Additionally, parents were less likely to rate their children as being very good at word problems than they were for other aspects of mathematics.

Table 7.11: Parental ratings of aspects of children's English performance and mean pupil English reading scores, by grade level

		Second		Sixth	
		%	Reading	%	Reading
English reading	Very good*	58.3	284.5	56.3	285.0
	Good	29.9	**246.9**	32.4	**245.0**
	A bit weak	9.7	**223.1**	9.4	**223.2**
	Very weak	2.2	**200.8**	2.0	**194.6**
English spelling	Very good*	50.6	282.0	52.2	281.3
	Good	35.2	**256.3**	34.6	**253.4**
	A bit weak	10.5	**235.3**	10.1	**229.4**
	Very weak	3.7	**215.7**	3.1	**219.7**
English writing	Very good*	38.7	284.5	47.0	281.3
	Good	43.7	**260.1**	39.5	**253.4**
	A bit weak	14.1	**241.3**	10.9	**229.4**
	Very weak	3.5	**220.7**	2.6	**219.7**
English oral language	Very good*	57.7	280.2	58.1	281.2
	Good	35.0	**250.9**	34.7	**255.2**
	A bit weak	5.9	**222.8**	6.2	**234.7**
	Very weak	1.4	**214.9**	0.9	**230.4**

Scores in **bold** are significantly different from the mean score of the reference (*) group.

As with English reading, parents' appraisals of their children's mathematics performance were related to actual pupil performance, with large gaps in mean scores between pupils rated as very good and those rated as very weak (gaps ranging from 89 to 98 points; Table 7.12; e-Appendix Table A7.28).

Table 7.12: Parental ratings of aspects of children's mathematics performance and mean pupil mathematics scores, by grade level

		Second		Sixth	
		%	Maths	%	Maths
Tables/facts	Very good*	44.4	287.3	45.6	288.0
	Good	40.7	**259.1**	38.2	**254.3**
	A bit weak	11.8	**225.0**	13.2	**223.7**
	Very weak	3.2	**198.8**	3.0	**190.4**
Sums	Very good*	48.9	285.8	44.4	290.4
	Good	39.2	**255.9**	38.8	**252.8**
	A bit weak	9.8	**219.8**	14.2	**223.1**
	Very weak	2.1	**194.6**	2.6	**195.0**
Word problems	Very good*	34.4	292.5	30.6	298.9
	Good	45.0	**263.8**	39.2	**262.6**
	A bit weak	16.9	**229.5**	23.9	**236.2**
	Very weak	3.7	**202.5**	6.3	**207.2**

Scores in **bold** are significantly different from the mean score of the reference (*) group.

Parents were also asked whether they had any particular areas of concern about their children's progress and, if so, what these were. Second class parents were asked to list up to three concerns they had relating to their children's English performance. One-quarter (25%) of Second class parents listed at least one concern, with 1360 concerns, relating to one of 22 main topics, listed in total. The ten most frequent concerns listed by Second class parents are presented in Table 7.13 (for a full list of concerns, and the frequency with which they were listed by parents, see e-Appendix Table A7.29).

Table 7.13: Parent concerns about aspects of their children's English performance, Second class

Concern	n	% of parents who listed a concern	% of all parents	% of concerns
Spelling	290	31.5	7.8	21.3
Handwriting	232	25.2	6.2	17.1
Reading (general)	189	20.5	5.1	13.9
Pronunciation	70	7.6	1.8	5.1
Grammar	59	6.4	1.6	4.3
Teaching	51	5.5	1.4	3.8
Specific learning disability	49	5.3	1.3	3.6
Comprehension	47	5.1	1.3	3.5
Oral language (general)	41	4.5	1.1	3.0
Fluency (unspecified)	36	3.9	1.0	2.6

At the Sixth class level, parents were asked to list up to three concerns they had about their children's mathematics performance, if relevant. Just over one in four Sixth class parents (27%) listed at least one concern, with 1647 concerns listed in total. The ten most frequently mentioned concerns are presented in Table 7.14 (for a full list, see e-Appendix Table A7.30).

Table 7.14: Parents' concerns about aspects of their children's mathematics performance, Sixth class

Concern	n	% of parents who listed a concern	% of all parents	% of concerns
Problem solving	467	45.6	12.2	28.4
Fractions	214	20.9	5.6	13.0
Teaching	99	9.7	2.6	6.0
Times tables	91	8.9	2.4	5.5
Percentages	84	8.2	2.2	5.1
Division	75	7.3	2.0	4.6
General concern	68	6.6	1.8	4.1
Reading/language difficulties	57	5.6	1.5	3.5
Decimals	49	4.8	1.3	3.0
All aspects	40	3.9	1.0	2.4

Second class parents were asked about their expectations for their children's future reading performance. Children whose parents strongly agreed that they expected their children to do well in English reading next year (59%) had significantly higher mean reading scores than children whose parents agreed (36%), did not know (4%), and the 1% whose parents disagreed or strongly disagreed (Table 7.15; e-Appendix A7.31).

Table 7.15: Parent expectations for future reading performance and mean reading scores, Second class

	Strongly agree*		Agree		Don't know		Disagree		Strongly disagree	
	%	Read	%	Read	%	Read	%	Read	%	Read
Expect child to do well in English reading next year	59.0	280.5	35.9	**247.4**	3.9	**225.1**	0.8	**209.9**	0.3	**183.9**

Scores in **bold** are significantly different from the mean score of the reference (*) group.

Sixth class parents were asked to indicate their level of agreement with a number of statements about their children and mathematics. Almost 100% of parents agreed or strongly agreed that it was important for their children to do well at mathematics at school (Table 7.16; e-Appendix Table A7.32). Children whose parents strongly agreed (80%) had a significantly higher mean mathematics score than pupils whose parents agreed (19%) and whose parents disagreed (just 0.1%). No Sixth class parent strongly disagreed with this statement. Most parents agreed (41%) or strongly agreed (46%) that their child's school had done a good job of preparing their child for mathematics at post-primary level. Children of parents who strongly agreed with this statement significantly outperformed on the mathematics test those pupils whose parents agreed, did not know (9%) or disagreed (4%).

Parents expectations for their child's future performance in mathematics were significantly associated with their children's mathematics test scores. Pupils whose parents strongly agreed that they expected their child to do well at mathematics at post-primary level (46%) had significantly higher mean mathematics scores than pupils whose parents agreed (41%), did not know (10%), disagreed (2%), or strongly disagreed (fewer than 1%). Approximately half of parents (51%) agreed or strongly agreed that they expected their child to work in a job that required knowledge of mathematics. Again, children whose parents strongly agreed with this statement (22%) had a mean mathematics score that was significantly higher than pupils with parents at all other levels of agreement (Table 7.16). A minority of parents (31%) agreed or strongly agreed that they had considered their child's mathematical ability when choosing which post-primary school he or she would attend. Pupils whose who strongly agreed with this (12%) had a significantly higher mean mathematics score than children whose parents agreed (19%), but did not differ significantly from the mean scores of pupils whose parents disagreed (43%), strongly disagreed (10%) or did not know (16%). Finally, a majority of parents agreed (49%) or strongly agreed (18%) that they were good at mathematics themselves. Approximately a quarter (24%) of parents disagreed or strongly

disagreed that they were good at mathematics. Children whose parents strongly agreed that they were good at mathematics themselves had a significantly higher mean mathematics score than children whose parents disagreed or strongly disagreed.

Table 7.16: Parent expectations and beliefs about mathematics, and mean mathematics scores, Sixth class

	Strongly agree*		Agree		Don't know		Disagree		Strongly disagree	
	%	Maths	%	Maths	%	Maths	%	Maths	%	Maths
It is important for my child to do well at maths at school	80.2	267.8	19.4	**247.4**	0.3	221.3	0.1	**229.4**	0.0	
My child's school has done a good job preparing him or her for maths at post-primary level	45.9	269.7	41.4	**261.5**	8.8	**254.1**	3.7	**243.5**	0.4	225.2
I expect my child to do well in maths at post-primary level	46.3	277.7	41.3	**259.0**	10.4	**234.0**	1.5	**211.2**	0.4	**181.3**
I expect my child to work in a job that requires a good knowledge of maths	22.2	280.3	28.6	**264.2**	41.1	**261.8**	6.8	**232.6**	1.4	**213.4**
I considered my child's ability in maths in deciding to which post-primary school to send him/her	12.1	267.7	19.1	**255.5**	16.2	261.6	42.5	266.9	10.0	267.9
I am good at maths myself	18.3	272.2	48.7	266.6	9.1	263.8	20.4	252.9	3.6	245.2

Scores in **bold** are significantly different from the mean score of the reference (*) group.

Home-School Interaction

Parents were also asked to report on their involvement in decision-making or organisational activities in their child's school. Specifically, parents were asked whether they were, or had previously been, involved in the school's Board of Management, Parents' Association, or another school committee. At the Second class level, parents' committee membership was not significantly related to pupils' mean scores in either reading or in mathematics. At Sixth class, pupils whose parents were members of the Board of Management, Parents' Association, and/or another school committee scored significantly higher than pupils whose parents were not. For mathematics, only parental involvement in the Board of Management was significantly related to test performance at the Sixth class level (Table 7.17; e-Appendix Tables A7.33 and A7.34).

Table 7.17: Parental membership of school committees, and mean pupil achievement scores, by grade level

		Second			Sixth		
		%	Reading	Maths	%	Reading	Maths
Board of Management	Yes	4.1	268.6	270.3	5.5	**283.9**	**281.7**
	No*	95.9	264.9	265.1	94.5	261.9	262.2
Parents' Association	Yes	23.6	272.6	271.9	25.1	**275.8**	271.0
	No*	76.4	263.4	263.9	74.9	260.2	260.7
Other committee	Yes	10.7	273.3	274.5	13.0	**278.5**	276.4
	No*	89.3	264.3	264.6	87.0	261.2	261.6

Scores in **bold** are significantly different from the mean score of the reference (*) group.

Parents were asked to indicate whether they or their partner had discussed their child's progress in English reading or mathematics with the child's teacher during the school year. A large majority of parents reported having spoken to their child's teachers about their child's progress. Discussing mathematics performance with the child's teacher was not significantly related to mathematics test performance at either grade level. Sixth class parents who had discussed English reading performance had children with significantly lower reading scores than those who had not (Table 7.18; e-Appendix Tables A7.35 and A7.36).

Table 7.18: Parent-teacher discussion about child's progress during the year, and mean pupil achievement scores, by grade level

		Second			Sixth		
		%	Reading	Maths	%	Reading	Maths
English reading	Yes*	89.7	265.4		85.6	263.4	
	No	10.3	265.1		14.4	**271.8**	
Mathematics	Yes*	89.8		266.0	87.2		263.2
	No	10.2		261.4	12.8		268.8

Scores in **bold** are significantly different from the mean score of the reference (*) group.

Second and Sixth class parents were asked to indicate their level of agreement with a series of statements about their child's school, on a five-point scale from strongly disagree to strongly agree. Table 7.19 summarises parent responses to a sample of these items, with response categories collapsed from five to three (to see all items, see e-Appendix Tables A7.37 and A7.38). Generally, parents were happy with their children's schools, with very high proportions of parents at both grade levels agreeing that their child's school has good discipline, has good teaching, and that the school is well run. An exception to this general trend relates to class size, with approximately one-quarter of parents at each grade level disagreeing that they are happy with class sizes in the school. On the whole, parents' satisfaction with the school was not related to their children's achievement. An exception to this includes the 2% of Second class parents who disagree that they are happy with their

child's school (overall) and have children with significantly lower mean reading scores than children whose parents are happy with the school (Table 7.19). Another is the 2% of Sixth parents who disagree that teaching is good in the school and whose children have a significantly lower mean reading score than children whose parents agree. Also, children whose parents disagree that they are happy with class sizes in the school significantly outperformed children whose parents are happy with class sizes, in both domains and at both class levels.

Table 7.19: Parent perceptions of the school and mean achievement scores, by grade level

		Second			Sixth		
		%	Reading	Maths	%	Reading	Maths
Discipline is good in the school	Agree*	96.2	265.6	265.9	95.5	264.7	263.7
	Don't know	2.4	270.7	264.4	2.1	260.9	269.6
	Disagree	1.5	250.3	260.7	2.3	256.6	259.5
The school is well run	Agree*	95.3	266.0	266.3	94.7	264.8	264.0
	Don't know	2.7	259.9	253.5	2.8	264.1	270.5
	Disagree	2.1	252.2	257.7	2.5	250.1	245.7
Overall, I am happy with the school	Agree*	96.0	265.8	266.0	95.1	264.7	264.0
	Don't know	2.2	269.7	266.5	2.4	262.5	265.0
	Disagree	1.9	**244.5**	250.4	2.4	253.5	248.4
Teaching is good in the school	Agree*	96.2	265.8	265.8	95.0	264.6	263.6
	Don't know	2.9	255.6	264.2	3.4	266.9	264.5
	Disagree	0.9	262.3	263.1	1.6	**247.4**	263.9
I am happy with the size of classes in the school	Agree*	68.9	262.4	263.4	70.4	260.6	260.7
	Don't know	5.6	263.0	264.9	4.7	259.0	262.0
	Disagree	25.5	**274.2**	**271.8**	25.0	**276.2**	**272.7**
The school is welcoming to parents	Agree*	93.9	265.3	265.5	93.7	264.3	263.6
	Don't know	3.0	270.8	265.7	2.5	269.7	270.7
	Disagree	3.1	270.6	273.6	3.8	262.4	260.0

Scores in **bold** are significantly different from the mean score of the reference (*) group.

Second and Sixth class parents were then asked to respond to a series of statements about school practices, again on a five-point scale from strongly disagree to strongly agree. Analysis of responses revealed that two underlying scales were indicated: parent perceptions of school support for families, and parent perceptions of school support for literacy and numeracy (e-Appendix Tables A7.39 to A7.44). However, relationships between

parent scores on these scales and pupil achievement were very weak ($r < |0.01|$ in all instances, see e-Appendix Tables A7.45 and A7.46).

Summary

This chapter has shown that a range of home and family characteristics were related to pupil achievement in NA '14. Elements of family structure, for example, were related to achievement, with pupils from two-parent homes and those with fewer siblings outperforming other pupils in both reading and mathematics.

Socioeconomic variables were also significantly related to achievement, with pupils from financially better-off families and those whose parents have higher levels of education having significantly higher mean achievement scores in both domains than other children.

Elements of home atmosphere were related to achievement, with those pupils with many books in their homes, who have Internet at home, who have access to educational games, having significantly higher achievement in both reading and mathematics than those pupils who do not.

A number of individual parent attributes were also associated with achievement. Parental confidence in helping with homework was significantly related to achievement in both domains and at both grade levels. Parent expectations of their children's future reading and mathematics performance were significantly related to their children's NA '14 scores.

Some parent practices were also related to achievement. Second class pupils whose parents strongly agreed that they set aside time for their child to read for enjoyment, agree rules with their child for behaviour at home, and agree rules about completing homework, had significantly higher mean achievement scores than other pupils.

Parents also had some concerns about their children's progress in English (Second class) and mathematics (Sixth class). The area of concern most frequently mentioned by Second class parents was that of spelling. At Sixth class, the most frequent area of concern was that of mathematical word problems.

Finally, on the whole, parents were happy with their children's schools, with large proportions agreeing that the teaching is good in their child's school, that the school is well run, and that the school is supportive of parents. However, pupil achievement tended not to vary much by parent satisfaction with their child's school.

Chapter 8: Understanding Second Class Reading Achievement: A Multilevel Analysis

Earlier chapters have examined the associations between reading achievement and a range of explanatory variables, looking at each explanatory variable individually. Although such analyses give a preliminary understanding of characteristics and behaviours associated with reading achievement, there are two main reasons why a multilevel analysis is required in order to draw more detailed conclusions. First, pupils participating in the National Assessments were clustered within classes, within schools. It is well known that individuals within groups tend to have more in common with each other than with those outside their group (Goldstein, 2011). Multilevel modelling offers statistical approaches to account for this clustering. Second, multilevel modelling allows the contribution of various explanatory variables to be examined simultaneously. Thus, for example, while there are raw differences in achievement between pupils who live in one-parent families and those who live with two parents, these differences are not statistically significant once other household characteristics are taken into account.

The remainder of this chapter is divided into six sections. The first section provides some basic technical information about interpreting multilevel models. Readers who are less interested in technical detail may wish to proceed directly to the next section. Second, the variance in reading achievement at Second class is considered, and how this varies between pupils in different schools and classes is examined. Third, the variables used in the modelling process are outlined. Section 4 summarises the method used in the current analysis and is likely to be of interest primarily to those seeking to understand more technical detail. Next, the results of the models of reading achievement are presented. The percentage of variance explained by different combinations of explanatory variables is provided. Gender interactions and random slopes are also considered. The final section provides a summary and conclusion to the chapter.

Understanding Multilevel Models

Readers interested in the technical details of multilevel models may wish to refer to texts such as Goldstein (2011), Snijders and Bosker (2012) or Hox, Moerbeek, and van de Schoot (2010). Cosgrove and Creaven (2013) give some detail on the recent application of multilevel modelling in an Irish context; Gilleece (2015) may also be of interest. Both of these publications are referenced extensively in this chapter as they refer to recent models of reading achievement for a similar age group of pupils. It is important to note the term 'effect' is used in a statistical sense in this chapter. Direction of causality cannot be inferred from the type of analyses presented here.

There is ongoing discussion in the multilevel modelling literature regarding the use of sampling weights (see e.g. Aitkin & Aitkin, 2011; Rabe-Hesketh & Skrondal, 2006; Rutkowski, Gonzalez, Joncas & von Davier, 2010) with some authors advocating their use (e.g. Rutkowski et al., 2010) and others proposing alternative methods (e.g., Aitkin, Francis & Hinde, 2005). A decision was taken to use weights for the analyses presented in this chapter and these were computed using the method outlined in Rutkowski et al. (2010). Thus, for each school, the school-level weight was computed as the inverse of the probably of selection for that school with an appropriate non-response adjustment. The pupil weight incorporated both the probability of selection of the pupil's class and the probability of selection of the pupil, as well as appropriate non-response adjustments. Similarly-constructed weights had been used in the analyses described earlier in this report.

Box 8.1: Concepts and terms used in Chapter 8

A variable which is included in the final model is statistically significantly associated with reading achievement, after controlling for the other variables in the model. That is, the final model presents the association between reading achievement and a variable of interest, assuming that the effects of all other variables in the model are held constant. The term 'effect' is used in a statistical sense only. The analyses presented do not allow causality or direction to be inferred.

Intercept: The intercept is the estimated reading achievement of a pupil who has a value of zero on all categorical explanatory variables and a mean value on any continuous explanatory variables.

Explanatory (independent) variables: All explanatory variables in the final model are categorical in nature. This means that the variable is represented by a number of categories and each pupil can belong to one and only one of these categories; e.g. the variable DEIS is represented by the categories Band 1, Band 2, DEIS Rural and non-DEIS.

Dummy variables and reference groups: Categorical variables (i.e. all those in the final model) are entered into the model using dummy variables. This means that for each category of the variable, a pupil has the value 1 or 0 so a pupil who attends a school that is not in DEIS would have the value 0 for Band 1, Band 2 and DEIS Rural. When using dummy coding in this way, one category is selected as the reference category in the model so that the variables in the model are compared to the reference category (which is not entered in the model). Using the DEIS example, non-DEIS was selected as the reference category so the model estimates how the reading achievement of pupils in DEIS Band 1 schools, Band 2 schools and DEIS Rural schools compares to that of pupils in non-DEIS schools. Specifically, in the DEIS example, the parameter estimates in the model give the expected difference in achievement between pupils in each type of DEIS school and those in non-DEIS schools, assuming that all other variables in the model are equal.

Standard error: Model parameters give *estimates* of the association between reading achievement and the variable of interest in the population (having accounted for all other variables in the model). These estimates are computed on the basis of having gathered data from a sample of pupils and have two main types of error associated with them. The first derives from having tested only a sample of pupils (sampling error) and the other refers to measurement error. The standard error associated with a parameter estimate in the model gives an indication of how likely the model estimate is to be close to the underlying population parameter. When standard errors are large, there is a greater degree of uncertainty that the model parameter is close to the underlying population parameter. In general, standard errors are larger when there are fewer students in a particular category of variable used in the model.

Between-class/school variance: This is the proportion or percentage of the total variation in achievement that is between groups (classes or schools). The higher the percentage, the more groups differ with respect to achievement. High between-school variance may be indicative of a less equal education system, if there are large differences in achievement between different schools.

Explained variance: This is the amount of variation in reading achievement that is explained by the variables in the model.

Based on Cosgrove & Creaven, 2013, p.203; Cosgrove, Gilleece & Shiel, 2011, p. 122

Variance in Reading Achievement

As mentioned previously, individuals within groups tend to have more in common with each other than with individuals in other groups. Pupils participating in NA '14 were clustered in classes, within schools. It is therefore necessary to consider the most appropriate hierarchical structure to use in the modelling process. Intuitively, it seems most appropriate to include pupil, class, and school levels, as about two-fifths of participating pupils were in schools where two classes completed the assessment. However, an analysis of the variance in reading achievement between classes shows that between-class variance within schools is very low. It is typically in the region of 1%, regardless of whether all schools are considered or only those where two classes completed the assessment, and regardless of whether weighted or unweighted data are examined (Table 8.1).

Table 8.1: Variance decomposition of NA '14 Second class reading achievement: Three-level and two-level models, percentage of variance between and within schools (weighted and unweighted)

	Unweighted %	Weighted %
Two level: school and pupil		
Between-school variance	12.0	9.4
Within-school variance	88.0	90.6
Two level: class and pupil		
Between-class variance	12.6	10.8
Within-class variance	87.4	89.2
Three level: school, class and pupil (All schools)		
Between-school variance	11.4	9.4
Between-class variance	0.9	<1
Within-class variance	87.7	90.6
Three level: school, class and pupil (Schools with two classes, only)		
Between-school variance	13.7	14.8
Between-class variance	1.1	1.6
Within-class variance	85.2	83.6

Another relevant consideration is that it is likely that the main policy interest is in achievement differences between schools, rather than between classes within schools. Even if differences between classes within schools were to be of interest, initial exploratory analyses showed few statistically significant associations between teacher or classroom variables and reading achievement. Therefore, there are few possibilities with the current dataset to examine differences between classes within schools.

Given the very low rates of between-class variation, and the limited possibilities to use teacher or class characteristics as explanatory variables, the model presented in this chapter is a two-level model, using school at Level 2 and pupil at Level 1. As shown in Table 8.1, between-school variance in reading achievement is about 9% (weighted estimate) and over 90% of variance in reading achievement is at the pupil level.

Variables Examined

The outcome variable in the model is reading achievement. Explanatory variables are drawn from the pupil, parent, and school questionnaires. Variables were selected for inclusion in the analysis if they have previously been shown to be significantly associated with achievement, and/or if they were hypothesised to be associated with achievement. Priority was given to variables with low levels of missing data. Recoding was conducted if there were very few pupils in a particular variable category. For example, parents of very few pupils indicated that they did not expect their child to do well in English reading this year, so the categories of don't know, disagree and strongly disagree were combined into a new category (still accounting for just 5% of cases).

Table 8.2 lists the variables used in the modelling process, outlines recodes that were applied, and provides descriptive statistics for continuous variables and the percentages of pupils in each of the categories for categorical variables. Independent variables were divided into the following blocks: Background; educational climate and home literacy activities; pupil attitudes and expectations about reading; and parental involvement and monitoring. Pupil ownership of a smartphone or bedroom TV are taken as indicators of (low) parental monitoring, as it is assumed that having either of these devices gives the child largely unsupervised access to various media (see also Gilleece, 2015).

Table 8.2: Variables used in modelling – coding and descriptives
(based on cases used in model)

Variable (Level)[a] and description	**Coding (weighted % of pupils per category)[b]**
Outcome: Reading achievement	Mean=264.36; SD=47.357; N=3981 out of total 4099 (97% of cases)
Background variables	
DEIS (2)	B1 (8%), B2 (7%), Rural (6%), **non-DEIS** (79%)
Language of instruction (2)	**English** (89%), Irish (11%)
School enrolment size (2)	Small (13%), **Medium** (44%), Large (43%)
School gender composition (2)	Girls only (10%), Boys only (7%), **Mixed** (83%)
% of parents with a third-level degree (2)	Mean=40.29; SD=19.557
Average age of fourth class pupils (2)	Mean=7.89; SD=0.143
Percentage of pupils with a medical card (2)	Mean=32.59; SD=19.478
School location (2)	City/suburbs Dublin, Cork, Galway, Limerick or Waterford (27%), Other large town/city (pop > 10,000; 14%), Town (pop < 10,000; 22%), **Village /rural** (pop < 1,500; 37%)
% of pupils Eng/Irish main home language (2)	Mean=91.60; SD=12.083
Pupil age (1)	7 or below (16%), **8** (79%), 9 or above (5%)
Gender (1)	Girl (50%), **Boy** (50%)
Parental education[c] (1)	**Up to Leaving Cert** (20%), Non-degree 3rd-level (34%), ≥ Degree (37%), Missing (9%)
Medical card[c] (1)	Yes (33%), **No** (59%), Missing (8%)
Parent rating of financial well-being[c] (1)	Poor (7%), **Avg** (72%), Well off (12%), Miss (9%)
Total jobs in the household[c] (1)	Missing jobs (8%)
Home language (1)[d]	**English or Irish** (92%), Other (8%)
Single parent family[c] (1)	Yes (75%), **N**o (18%), Missing (8%)
Educational climate and literacy activities at home (all Level 1)	
Number of books in the home[c]	**≤50** (29%), 51-250 (41%), ≥251 (23%), Miss (7%)
Parental freq of reading for enjoyment[c]	**Never/hardly ever** (7%), 1-2 per month (10%), 1-2 per wk (19%), Daily/almost (57%), Miss (7%)
Parent is a member of a public library[c]	At least one parent library member (57%), **Neither is library member** (37%), Miss (6%)
Pupil is a member of a public library[c]	Yes (69%), **No** (25%), Missing (6%)
Pupil freq of reading books alone for fun[c]	**Most days** (46%), Some days (40%), Never (14%), Missing (<1%)
Pupil freq of reading with mum or dad[c]	**Most days** (33%), Some days (42%), Never (24%), Missing (<1%)
Pupil freq: read magazines/comics for fun[c]	Most days (19%), **Some days** (32%), Never (48%), Missing (<1%)

Table 8.2: Continued.

Pupil attitudes and expectations about reading (all Level 1)	
Pupil: I like reading	Yes (88%), **No** (12%)
Pupil: I really want to do well at reading	Yes (95%), **No** (5%), Missing (<1%)
Parental involvement and monitoring (all Level 1)	
Pupil: Like to tell my family about reading	Yes (70%), **No** (30%), Missing (<1%)
Parent has attended course about helping with Eng[c]	Yes (6%), **No** (87%), Missing (7%)
Parent expects child to do well in Eng reading this year[c]	Strongly agree (55%), Agree (33%), **Don't know, disagree or strongly disagree** (5%), Miss (7%)
Parent sets aside time for child to read for fun most days[c]	Strongly agree (39%), **Agree** (44%), Don't know, disagree or strongly disagree (10%), Miss (8%)
Parent – agree – rules with child for behaviour at home[c]	Strongly agree (57%), **Agree** (33%), Don't know, disagree or strongly disagree (2%), Missing (7%)
Parent – agree – rules with child re completing homework[c]	Strongly agree (60%), **Agree** (31%), Don't know, disagree or strongly disagree (2%), Missing (7%)
Parental agreement that parents are invited to contribute their views about school policies[c]	Strongly agree (36%), Agree (34%), Don't know (14%), **Disagree/strongly disag** (9%), Miss (8%)
Parent – member: Board of Mgmt[c]	Yes (3%), **No** (79%), Missing (18%)
Parent – member: Parents' Assoc[c]	Yes (70%), **No** (21%), Missing (9%)
Parent – member: other committee child's sch[c]	Yes (9%), **No** (74%), Missing (17%)
Parent – agree – school keeps parents informed about child's progress in Eng read[c]	Strongly agree (34%), Agree (40%), Don't know (6%), **Disagree/strongly disag** (14%), Miss (7%)
Parent – agree – school good comms /parents[c]	Strongly agree (41%), **Agree** (41%), Don't know, disagree or strongly disagree (11%), Miss (8%)
Parent: I feel involved in my child's schooling[c]	Strongly agree (40%), Agree (42%), **Don't know, disagree or strongly disagree** (11%), Miss (8%)
Pupil has TV in bedroom	Yes (43%), **No** (57%)
Pupil has own mobile phone or smartphone	Yes (34%), **No** (66%)

[a]Level 2: school or class, Level 1: pupil; [b]Bold indicates reference category; [c]Variable has missing indicator to preserve cases in the dataset; [d]Where pupil are missing, parent data are substituted if possible

Method

Variables were examined one-by-one for their associations with reading achievement. The significance of a variable was determined by adding that variable to the null model and by examining either the t-value associated with the variable, or the deviance difference of a model with and without the variable. The analyses were conducted in MLwiN (Version 2.34; Rasbash, Browne, Healy, Cameron, & Charlton, 2015)

Variables that were statistically significant individually ($p < .05$) were retained in their respective blocks and the blocks were tested one-by-one for their association with achievement. The blocks were finalised by retaining only those variables that were statistically significant when all variables in the block were added to the model together. Finally, all blocks were added to the model. Variables that were not statistically significant

were removed one at a time, starting with the variable with the lowest test statistic value (chi-square or t). The final model includes only variables that are statistically significant. Variance explained was computed by comparing the fitted model (without interactions) to the null model. Effect sizes for the model were calculated as follows (Strand, 2004, p.51):

- the effect size of a categorical variable was calculated as the regression coefficient divided by the outcome standard deviation (SD), i.e., the pupil-level SD in reading achievement (47.36);
- the effect size of a continuous variable was calculated as the regression coefficient multiplied by twice the variable's SD, divided by the outcome SD. The effect size gives the difference (in terms of standard deviation units) between the predicted reading scores of pupils who are one SD above the mean and those who are one SD below the mean on the predictor variable.

According to the What Works Clearing House (WWC), an initiative of the Institute for Education Sciences at the U.S. Department of Education, effect sizes of 0.25 standard deviations or larger are "substantively important". Even if not statistically significant, effect sizes of this magnitude "are interpreted as a qualified positive (or negative) effect" (WWC, 2014, p.23).

Next, interactions between gender and other variables in the model were examined as it is of interest to know if there are differences between girls and boys in the associations between the explanatory variables and reading achievement. Finally, the statistical significance of random slopes was considered.

Results for the Model of Reading Achievement

Five of the background variables examined were *not* statistically significant when examined one-by-one with achievement. These were: language of instruction, school enrolment size, school gender composition, mean pupil age, and school location. This is noteworthy as, in their analysis of the PIRLS (Progress in Reading Literacy Study) 2011 data, Cosgrove and Creaven (2013) found significant effects of school enrolment size on achievement in mathematics and science, and significant effects of language of instruction and mean age on Fourth class reading achievement.

Turning to the home literacy activity variables, all were statistically significant when examined individually for their associations with achievement. Similarly, both pupil attitudes and expectations variables were statistically significant when examined one-by-one. Of the parental involvement and monitoring variables, four were not statistically significant when examined individually. These were: pupil likes to tell his/her family about what he/she is reading; parental agreement that parents are invited to contribute their views about school policies; current or prior parental membership of the Board of Management; current or

prior parental membership of another school committee. The findings that parental contributions to school policies and membership of the Board of Management or school committees are not statistically significant mirrors findings of Gilleece (2015), which show that formal parental involvement in school activities has a much weaker or non-significant association with achievement when compared to informal parental involvement.

Table 8.3 presents the full model of reading achievement (without gender interactions). Using the WWC criterion ($d \geq 0.25$), substantively important effect sizes are associated with DEIS Band 1, a pupil being aged 9 or above, at least one parent having a third-level degree or above, having a high number of books at home, the pupil *never* reading books alone for fun, the pupil *never* reading with a parent, and high parental expectations. These are discussed in turn alongside findings with respect to variables associated with smaller effect sizes. Pupil age is discussed later in the context of gender interactions.

All else being equal, i.e., having controlled for all other variables in the model, pupils in DEIS Band 1 schools have a mean achievement score that is 14.5 points lower than pupils in non-DEIS schools (Table 8.3). This amounts to just under one-third of a standard deviation ($d = -0.31$). There is no substantive or statistically significant difference between pupils in DEIS Band 2 schools and those in non-DEIS schools, once all other variables are included in the model. There is a comparatively large standard error associated with the parameter estimate for DEIS Rural, so differences between pupils in non-DEIS and rural DEIS schools are not statistically significant. Thus, the salient finding here is that, having controlled for other variables in the model, significant differences in achievement persist between pupils in DEIS Band 1 schools and those in non-DEIS schools.

Gender differences in favour of girls are noted in the final model (Table 8.3), although gender interactions will be examined further later. Significant findings are also noted regarding pupil age. Table 8.2 showed that a majority of pupils (79%) were aged 8. Pupils aged 7 or below had reading achievement scores that were about one-fifth of a standard deviation below those of pupils aged 8. Also, pupils aged 9 or above had a mean reading score that was about one-quarter of a standard deviation below that of pupils in the reference category (aged 8). Pupil age is discussed further later in the context of gender interactions.

Parental education was also significantly associated with reading achievement (Table 8.3). Having controlled for other variables in the model, there is a difference of about one-quarter of a standard deviation between pupils where the highest level of parental education is Leaving Certificate or below and those where the highest level is a third-level degree or above. All else being equal, pupils who speak English or Irish at home had a mean score that is one-fifth of a standard deviation higher than those who speak other languages at home. There is a negative association between achievement and family possession of a medical card. Pupils from families with a medical card have a mean achievement score that

is about one-eighth of a standard deviation lower than pupils whose families do not have a medical card, having controlled for other variables in the model.

Turning to variables representing the home educational climate and home literacy activities, statistically significant *positive* associations are found between reading achievement and the number of books in a pupil's home, parental frequency of reading for enjoyment, the child being a member of a public library, and the frequency with which the child reads books alone for fun (Table 8.3). Higher numbers of books at home are associated with higher levels of achievement; i.e., pupils with 251 or more books have a mean reading score that is over one-third of a standard deviation higher than those who have 50 or fewer books at home. Pupils whose parents report reading themselves for enjoyment have higher mean scores than pupils whose parents report never reading for enjoyment. However, the largest difference is between pupils whose parents never read and those who read occasionally (once or twice a month). Smaller and non-statistically significant differences are found between pupils whose parents never read and those who read more frequently (i.e., on a weekly or daily basis). It may be the case that engaging in even occasional leisure reading on the part of parents models the desirable behaviour for their children. All else being equal, pupils who are a member of a public library have a mean score that is about one-seventh of a standard deviation higher than those who are not. Membership of a public library is statistically significant even when the number of books in a pupil's home is included in the model, suggesting that library membership offers something over and above simply having access to a large number of books. Children who reported reading a book alone for fun 'most days', had a higher mean score than children who reported never reading for fun. The difference between these two groups was about one-quarter of a standard deviation. A difference of similar magnitude was found between pupils who reported reading a book alone for fun on 'most days' compared to those who reported reading only 'some days'.

A statistically significant *negative* association was found between reading achievement and the frequency of reading a book with a parent (Table 8.3). Pupils who reported never reading with their parents had a mean score that was almost one-third of a standard deviation higher than those who reported reading with their parents on most days. It is likely that lower-achieving pupils need to read with their parents more frequently while higher-achieving Second class pupils are capable of independent reading.

Reading magazines or comics with greater frequency was also *negatively* associated with achievement (Table 8.3). Pupils who reported reading comics or magazines on most days scored one-tenth of a standard deviation lower than those who reported reading them on some days. There is no significant difference between pupils who reported never reading magazines or comics and those who reported reading them on some days, suggesting that occasional reading of such material is not associated with lower achievement.

All else being equal, pupils who reported that they liked reading had a mean score that was one-fifth of a standard deviation higher than those who indicated that they did not like reading (Table 8.3).

Parental expectations were strongly associated with achievement, even after controlling for other variables in the model. Table 8.2 shows that a large majority of parents agreed or strongly agreed that they expected their children to do well in English reading; just 5% were in the don't know, disagree, or strongly disagree category. Compared to those in the don't know, disagree, or strongly disagree category, pupils whose parents strongly agree that they are expected to do well scored on average over one standard deviation higher (Table 8.3). The difference between those whose parents don't know, disagree, or strongly disagree, and those whose parents agree that they are expected to do well was about three-fifths of a standard deviation.

A statistically significant positive effect was found for parents setting aside time for leisure reading for their children. Pupils whose parents strongly agreed that they set aside time for leisure reading had a mean score that was one-eighth of a standard deviation higher than those whose parents agreed with the statement (Table 8.3). Just 10% of pupils came from homes where parents disagreed, strongly disagreed, or provided a don't know response to this item. As the standard error associated with don't know, disagree, or strongly disagree is larger than the parameter estimate, the effect is not statistically significant.

The findings associated with parental rules for behaviour at home are somewhat counter-intuitive, as pupils whose parents *strongly agree* that they set rules for behaviour have lower achievement scores than those whose parents *agree* that they set rules, all else being equal. Thus, it may be the case that stricter setting and enforcement of rules is a consequence of lower achievement. Alternatively, possible correlates of lower achievement may include behavioural issues that might lead parents to set stricter boundaries.

All else being equal, pupils who have a TV in their bedroom score about one-seventh of a standard deviation lower than those with no bedroom TV (Table 8.3). Possession of a mobile or smartphone is also associated with lower achievement, although the difference between pupils with and without such a device is less than one-tenth of a standard deviation.

Another counter-intuitive finding is that pupils whose parents strongly agree that the schools has good communication with parents have significantly lower achievement than those whose parents agree that communication is good. Again, this may be a consequence of improved communication being a response to low achievement.

Table 8.3: Multilevel model of reading achievement (Second class)

	PE	SE	p	d
Intercept	195.2	6.62		
DEIS (Ref: Non-DEIS)				
Band 1	-14.5	2.56		-0.31
Band 2	-1.9	2.00	***	-0.04
DEIS Rural	8.5	5.13		0.18
Gender (Ref: Boy)	4.6	1.75	**	0.10
Pupil age (Ref: age 8)				
Age 7 or below	-9.0	2.02		-0.19
Age 9 or above	-13.4	3.99		-0.28
Parental Education[a] (Ref: Leaving Cert or below)				
3rd level diploma or certificate	4.2	2.05	***	0.09
3rd level degree or above	12.2	2.43		0.26
Speaks Eng/Irish at home (Ref: Other language)	9.6	2.61	***	0.20
Family has medical card[a] (Ref: No)	-6.0	1.70	***	-0.13
Books in the home[a] (Ref: Up to 50)				
51 to 250	8.7	1.88	***	0.18
251 or more	17.9	2.79		0.38
Parental frequency of reading for enjoyment[a] (Ref: Never)				
Once or twice a month	11.6	4.05	***	0.24
Once or twice a week	5.4	4.34		0.11
Daily or almost	4.8	3.77		0.10
Child is member of a public library[a] (Ref: No)	7.1	1.87	***	0.15
Freq of child reading books alone for fun[a] (Ref: Most days)				
Some days	-10.3	1.95	***	-0.22
Never	-12.5	2.32		-0.26
Freq of child reading with mum or dad[a] (Ref: Most days)				
Some days	3.4	2.09	***	0.07
Never	14.1	2.17		0.30
Freq of child reading magazines/comics alone for fun[a] (Ref: Some days)				
Most days	-4.6	2.19	*	-0.10
Never	-0.8	1.57		-0.02
Pupil: "I like reading" (Ref: No)	10.5	2.31	***	0.22
Parent expects child to do well in Eng[a] (Ref: Don't know/disagree)				
Strongly agree	51.7	3.53	***	1.09
Agree	26.5	3.70		0.56
Parent sets aside time most days for child's leisure reading[a] (Ref: Agree)				
Strongly agree	5.6	1.89	**	0.12
Don't know, disagree or strongly disagree	1.4	2.61		0.03
Parent agrees rules with child for behaviour at home[a] (Ref: Agree)				
Strongly agree	-4.9	1.83	**	-0.10
Don't know, disagree or strongly disagree	-8.9	5.38		-0.19
Pupil has TV in bedroom (Ref: No)	-6.8	1.91	***	-0.14
Pupil has own mobile or smartphone (Ref: No)	-3.7	1.60	*	-0.08
School has good communication with parents[a] (Ref: Agree)				
Strongly agree	-7.2	1.59	***	-0.15
Don't know, disagree or strongly disagree	-0.8	3.03		-0.02

[a]Variable has missing indicator

Table 8.4 outlines the percentages of total, between- and within-school variance explained by various combinations of variable blocks. The background variables explain 15% of the total variance, 75% of the between-school, and 9% of the within-school variance. The addition of the home climate variables helps to explain an additional 10% of within-school variance. As there is only one statistically significant pupil attitudinal variable, there is little additional variance explained by the inclusion of this variable. The full model explains 36% of the total variance in reading achievement, 83% of between-school variance and 31% of within school variance.

Table 8.4: Between-school, within-school and total variance explained by various blocks of variables in the model

	Between-school	Within-school	Total
Background variables only	75%	9%	15%
Background & home climate	80%	19%	25%
Background, home climate & pupil attitudes towards reading	81%	20%	25%
Background, home climate, pupil attitudes, and, parental involvement (including parental expectations) and monitoring (Full model)	83%	31%	36%

Focusing on the parental involvement and monitoring block, the addition of this intact block to the model containing the background, home climate, and pupil attitudes towards reading block explains an additional 2% of the between-school variance and 11% of the within-school variance (Table 8.4). Of the variables contained in this block, parental expectations is key in terms of explaining the variance in reading achievement. The addition of this variable on its own to a model containing the background, home climate, and liking reading variables (not shown in table), explains an additional 12% of within-school variance but no additional between-school variance, while the addition of the remaining parental involvement and monitoring variables, *excluding* parental expectations, explains an additional 8% of between-school variance and 4% of within-school variance over background, climate, and pupil attitudes.

Table 8.5 sets out the full model with the three statistically significant gender interactions included. Gender interacts significantly with pupil age, parental attitudes towards school communication, and the frequency with which a pupil reads magazines or comics for fun. In interpreting these interactions, it should be borne in mind that although these are statistically significant, they may not necessarily be of substantive importance.

Table 8.5: Multilevel model of Reading Achievement (Second class) – with statistically significant gender interactions

	PE	SE	p	d
Intercept	198.3	6.68		
DEIS (Ref: Non-DEIS)				
Band 1	-14.5	2.48		-0.31
Band 2	-2.2	1.99	***	-0.05
DEIS Rural	7.7	5.19		0.16
Gender (Ref: Boy)	-1.1	3.16	a	-0.02
Pupil age (Ref: age 8)				
Age 7 or below	-10.3	3.01	a	-0.22
Age 9 or above	-18.4	4.71		-0.39
Parental Education[b] (Ref: Leaving Cert or below)				
3rd level diploma or certificate	4.3	2.04	***	0.09
3rd level degree or above	12.1	2.42		0.26
Speaks English/Irish at home (Ref: Other lang)	9.9	2.58	***	0.21
Family has medical card[b] (Ref: No)	-6.0	1.68	***	-0.13
Books in the home[b] (Ref: Up to 50)				
51 to 250	8.5	1.86	***	0.18
251 or more	17.9	2.82		0.38
Parental frequency of reading for enjoyment[b] (Ref: Never)				
Once or twice a month	11.7	3.94	***	0.25
Once or twice a week	5.5	4.31		0.12
Daily or almost	4.7	3.72		0.10
Child is member of a public library[b] (Ref: No)	7.0	1.91	***	0.15
Freq of child reading books alone for fun[b] (Ref: Most days)				
Some days	-10.2	1.94	***	-0.21
Never	-12.3	2.21		-0.26
Freq of child reading with mum or dad[b] (Ref: Most days)				
Some days	3.3	2.10	***	0.07
Never	14.1	2.15		0.30
Freq of child reading magazines/comics alone for fun[b] (Ref: Some days)				
Most days	-9.5	2.61	a	-0.20
Never	-3.5	2.32		-0.07
Pupil: "I like reading" (Ref: No)	10.3	2.27	***	0.22
Parent expects child to do well in English[b] (Ref: Don't know or disagree)				
Strongly agree	51.7	3.45	***	1.09
Agree	26.8	3.65		0.56
Parent sets aside time most days for child's leisure reading[b] (Ref: Agree)				
Strongly agree	5.9	1.85	**	0.13
Don't know, disagree or strongly disagree	1.1	2.61		0.02

Table 8.5: Continued.

Parent agrees rules with child for behaviour at home[b] (Ref: Agree)				
Strongly agree	-5.0	1.80	**	-0.10
Don't know, disagree or strongly disagree	-8.5	5.39		-0.18
Pupil has TV in bedroom (Ref: No)	-7.0	1.90	***	-0.15
Pupil has own mobile or smartphone (Ref: No)	-3.9	1.60	*	-0.08
School has good communication with parents[b] (Ref: Agree)				
Strongly agree	-7.5	2.23	[a]	-0.16
Don't know, disagree or strongly disagree	4.7	3.28		0.10
Gender and Pupil age				
Girl * Age 7 or below	2.6	4.29	*	0.05
Girl * Age 9 or above	14.7	6.89		0.31
Gender * School has good communication with parents				
Girl * Strongly agree	0.3	3.44	***	0.01
Girl * Don't know, disagree or strongly disagree	-11.7	5.37		-0.25
Gender * Freq of reading magazines or comics for fun				
Girl * Most days	11.0	4.67	*	0.23
Girl * Never	5.2	3.60		0.11

[a]Significance is given for interaction term [b]Variable has missing indicator

Figure 8.1 illustrates the interaction between gender and age, showing that there is little difference in the mean achievement of boys and girls aged 7 or less, or between the mean achievement of boys and girls aged 8. However, the gender effect is evident for pupils aged 9 or more, where the mean achievement of boys in this age group is substantially lower than that of girls. The expected reading scores shown in Figure 8.1 are the expected mean scores for boys and girls aged 7 or below, aged 8, and aged 9 or above, having controlled for the other variables in the model as follows: the pupil speaks English or Irish at home, likes reading, has no TV or smartphone, attends a non-DEIS school, has at least one parent with a degree, has no medical card, has between 51 and 250 books at home, neither parent reads for enjoyment, the parent *disagrees* that the child is expected to do well, the child is not a library member, the parent agrees that the school has good communication with parents, the child reads for fun most days, the child reads most days with mum or dad and reads magazines some days, the parent agrees that time is set aside for reading most days and agrees that rules are set for behaviour.

Figure 8.1: Gender Interactions – Gender and age

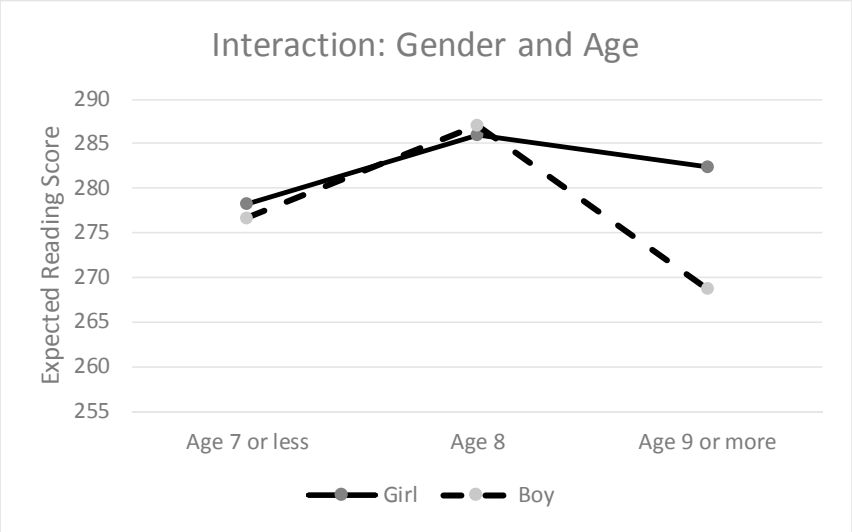


Figure 8.2 illustrates the interaction between gender and parental ratings of the quality of school-parent communication. Having controlled for other variables in the model, both boys and girls have a lower expected mean reading score when parents *strongly agree* that parent-school communication is good compared to when parents *agree* with this statement. There is no difference between the mean scores of boys and girls for either the strongly agree or agree categories. However, when parents don't know, disagree or strongly disagree with this statement, there is statistically significant gender difference in achievement in favour of boys. Figure 8.2 suggests that higher levels of achievement amongst boys are associated with lower levels of parental satisfaction about home-school communication; i.e., that schools communicate most effectively with the parents of lower achieving boys. Figure 8.2 suggests that this is not necessarily the case for girls; i.e., all else being equal, there is little difference in the mean achievement scores of girls when parents strongly agree, or when they don't know, disagree, or strongly disagree that home-school communication is good.

Figure 8.2: Gender interactions – Gender and quality of school-parent communication

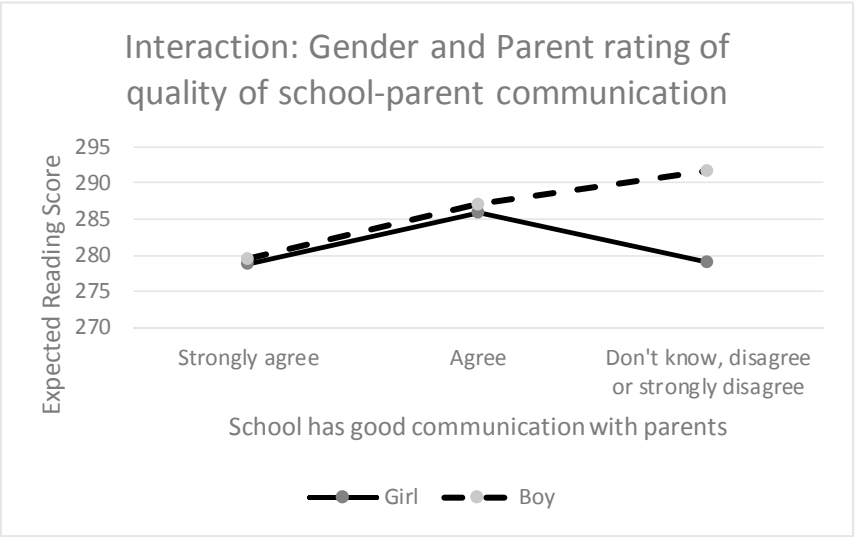
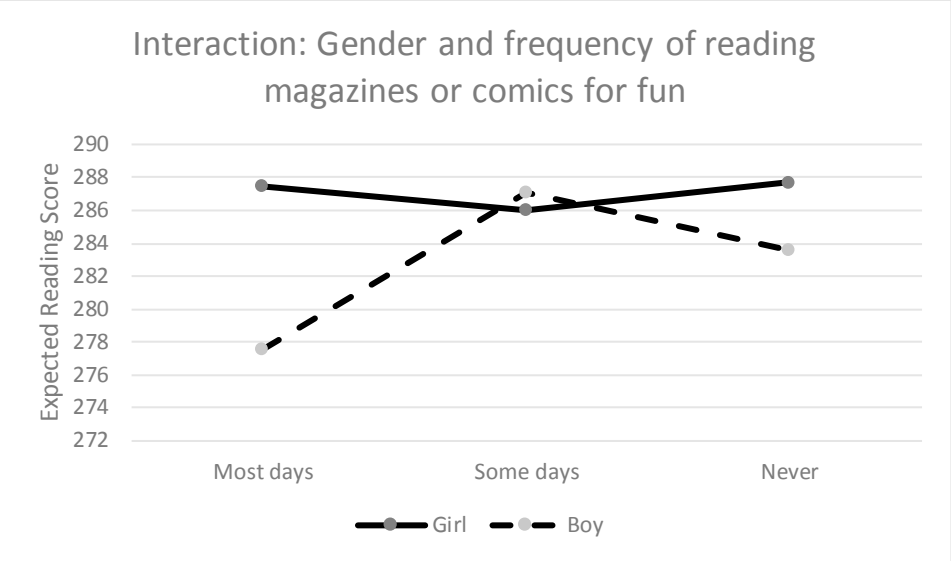


Figure 8.3 shows that frequent reading of magazines or comics, i.e. reading them on a daily or almost daily basis, has a stronger negative effect for boys than girls. For girls, there is little difference in expected reading scores associated with reading magazines or comics 'most days', 'some days' or 'never'. However, boys who reported reading comics on 'most days' have a substantially lower mean score than boys who report reading these materials only 'some days' or 'never'. It would be interesting to give further consideration to the content of magazines and comics read by boys and girls and to examine how these support developing reading skills.

Figure 8.3: Gender interactions – Gender and frequency of reading magazines or comics for fun



As a final step of the analysis process, consideration was given to the extent to which the effects of pupil-level variables vary across schools; i.e., the statistical significance of random slopes was examined. Although technically possible, it would not be simple to interpret random slopes in the model containing gender interactions. Therefore, random slopes were examined in the model excluding gender interactions. Three pupil-level variables were associated with statistically significant random slopes. These were: the pupil has a TV in his/her bedroom, parental expectations that the child will do well in English reading, and books in the home. The variation in the slopes of these three variables was examined in association with the variation in the intercept (school-average expected achievement) across schools. This allows the computation of a correlation coefficient for the correlation between the intercept and slope for each of the variables.

The correlation between the expected average achievement at school level and the slope associated with having a TV in a pupil's bedroom is -0.6. This means that schools with lower average achievement tend to have larger achievement gaps between pupils with and without bedroom TVs. Conversely, in higher achieving schools, there is a less detrimental

effect associated with having a bedroom TV; i.e., there is a smaller gap in the achievement of pupils with and without a bedroom TV.

Although there was a negative correlation between the intercept (average school achievement) and the effects of having at least 251 books at home, further work would be needed to fully examine the consequences of some lower achieving schools having very few (or no) pupils with such high numbers of books at home. Also, with the parental expectations variable, interpretation of a significant random slope is not straightforward. As shown in Table 8.1, just 5% of parents provided a don't know, disagree or strongly disagree response to the question of whether or not they expected their child to do well in English reading in the current school year. Given the very high level of agreement with the statement, and given the circular nature of the association between expectations and achievement, it would appear unwise to attach a high degree of substantive importance to the finding of a statistically significant random slope for this variable.

Conclusions and Suggestions for Further Work

This chapter presented the results of two multilevel models of reading achievement in Second class. The first included main effects only; the second included statistically significant gender interaction terms. The model (without interactions) explains 36% of the total variance in reading achievement, 83% of between-school variance, and 31% of within school variance. These percentages are comparable to those previously reported in an Irish context. One model of reading achievement in Ireland based on PIRLS 2011 data explained 33% of the total variance in reading achievement, 84% of between-class variance, and 24% of within-class variance (Gilleece, 2015); an alternative model explained 28% of the total variance, 74% of between-class variance and 22% of within-class variance (Cosgrove & Creaven, 2013). Multilevel models of the reading achievement amongst particular subgroups of pupils in Ireland have also been published. For example, a model of the reading achievement of Second class pupils in scoileanna lán-Ghaeilge explained 20% of the total variance in reading achievement, 67% of between-school variance and 16% of within-school variance (Gilleece, Shiel, Clerkin & Millar, 2012) while a model of the reading achievement of pupils in designated disadvantaged schools explained 69% of between-school variance and 29% of within-school variance (Sofroniou, 2004).

The current analysis showed that differences remain between the mean reading scores of pupils in DEIS Band 1 schools compared to pupils in non-DEIS schools, even having controlled for the home background and various other characteristics of the pupils. Cosgrove and Creaven (2013) conducted detailed analyses of the *social context effect*, investigating the statistical significance of the DEIS variable in their models of reading achievement once other pupil-level variables were included in the models. They conclude that the inclusion of a wider range of pupil characteristics in the model results in a reduction of the social context effect. However, the current model does include a wide range of pupil-

level variables. Gilleece (2015) shows that the effects of DEIS on reading achievement are substantially reduced when measures of informal parental involvement are included in the model. Of the informal parental involvement variables considered, the largest effect sizes were associated with teacher reports of the average level of parental support for pupil learning, frequency of parents and pupils talking about schoolwork, and parents setting aside time for homework on a daily basis. Cosgrove and Creaven (2013) included the frequency of parents setting aside time for homework in their model. It might be expected that this contributed to the non-statistical significance of the DEIS variable. It should also be borne in mind that the current model uses data from a different assessment (NA rather than PIRLS) and a slightly younger age group of pupils (Second class rather than Fourth), so findings would not be expected to be identical to those cited earlier.

Results of the current model show that children experiencing socioeconomic disadvantage, i.e., from families with a medical card, have lower mean reading scores than pupils from more advantaged households. However, the current model also shows the independent contribution of home environment, i.e., having controlled for variables such as medical card possession and parental education, children who are members of public libraries and who do not have televisions in their bedroom have higher mean scores than children who are not members of the library or do have a TV in their bedroom. Therefore, even in situations of socioeconomic disadvantage, parents can be usefully advised of low cost activities that support learning.

The analysis of statistically significant gender interactions showed that, all else being equal, there is little difference between the mean achievement scores of boys and girls aged 7 or below, or of those aged 8. However, for children aged 9 or above, there is a significant difference in favour of girls. In the current dataset, a slightly higher percentage of boys (6%) than girls (4%) are aged 9 or above while a slightly lower percentage of boys (15%) than girls (18%) are aged 7 or below. It may be the case that boys identified as being potential lower achievers started school slightly later with the intention of giving them extra time to become ready for school, or that boys are more likely to repeat a grade than girls. It is unclear why this would vary by gender.

Finally, the models presented above used a missing indicator approach to account for missing values in the dataset. It would be useful to examine how parameter estimates and standard errors may change if a multiple imputation approach is employed.

Chapter 9: Conclusions and Recommendations

Arising from concerns about standards in literacy and numeracy, the *National Strategy to Improve Literacy and Numeracy among Children and Young People 2011-2020* was launched by the DES in 2011, following a public consultation. It included targets for literacy and numeracy at primary and post-primary level, and set out a range of measures designed to achieve those targets, and to improve literacy and numeracy more generally. In particular, it recognised the importance of the early years in promoting literacy development, teacher continuing professional development, and the emerging role of digital literacy.

As noted in the Performance Report on NA '14 (Shiel et al., 2014), the targets for achievement in literacy and numeracy at both primary and post-primary levels have already been met, ahead of the end date of the Strategy in 2020. While this is encouraging, and reflects the strong efforts of schools, teachers, parents, and pupils during what have been difficult economic times, a number of issues remain to be addressed within the lifetime of the Strategy, not least ensuring that gains reported in NA '14 are maintained and built on. This chapter considers a number of ongoing key issues and how they might be addressed over the remainder of the Strategy, including performance on particular aspects of literacy and numeracy, instructional time allocated to these areas, teachers' continuing professional development, and parental involvement and support.

Overall Performance on Reading Literacy

Given the relatively strong performance of pupils in Ireland on PIRLS 2011 reading literacy (an overall ranking of 10th internationally, with just 5 of 45 countries achieving significantly higher mean scores; Eivers & Clerkin, 2012), which took place before the Strategy was implemented, and the significant and substantive increases in performance observed in NA '14, it seems reasonable to conclude that overall performance on reading literacy at primary level is now quite strong. However, there are some challenges that need to be faced as the Strategy moves forward.

First, it is important to ensure that gains achieved between NA '09 and NA '14 are maintained, and, perhaps, improved upon. This can be done by ensuring that schools continue to prioritise reading literacy and other aspects of English that can support reading development, such as oral language and writing. Some of the impetus for this will come from implementation of the new Primary Language Curriculum (NCCA, 2015a, 2015b), which, initially, will cover Junior Infants to Second class (from 2016). It will also come from a continuing focus on literacy in school planning and School Self-Evaluation (SSE), and access to appropriate professional development opportunities for teachers.

Second, it is important to continue to provide intensive support to schools in DEIS. While reading performance increased significantly in DEIS schools between NA '09 and NA '14, corroborating the findings of studies specifically designed to evaluate the initiative (e.g.,

Weir & Denner, 2013), the gap between urban DEIS schools and other schools was maintained in NA '14, with the exception of DEIS Band 2 schools at Second class, where it narrowed. Also in NA '14, large proportions of pupils in DEIS schools performed at or below Level 1 (the lowest proficiency level) on overall reading literacy. At Second class, 44% of pupils in Band 1 schools and 28% in Band 2 performed at or below Level 1, compared with 20% in urban non-DEIS schools; at Sixth class, 47% in Band 1 schools and 38% in Band 2 schools performed at or below Level 1, compared with 22% in urban non-DEIS schools (Shiel et al., 2014, Tables 5.3, 5.5).

Third, it is important to monitor and seek to better understand links between gender and reading performance. Gender differences on overall performance in reading in NA '14 were relatively small, with a significant difference of 7 points in favour of girls on overall reading in Second class (down from 14 points in NA '09). There was a nonsignificant difference of 4 points in favour of girls on overall reading in Sixth (the same as in NA '09), though there was a significant difference in favour of girls on Reading Comprehension (by 5 points) at that class level. The multilevel model presented in Chapter 8 of this report suggests that older boys in Second class (9-year olds) may be at particular risk.

In PIRLS 2011, girls in Ireland significantly outperformed boys by 15 score points or one-quarter of a national standard deviation – about the same as the international average difference, but lower than in countries such as Finland (21 points) and England (23 points). This is broadly consistent with the outcomes of NA '14, notwithstanding the non-significant difference observed for overall reading in Sixth class. However, PIRLS 2011 did not include a specific module on reading vocabulary; hence, the finding of a small but significant difference on comprehension at Sixth class is consistent with the outcome of PIRLS 2011 for overall reading in Ireland.

Recommendation 1: The current focus on print literacy in primary schools should continue for the duration of the National Strategy, with a view to maintaining and building on gains reported for NA '14. There should be a particular emphasis on improving the reading performance of pupils in DEIS schools, as well as the overall performance of older boys in Second class and the reading comprehension of boys in Sixth class.

Development of Digital Literacy Skills

The National Strategy recognised the importance of digital literacy, both in its definition of literacy, and in its plan to measure pupils' ability to read digital texts as part of future national assessments of reading.

Data gathered across a number of national and international studies suggest that there are significant problems with pupils' access to and use of ICT infrastructure in schools. In PIRLS 2011, 56% of pupils in Fourth class in Ireland were in classrooms in which there was access to at least one computer for pupil use during reading lessons, compared with 85% or more in

Norway, Denmark, New Zealand and the Netherlands (as cited in Cosgrove et al., 2014). According to their teachers, 19% of pupils in Ireland were in classes in which a computer was used by pupils to write stories at least weekly, compared with 27% across all participating countries, 37% in Northern Ireland, and 58% in Sweden. On the other hand, 98% of Fourth class pupils in Ireland were taught by teachers who reported using a computer in their classroom instruction — well above the corresponding international average (Clerkin, 2013).

In NA '14, 41% of pupils were in classrooms in which digital texts such as webpages were read at least once a week, while 18% were in classrooms in which e-books were read with the same frequency. In NA '14, teachers of pupils in Second class indicated that using ICTs to teach English was among the aspects of teaching with which they felt least confident. Eighteen percent of teachers identified ICTs as a priority area for continuing professional development. Principal teachers of two-thirds of pupils identified a shortage of teaching software and slow Internet speed as factors hindering teaching and learning at least 'to some extent' in their schools.

A new *Digital Strategy for Schools* (DES, 2015) outlines a series of steps to be taken by the Department and its agencies, and by Colleges of Education, between 2015 and 2020, to ensure the successful integration of ICTs into teaching and learning. As infrastructure in primary schools improves, steps may need to be taken to ensure that teachers are aware of and pupils acquire the additional skills needed for successful comprehension and composition of digital texts. In addition to the comprehension skills required to read print-based texts, they include analysing, synthesising, integrating and interpreting relevant information from multiple text (or information) sources, evaluating the authenticity of texts and deciding on what to read next (Coiro & Dobler, 2007; Hartman, Morsink & Zheng, 2010; Leu et al., 2015).

In 2016, Ireland will take part in e-PIRLS, a computer-based assessment that will be delivered alongside the regular print-based PIRLS assessment to representative national samples of pupils in Fourth class. The results of e-PIRLS should provide some insights into the reading skills of Irish pupils as they interact with digital texts, and how they compare with their print reading skills. This can indicate if there is additional value in including digital reading in the 2019 National Assessments at Second and/or Sixth classes.

Recommendation 2: In line with projected improvements in ICT infrastructure in schools, attention should be given to supporting the development of pupils' digital reading and writing skills and the application of those skills to a range of digital texts. The extensive use of computing devices by teachers during instruction needs to be matched by a greater use of such devices by pupils.

Overall Performance on Mathematics

There was a significant and substantive improvement in mathematics performance in NA '14, at both Second and Sixth classes, compared with NA '09. At both class levels, there were declines in the proportions of pupils performing at or below Level 1 on the overall mathematics proficiency scales (from 35% to 26% in Second, and from 35% to 27% at Sixth), and increases in the proportions performing at Levels 3-4 (from 35% to 47% at Second, and from 35% to 42% at Sixth). As with reading, however, there are still substantial gaps in average performance between pupils attending DEIS and non-DEIS schools. For example, although mean scores for pupils in Second and Sixth classes in DEIS Band 1 schools and in Sixth in DEIS Band 2 schools were higher in NA '14 than in NA '09, differences were not statistically significant. At both Second and Sixth class levels, 50% of pupils in DEIS Band 1 schools in NA '14 performed at Level 1 or below, compared with 21% (Second class) and 25% (Sixth class) in non-DEIS urban schools.

In TIMSS 2011, pupils in Fourth class in Ireland achieved a mean score that was significantly above the international mean (Eivers & Clerkin, 2012). However, Ireland ranked 17th of 48 participating countries, and 13 of these achieved significantly higher mean scores than Ireland (including the United States, England, Finland, Northern Ireland, and a group of five east-Asian countries). Further, 23% of pupils in Ireland performed at or below the Low TIMSS performance benchmark, compared with 15% in Northern Ireland, and fewer than 5% in Singapore, South Korea, and Hong Kong-China. Related to this, just 9% of pupils in Ireland performed at the High TIMSS benchmark, compared with 24% in Northern Ireland, and over 35% in Singapore, South Korea, and Hong Kong-China. Pupils in Ireland performed less well on the mathematical content areas of Geometry and Measures, and on the higher-level process of Application, than on the test as a whole.

TIMSS 2015 will provide the next opportunity to gauge Ireland's performance in mathematics relative to that of other participating countries. It might be hoped that the increased focus on numeracy in Irish primary schools as a result of the *National Strategy to Improve Literacy and Numeracy* will also have contributed to improvement in performance in TIMSS 2015. However, it is important to note that gains of the magnitude observed in the National Assessments, where achievement tests are based on national curricular objectives, may not necessarily be mirrored in international assessments such as TIMSS. What does seem clear, given Ireland's historically weaker performance in international assessments of mathematics than in international assessments of reading, is that there is still considerable scope for improvement in mathematics.

In NA '14, boys significantly outperformed girls in mathematics at Second class, albeit by just 5 score points. A small difference in favour of boys at Sixth class (4 points) was not statistically significant. At both class levels, boys significantly outperformed girls on Measures and Apply and Problem Solve (both aspects of mathematics with a strong focus on solving problems), albeit by small margins (by between 5 and 7 points). In TIMSS 2011,

boys in Ireland outperformed girls by 3 points – a difference that was not statistically significant. There were no significant differences between boys and girls on any of the TIMSS mathematics content areas or processes, though, in all cases, boys were marginally ahead of girls.

It is unclear why pupils in Ireland at both primary and post-primary levels have performed consistently better on reading literacy than on mathematics in international studies, given that, in general, countries that perform well in one domain also do well in the other. It is likely that differences arise from a number of factors. Since, for the most part, curriculum content is broadly similar in Ireland and in other countries in studies such as TIMSS, differences must arise for other reasons. While the nature and focus of mathematics instruction is likely to be a factor, other factors affecting curriculum implementation are also relevant, including support for teachers in the form of professional development, time allocated to teaching mathematics, the quality and appropriateness of support materials such as tests and text books, the support pupils receive at home and at school, and pupils' dispositions.

Recommendation 3: It is recommended that, for the remainder of its lifetime, the National Strategy place a stronger emphasis on mathematics/numeracy, with a view to further increasing pupils' proficiency in mathematics, improving their dispositions towards mathematics, and reducing gaps between performance in DEIS and non-DEIS schools.

Problem Solving in Mathematics

One-quarter of mathematics items at Second class and one-third at Sixth class in NA '14 comprised problems embedded in real-life contexts. Although performance on Apply and Problem Solve items improved significantly at both grade levels since NA '09, percent correct scores in NA '14 were lower in this area than in any other content or process area assessed in mathematics, with average scores of 54% correct in Second class (up from 49% in NA '09), and 49% correct at Sixth class (up from 44%). In contrast, the corresponding percentages for Implement items are 61% and 65% respectively. Hence, there is considerable room for further development in problem solving.

Questions have also been raised in other studies about the performance of pupils in Ireland on problem solving. In TIMSS 2011, pupils in Fourth class in Ireland performed considerably less well on tasks requiring mathematical reasoning (essentially problem solving in non-routine contexts) than on the TIMSS test as a whole (Eivers & Clerkin, 2012), whereas pupils in countries like Australia and Finland performed equally well on all aspects of mathematics. In the same assessment, pupils in Ireland performed at about the same level as on the test as a whole on items requiring application (that is, routine problems in familiar contexts). Hence, there is a clear gap between performance on routine and non-routine mathematical problems among primary level pupils in Ireland.

At post-primary level, concerns have been raised about the performance of 15-year olds in Ireland on items in the Space and Shape content area in the OECD Programme for International Student Assessment (PISA; Perkins et al., 2013). While some PISA Space and Shape items involve interpreting views of three-dimensional shapes from different perspectives and constructing representations of shapes, others draw on understanding and application of measurement, number, and algebra. In PISA 2012, when students in Ireland performed above the average for OECD countries in mathematics, their performance on Space and Shape was significantly below the OECD average. Also in PISA 2012, students in Ireland achieved a mean score on a test of computer-based problem solving that was not significantly different from the corresponding OECD average, suggesting pupils in Ireland struggle on problem solving in general, as well as on non-routine mathematical problems (Perkins & Shiel, 2014).

A consistent finding in both national and international studies is that girls in Ireland underperform on problem solving and other higher-level mathematical tasks, compared with boys. As noted earlier, girls at both Second and Sixth classes in NA '14 had significantly lower mean scores than boys on the Measures content area (which includes several problems) and on the Apply and Problem Solve process skill. Girls also scored less well than boys on a measure of mathematical self-concept. In PISA 2012, boys in Ireland outperformed girls on four content areas (including Space and Shape), and on three mathematical processes (formulating situations mathematically; employing mathematical concepts, facts, procedures and reasoning; and interpreting, applying and evaluating outcomes). The low performance of girls on aspects of PISA mathematics was associated with low scores on a number of attitudinal and engagement variables such as self-efficacy in mathematics, mathematical self-concept, instrumental motivation and perseverance, and high levels of anxiety about mathematics, compared with boys.

There was a clear awareness among participants in NA '14 that mathematical problem solving presented a particular difficulty. More pupils (52%) were taught by teachers who expressed a need for CPD in the area of problem solving/reasoning than in any other aspect of mathematics. Problem solving was the area mentioned most often by teachers when asked to identify classroom targets for improving mathematics. Parents of pupils in Sixth class also identified problem solving as the area of greatest concern relating to their child's mathematical performance. Yet, a majority of pupils in Sixth class were taught by teachers who expressed themselves as being very confident in their ability to teach problem solving, and 'strongly agreed' or 'agreed' that 'many pupils who struggle with word problems cannot read the problems, but know the underlying mathematics'.

As the comments of teachers in NA '14 indicate, many schools are employing specific strategies in an effort to improve pupils' mathematical problem solving. Strategies such as RUDE (**R**ead the question, **U**nderline (highlight) key words, **D**raw diagram/graph/chart, **E**stimate the answer) and RUCSAC (**R**ead, **U**nderstand, **C**hoose, **S**olve, **A**nswer and **C**heck)

were mentioned. While these may be useful in providing pupils with broad strategies for addressing problems, other factors must also be considered. A number of these were identified by teachers in NA '14, and include the lack of variety and the formulaic nature of problems in maths textbooks, and the challenge that mathematical language, and indeed everyday language, presents for some pupils.

A series of reports on mathematics published by the NCCA (Dunphy et al., 2014; Dooley et al., 2014) identify some actions that, if followed consistently over time, could lead to improved performance on mathematical problem solving. These include:

- A recognition that problem solving is one of several processes that are emphasised in instruction, including connecting, communicating, reasoning, argumentation, justifying, representing, and generalising. All of these are encompassed in the over-arching concept of mathematization, which entails children interpreting and expressing their everyday experiences in mathematical form and analysing problems in a mathematical way using these processes.
- A shift away from textbooks as the only source of mathematical problems, and a greater use of real-life mathematical problems (i.e., problem solving in familiar and unfamiliar contexts).
- An understanding of the need to develop a learning environment in which problem-solving permeates all aspects of mathematics learning (that is, new concepts in all aspects of mathematics are presented as problems to be solved and pupils infer underlying structures as they solve problems).
- Engagement of learners in developing models of mathematical situations by using mathematical objects and representations.
- A focus on children's sense of their own ability to solve mathematical problems.
- A focus on and acceptance of children's intuitive representations and informal procedures to solve problems.
- The promotion of 'math talk' (mathematical discourse or conversations about mathematical thinking and reasoning) in the context of developing children's mathematical understanding and problem solving, without losing a focus on the underlying mathematics. Children clarify their reasoning by talking about concepts and procedures and giving good reasons for the strategies that they are employing (i.e., justification and argumentation). Math talk includes, but is not confined to, mathematical vocabulary. It also includes modes of argument, and methods of thinking mathematically (Halliday, 1978).
- Establishment of connections within and between different aspects of mathematics (for example, applying knowledge of shape and space to other mathematical content areas).
- The extension of problem solving across subject boundaries so that children have an opportunity to apply mathematical knowledge in different contexts.
- A deepening of the interaction between teacher and children, and between children themselves as they collaborate to solve problems.

In reflecting on the practices of teachers in PISA 2012, Burge, Lenkeit and Sizmur (2015) suggest an emphasis on the following instructional strategies, which are viewed as supporting the development of pupils' thinking in mathematics lessons, and seem particularly relevant for pupils in the senior primary classes:

- Ask questions that encourage students to reflect on a problem.
- Assign problems that require pupils to think for an extended time.
- Ask pupils to decide on their own procedures for solving problems.
- Present problems which have no immediate or obvious method for finding the answer.
- Present problems in different contexts so that pupils know whether they have understood the concepts.
- Present problems that can be solved in different ways.
- Present tasks that require children to summarise, question, clarify, and predict in their mathematics lessons.

Burge et al. (2015) note that a re-envisioning of how problem solving is taught takes time. They also note that, while change can occur at the level of the individual lesson, some activities, such as working collaboratively with other teachers to implement and document change across class levels, may take considerably longer.

Efforts to broaden the focus on problem solving in classrooms will need to draw on available international resources as well as national best practice. Relevant international programmes include Problem Solving (www.nzmaths.co.nz), Mathematics in Context (www.mmmproject.org/micS.htm), Nrich Mathematics (www.nrich.maths.org), Everyday Mathematics (http://everydaymath.uchicago.edu/), and Mathland (http://everydaymath.uchicago.edu/). At national level, work by Corcoran (2008), NicMhuirí (2011), Treacy (2013) and others is relevant.

Recommendation 4: Schools and teachers should be supported in implementing innovative approaches to teaching mathematical problem solving, with particular emphasis on modifying the learning environment, which should feature high levels of mathematical discourse (math talk), mathematical modelling, argumentation, reasoning, and collaborative work. There should be a particular focus on discovery through problem solving, the use of non-routine problems, problems in real-life contexts, problems that are cross-curricular, and problems that require extended time to solve. Schools and teachers should ensure that additional support is given to girls where needed, especially for problem solving involving spatial reasoning.

Access to Support Programmes and Initiatives to Improve Performance

NA '14 looked at the performance on English reading and mathematics of a number of at-risk groups, and examined the supports to which they had access. It also looked at the range of add-on programmes used in schools.

In NA '14, 8% of pupils in Second and Sixth classes reported speaking a language other than English/Irish at home, and these pupils performed significantly less well in English reading than pupils who spoke English or Irish. The average gap between those who spoke a different language and those who spoke English or Irish was 27 score points at Second class, and 24 at Sixth. Speakers of a language other than English or Irish were unevenly distributed across schools, with, for example, 16% of pupils in Sixth class in schools where no pupils had a first language other than English or Irish, and 27% in schools in which more than 10% had a different first language. On average, at Sixth class, but not at Second, reading performance was significantly lower in schools in which more than 10% of pupils spoke a language other than English or Irish, compared with schools in which no pupils spoke a different language. At both class levels, performance in mathematics was lower among these pupils, but not to a statistically significant extent. Just over 2% of pupils at Second and Sixth classes accessed additional support for English from an officially-sanctioned language teacher, though others availed of support from learning support/resource teachers. These data highlight the challenges facing schools in addressing the needs of children who speak languages other than English or Irish. It is unclear to what extent language support and other programmes impact on pupils' performance in English reading and mathematics.

In NA '14, 13% of pupils in Second and Sixth classes accessed learning support for English reading, while 10% at both class levels accessed learning support for mathematics. More boys than girls accessed support for English, and more girls than boys for mathematics. When numbers for learning support/resource teaching and language support are combined, 15% of pupils in Second and 14% in Sixth access support for English. Hence, mathematics lags behind English, where access to support is concerned. This is particularly apparent in DEIS Band 1 schools where, in Second class, 19% of pupils access learning support/resource teaching or language support for English, and 7% access support for mathematics. While additional support in English reading and mathematics was generally targeted at those who performed least well in NA '14, this was not always the case. For example, 3% of pupils in Second class who were not in receipt of support performed below Level 1 on English reading, and 2% did so in mathematics. Twelve percent of pupils in Second and 9% in Sixth were taught by teachers who believed that there is little or no coherence between class and support programmes.

Teachers in NA '14 reported that they implemented a range of programmes designed to improve the performance of pupils on English reading and mathematics, though it is unclear to what extent teachers adapted these programmes to address their specific needs. For English at Second class, programmes such as Reading for Fun, Paired Reading, and Jolly

Phonics were used weekly or more often by teachers of at least 50% of pupils. Other programmes, such as First Steps Reading, Writing and Oral Language, and Literacy Lift-Off/Power Hour, tended to be used more extensively in DEIS than in non-DEIS schools. Programmes such as DEAR (Drop Everything and Read), Building Bridges, and Guided Reading/Guided Reading PM were also widely used across all schools. The range of supplementary programmes used in mathematics classes was less extensive than for reading, with Paired Maths, Maths for Fun, and Maths Recovery being used most widely. It is clear that mathematics lags well behind reading in terms of the range of available supplementary programmes and the frequency with which they are implemented. Little or no data are available on the impact of supplementary programmes on performance in English reading and mathematics.

Recommendation 5: There is a need for system-level evaluation of support provided to pupils who speak a language other than English or Irish at home, with a view to identifying the nature and levels of support that are most appropriate.

Recommendation 6: As schools focus on mathematics as part of School Self-Evaluation, the balance between access to learning support/resource teaching in English and mathematics should be examined, so that all pupils with learning difficulties in mathematics can access the support they need. There is a need to ensure that teachers are supported in achieving high levels of coherence between class and support programmes in English and mathematics in all schools.

Recommendation 7: There is a need to increase teachers' awareness of the range of supplementary programmes available for teaching mathematics. There is also a need to examine how well existing supplementary programmes in English reading and mathematics are implemented, and how they impact on the performance and attitudes of pupils.

Instructional Time

The data on instructional time gathered in NA '14 indicate that instructional time in English classes has increased since NA '09 from 265 minutes per week to 294 minutes (i.e., by 29 minutes, to give 4 hours and 54 minutes per week). This is broadly in line with what was envisaged in Circular 0056/2011 (DES, 2011b) (i.e., an increase from 4 hours per week in L1 schools to 4.5 hours), even before taking into account any additional time allocated to teaching English across the curriculum. Most pupils in Second class in NA '14 were taught by teachers who were satisfied with the allocation of instructional time to reading, with fewer than 10% taught by teachers who deemed available time to be insufficient. In PIRLS 2011, teachers of pupils in Fourth class in Ireland reported allocating 175 instructional hours per year to the language of the PIRLS test (English). Among EU countries in PIRLS 2011, only Croatia (172 hours) allocated fewer instructional hours to the language of the PIRLS test. In NA '14, instructional time in English was estimated to be at 180 hours per year. Nevertheless, if there is a satisfactory focus on the development of literacy skills in other

curriculum areas (as advocated by the National Strategy), the current allocation of time to the teaching of English in primary schools can be considered satisfactory.

According to NA '14, instructional time in mathematics at Sixth class is now 283 minutes per week, compared with 260 minutes in NA '09, and exceeds the 4 hours and 10 minutes envisaged in Circular 0056/2011, again without taking any additional time allocated to teaching mathematics across the curriculum into account. However, 25% of pupils in Sixth class in NA '14 were taught by teachers who deemed the time allocated to mathematics to be insufficient. According to TIMSS 2011, teachers in Ireland allocated 150 hours per year to the teaching of mathematics. Although this was not the lowest among EU countries in the study (Finland reported 139 hours, and Croatia 134), it was behind Northern Ireland (232 hours), the Netherlands (195), England (188) and Germany (163). Based on NA '14 data, the annual allocation in Ireland is now 172 hours.

Although the allocation of some additional time to mathematics in primary schools in Ireland would seem desirable, attention also needs to be paid to how existing time is used. For example, Close (2013), using data from the TIMSS 2011 teacher questionnaire, noted that teachers in Ireland allocated 56% of time to Number, compared with 22% to Geometric Shapes and Measures, 12% to Data Display, and 10% to other topics. He has argued that weaknesses in Shape and Space, Measures, and Apply and Problem Solve, revealed in earlier national assessments, point to a need to re-balance the amount of time allocated to different aspects of mathematics. Close (2013) also pointed out that that some activities, such as the solution of real-life problems, require extended class time.

Recommendation 8: Schools in general should continue to allocate approximately one hour per day to the teaching of English, with additional time allocated in schools in which there are large numbers of struggling readers. Schools and teachers should continue to integrate literacy into a range of curricular domains.

Recommendation 9: The DES and the NCCA should examine the current allocation of instructional time to mathematics, and advise schools on whether this should be increased, taking the differing needs of schools into account. The distribution of time across aspects of mathematics should also be considered, with a view to achieving a better balance across content areas, and between higher- and lower-order processes.

Professional Development

The *National Strategy to Improve Literacy and Numeracy* identified initial teacher education and continuing professional development as key factors in raising teaching standards in literacy and numeracy in schools. In particular, it indicated that it would support primary teachers accessing high-quality, accredited courses of 20 hours duration in literacy, numeracy, and the use of assessment every five years. The Teaching Council (2011, 2015) has made significant progress in conceptualising professional development and outlining the structures that will support professional development as a key element of teachers' ongoing

learning in the future. However, the DES has yet to begin providing accredited courses, though ongoing input is provided to schools and teachers through the work of the Professional Development Service for Teachers (PDST).

In NA '14, continuing professional development (CPD) was defined as including attendance at courses, participation in school-based activities related to English or mathematics (though no distinction was made between activities facilitated by an internal or external person/persons), and online activities. At Second class, teachers reported completing 21.4 hours of CPD related to English in the two years prior to NA '14, with 13 hours of this completed as part of a summer course. At Sixth class, teachers reported attending 17 hours of CPD on the teaching and learning of mathematics in the two years prior to NA '14, with 9 hours of this as part of a summer course. About one-fifth of pupils in Second class were taught by teachers who had not availed of any CPD in English. A similar proportion in Sixth class were taught by teachers who had not availed of any CPD in mathematics.

Even allowing for differences in how CPD was defined across NA '09 and NA '14, the data for NA '14 point to the increased involvement of teachers in CPD. For example, whereas in NA '09, teachers of pupils in Second class attended an average of 2.2 days of coursework on the teaching of English in the three years prior to the assessment (Eivers et al., 2010), in NA '14, they attended the equivalent of 5.6 days in the previous two years. Similarly, whereas teachers of pupils in Sixth class in NA '09 had attended 1.5 days of CPD in mathematics in the previous three years, teacher of pupils in Sixth class in NA '14 reported attending the equivalent of 5.1 days in the previous two years. In NA '09, 48% of pupils in Second were taught by teachers who had attended no CPD days on English, while 52% in Sixth were taught by teachers who had attended no CPD in mathematics. In PIRLS and TIMSS 2011, teachers in Ireland reported participating less often in CPD in both English and mathematics than on average across participating countries (Clerkin, 2013), though these studies pre-dated the implementation of the *National Strategy to Improve Literacy and Numeracy*.

Although participation in CPD has increased substantially since NA '09, with summer courses playing a key role in this, teachers in NA '14 identified a number of priority areas for further CPD. In the case of English, 44% of pupils were taught by teachers who identified the teaching of writing as a main priority area. Other priority areas included reading comprehension/comprehension strategies, oral language, assessment, addressing learning difficulties, and integrating ICT into teaching and learning English. Most of these topics, including the teaching of writing, will be covered in the context of disseminating and implementing the revised Primary Language Curriculum for junior classes (Junior Infants to Second) over the next two to three years. Teachers of both junior and senior classes will avail of CPD relating to this. Since it will be some years before the Primary Language Curriculum for English extends to the senior classes, there may be some topics (e.g. comprehension of digital texts) on which CPD should be provided before then.

In the case of mathematics, 51% of pupils in Sixth class in NA '14 were taught by teachers who identified problem solving/reasoning as a priority area for CPD. Other priority areas included ICT, specific mathematics content areas (such as Shape and Space), mathematics activities and resources, working with children with varying abilities, and assessment and recording.

Almost all teachers at both Second and Sixth classes in NA '14 'strongly agreed' or 'agreed' that they would benefit from additional external CPD in English and mathematics, while between 75% and 80% agreed that they would benefit from online CPD. On the other hand, two-thirds of pupils in Second class were taught by teachers who disagreed with the view that all their CPD needs in English could be met at school level, while one-third of pupils in Sixth were taught by teachers who disagreed that all their CPD needs in mathematics could be addressed at school level. Crucially, two-thirds of pupils in Sixth class were taught by teachers who strongly agreed or agreed that they would benefit from a course to improve their understanding of the mathematics they teach.

Recommendation 10: While CPD in English will be available to teachers in the context of implementing the new Primary Language Curriculum in the junior classes, a strategy should be put in place to ensure that teachers of all classes have access to appropriate CPD in mathematics throughout the remainder of the National Strategy. Availability should not be dependent on curriculum implementation.

Recommendation 11: In addition to covering policy priorities and curriculum implementation, CPD in English and mathematics should seek to address key areas that are of concern to teachers. For English, these include writing, reading comprehension, oral language, and assessment in English. For mathematics, they include problem solving/reasoning, use of ICTs, specific content strands (e.g., Space and Shape), use of mathematics activities and resources, working with children of differing abilities and assessment and recording in mathematics. There would also be value in examining how a need expressed by teachers for course to improve their understanding of the mathematics they teach could be met.

Recommendation 12: CPD in English and mathematics should continue to be available in a range of different formats. These include external courses, courses delivered online, and in-school courses and support activities.

Assessment, Evaluation, and Planning

The increases in average performance on English reading and mathematics at both Second and Sixth classes in NA '14 suggest that standardised tests currently in use in schools may overestimate pupil performance. Other factors contributing to a possible overestimation of performance based on standardised test results include the age of test norms (currently-available tests were standardised about ten years ago and the norms developed at that time

can now be considered 'old'), the familiarity teachers and pupils may develop with particular tests over a number of years (tests in current use are not secure), and the higher status attributed to tests and test scores since Circular 0056/2011 (DES, 2011) was issued. A possible consequence of overestimating performance is that schools may not allocate resources to those in greatest relative need, or focus on aspects of the curriculum where pupils require additional support.

In NA '14, principal teachers reported that data derived from standardised tests were used for a wide range of purposes, with at least 90% of pupils in schools in which they were used to provide feedback to parents, provide feedback to the Board of Management, identify pupils with learning difficulties, set school-level targets, inform school self-evaluation, and inform classroom teaching. In addition, schools submit aggregate results to the DES at the end of Second, Fourth and Sixth classes. Fifty percent or fewer pupils attended schools where results of standardised tests were shared with pupils. The latter finding may reflect an effort by some schools to ensure that standardised test results are not over-used.

The broad range of purposes for which standardised test results are administered in schools is potentially problematic. There is a need to separate the evaluative purposes of tests (which include the submission of aggregated outcomes to the DES) and the use of tests by schools and teachers to monitor progress and plan instruction. There is an immediate opportunity to accomplish this in the context of the Primary Language Curriculum in the junior classes, where assessment continua will allow teachers to record the progress of pupils in a range of literacy-related areas (reading, writing, oral language) against expected development, and use that information in planning for instruction.

Principal teachers responding to the School Questionnaire in NA '14 were asked to provide examples of 'specific and measurable' targets that were included in the school's SIP. In the case of English, principals of 25% of pupils did not provide any target (perhaps because mathematics was emphasised ahead of English in the initial stage of School Self-Evaluation). Just 15% of pupils were taught by principals who provided targets that referred to standardised test outcomes, and these generally pointed to relatively small expected changes in aggregated outcomes. On the other hand, it is noteworthy that many of the targets suggested by schools related to specific aspects of English (including reading comprehension and oral language) that schools sought to improve. In the case of mathematics, 40% of pupils attended schools where either no target was given, or it was indicated that the development of a SIP for mathematics was in progress at the time when NA '14 was administered. Twenty percent of pupils were in schools where the principal teacher indicated that problem solving was a target. However, principals tended not to identify specific aspects of problem solving that needed to be addressed. This suggests that greater levels of specificity may be warranted in some cases.

Principals in NA '14 were not asked to identify the data sources underpinning their targets. However, it seems likely that principals drew on a combination of standardised test results,

and outcomes based on other data sources such as teacher assessments. This seems a reasonable approach. There are dangers in linking all of a schools' targets to the outcomes of standardised tests, as important outcomes not measured by such tests may be overlooked. Furthermore, many standardised tests are not robust enough to provide reliable data on subprocesses (such as performance on specific aspects of comprehension, or problem solving). It would be desirable to produce diagnostic tests or item banks in mathematics that could be used by schools to assess content areas or processes about which they have concerns.

Teachers in NA '14 reported on the frequency with which they used a range of non-standardised classroom assessments to assess English reading, with teacher-designed tests, documented observations, and self-assessment by pupils being used most frequently by teaches of pupils in Second class. For mathematics, teachers of pupils in Sixth class mainly used teacher-made tests, error analysis, and self-assessment by pupils. Curriculum profiles/performance continua and computer-based tests were not used very often at either class level.

Recommendation 13: In the short term, currently-available standardised tests of English reading and mathematics need to be re-normed and/or revised so that schools and teachers can make more accurate decisions about the learning needs of pupils.

Recommendation 14: There is a need to consider whether schools should continue to use non-secure tests as a basis for generating data that are used to report aggregated results to the DES and Boards of Management.

***Recommendation 15*:** There is a need to develop diagnostic modules or item banks of test items corresponding to mathematics content areas and processes in the curriculum so that teachers can generate reliable data on pupil performance in these areas, and use such data as a basis for planning, teaching and learning.

Recommendation 16: The targets that schools set for English reading and mathematics should be based on a combination of standardised tests results and other objective information gathered at school level, including data that are based on teacher assessments.

Parent Engagement and Support

Findings from NA '14 reinforce findings from previous national and international assessments that have demonstrated strong associations between pupils' home and family lives and their reading and mathematics achievement. As in many previous studies, indicators of family socioeconomic status, such as medical card possession, ratings of family financial well-being, and parental employment status, were found to be related to English reading and mathematics achievement in NA '14. A range of other sociodemographic variables, including parental education, elements of family structure, and language of the home, were also significantly related to achievement. Such home background characteristics

are not amenable to change, and are not under the influence of schools. However, results of the multilevel model presented in Chapter 8 showed the independent contributions of manipulable elements of the home environment, indicating that there are ways in which schools can usefully advise parents to support their children's learning at home.

Statistically significant positive associations were found between reading achievement and the number of books in the home, frequency of parents' leisure reading, parents' setting aside of time for their child to read for pleasure, the pupil being a member of a public library, and the frequency with which the child reads books alone for fun. Membership of a public library was found to be related to reading achievement even when the number of books in the home was taken into account, suggesting that library membership offers something more in terms of reading achievement than mere access to large numbers of books. Parents should be encouraged to create opportunities for children to read for pleasure at home, and to become involved with their local library. They should model positive attitudes towards reading as well as positive reading behaviours to their children wherever possible. More frequent reading of magazines and comics by pupils was associated with lower achievement, however, suggesting that parents should have a role in monitoring the types of material which their children are reading, and, where possible, seeking to broaden this.

Parental monitoring variables assessed in NA '14 were found to have much stronger relationships with achievement than more formal school-based parental involvement activities (e.g. committee membership). This supports recent findings from a similar model of reading achievement using PIRLS 2011 data (Gilleece, 2015). In NA '14, pupils who spent the most time playing computer games, watching television, using the Internet, and playing with friends, had the lowest mean scores in reading and mathematics, suggesting a role for parents in limiting the amount of time that their children spend on these activities. Additionally, Second and Sixth class pupils who had televisions in their bedrooms, and Second class pupils who had their own smartphones/mobile phones had significantly lower mean achievement than pupils who did not. The multilevel model of reading achievement at Second class showed these variables to be significantly negatively associated with achievement when all other variables in the model were held constant. In a context where 51% of pupils in NA '14 were in schools where principals indicated that pupils coming to school tired hindered progress in teaching and learning 'a lot' or 'to some extent', the importance of parental monitoring of pupil behaviour seems clear.

Parental monitoring and home-based involvement in education should be supported by strong home-school communication. In NA '14, nearly all pupils (99% at Second class; 96% at Sixth) were in schools where the results of standardised tests were used to give feedback on children's progress to parents. Despite this, parents' ratings of their children's English reading and mathematics tended to be overly positive, with 88-89% of parents rating their child as very good or good at English reading, and 84-85% of parents characterising their

child as very good or good at mathematics. In the context of 22-27% of pupils across domains and grades performing at or below Proficiency Level 1 (i.e. displaying, at most, basic reading and mathematics skills), this suggests that many parents may not have a full understanding of how their children are progressing academically. As noted by Eivers et al. (2010), overestimating a child's performance in reading and/or mathematics may have implications for the nature and extent of support which parents provide to their child at home. Guides to interpreting test scores, such as those provided for parents on the NCCA website (www.ncca.ie) should be helpful for ensuring that parents fully comprehend the feedback on their children's standardised test performance that they receive from schools. Findings from the PIRLS and TIMSS 2011 international studies showed that parents in Ireland received information about their children's academic development less frequently than parents on average internationally (Eivers & Creaven, 2013). Having clear, comprehensive, and understandable information on how their children are performing relative to others in their class and nationally could make parents more aware of when extra home support for English reading and/or mathematics could be beneficial.

Encouraging parents to support reading and mathematics in the home is an important step, but providing information on *how* to do so may be a prerequisite for many parents. Indeed, a substantial majority of parents (76% at Second class, 71% at Sixth) indicated that they would attend a course or information evening for parents aimed at helping their children with English, were one organised by their child's school. Even larger proportions of parents (79% at Second, 75% at Sixth) reported that they would attend such a course for mathematics. However, very small proportions of parents at both grade levels reported that they had actually attended a course or information evening aimed at helping their child with English (7% at Second class, 5% at Sixth) or mathematics (6% at Second class, 5% at Sixth), despite the fact that around 40% of pupils at each grade level were in schools where a parent programme for English reading was implemented in the 2013-14 school year, and around 30% of pupils at each grade level were attending schools were such a parent programme was available for mathematics. The mismatches between parent desire for, availability of, and actual uptake of such programmes are concerning, and suggest either a lack of awareness on the part of parents of such initiatives, where they are in fact available in schools, or that schools target the programmes at particular groups of parents (e.g. parents of children in particular grade levels), meaning that they are not open to all parents who might feel a need to avail of them. It is also worth noting that there has been a substantial drop in the availability of such programmes for English reading since NA '09, where 69% of Second class and 65% of Sixth class pupils attended schools which provided these programmes for parents. In NA '09, 37% of Second class pupils and 29% of Sixth class pupils attended schools which offered parent programmes in mathematics. In both NA '14 and NA '09, therefore, schools were less likely to offer parent programmes for mathematics than for reading. Similarly, schools were more likely to have shared resources with parents for supporting English reading (e.g. websites, reading lists) in the 2013-14 school year (74%

at Second class; 68% at Sixth) than for supporting mathematics at home (60% at Second class; 55% at Sixth). This arises despite parents indicating greater demand for programmes in mathematics, and parents reporting lower levels of confidence (particularly at Sixth class) in helping their children with mathematics homework than with English homework. Schools should endeavour to make information evenings, courses and resources available for parents to support their children's mathematical development as well as those that they offer for reading.

One in two pupils in NA '14 were in schools where principals indicated that a lack of support for children from their parents hindered progress in teaching and learning 'a lot' or 'to some extent'. Principals in NA '14 also responded to a series of statements relating to the engagement of teachers, parents, and pupils in various aspects of school life. Those relating to parent-level engagement (parental support for pupil achievement, and parent involvement in school activities) were least likely to be rated as very high or high by school principals. Hence, there appears to be considerable scope to strengthen the links between home and school in order to support pupil achievement. It is acknowledged, however, that not all teachers may be aware of how best to forge partnerships with parents, or feel confident about doing so. In NA '14, teachers of Second class pupils were asked to indicate their levels of confidence in relation to various aspects of teaching English. Of these, *working with parents to raise children's literacy levels* was one of the areas in which teachers were least likely to say they were very confident (14th of 15) and in which they were most likely to say they were not at all confident (2nd of 15). Raising teacher confidence in collaborating with parents, through initial education programmes and continuing professional development, may be a necessary first step.

Recommendation 17: Schools should seek to raise awareness among parents about behaviours and practices that are supportive of children's academic development (such as reading books at home for pleasure) and those that are not (unmonitored television access, large amounts of technology use).

Recommendation 18: Schools should share information and resources with parents to help them support their children's learning in the home. An increased focus on mathematics may be particularly useful in this regard. Schools should also seek to ensure that parents understand the performance of their children in reading and mathematics relative to others in their class and nationally.

Recommendation 19: There should be an increased emphasis in initial teacher education and in continuing professional development programmes on preparing teachers to work in partnership with parents.

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