

## 5. Pupils' engagement

### Chapter outline

This chapter summarises Year 6 (Y6, ages 9-10) pupils' attitudes towards reading, mathematics and science, and their confidence in the three subjects. The chapter also explores pupils' engagement in reading, mathematics and science, and teachers' approaches towards engaging pupils.

Within each sub-section, findings for reading are presented first, followed by findings for mathematics and then science. Outcomes for Northern Ireland are compared with those of other countries where relevant.

- In several cases, the highest-performing countries in reading, mathematics or science had relatively low percentages of pupils categorised as *Liking* these subjects; being *Confident* in these subjects; and being *Engaged* in lessons.
- In Northern Ireland, and internationally, the pupils who most like reading also had higher average achievement scores.
- The proportion of pupils in Northern Ireland who *Like Reading* was similar to the international mean, although the proportion of pupils who *Do Not Like Reading* was higher.
- Pupils in Northern Ireland who were categorised as *Motivated* or *Somewhat Motivated* readers were higher achieving than those who were *Not Motivated*.
- In Northern Ireland across science and mathematics, the pupils who were categorised into the *Like Learning Mathematics/Like Learning Science* bands were also the pupils with the highest achievement in the subject.
- Pupils' level of *Confidence in Reading* in Northern Ireland was very close to the international average. There was a positive association between reading confidence and reading achievement within most countries, including Northern Ireland.
- Within Northern Ireland, the pupils who were classified as *Confident* in mathematics and science were also the pupils who had higher average achievement scores.
- Northern Ireland had fewer pupils reported as *Engaged* in reading lessons than the international mean. Internationally, the higher achieving countries had the lowest levels of pupils with a high level of engagement. Within many countries, however, as in Northern Ireland, the pattern is more mixed.
- In Northern Ireland, a relatively high percentage of pupils in all three subjects were taught by teachers who were classified as using the listed engagement practices in *Most Lessons*.

## 5.1 Pupils' attitudes to reading, mathematics and science

### Interpreting the data: indices and scales

In order to summarise data from a questionnaire, responses to several related items are sometimes combined to form an index or scale. The respondents to the questionnaire items are grouped according to their responses and the way in which responses have been categorised is shown for each index or scale. The data in an index or scale is often considered to be more reliable and valid than the responses to individual items.

#### 5.1.1 Pupils' attitudes: liking the subject, reading

Table 5.1 shows the proportions of pupils categorised as *Liking*, *Somewhat Liking* and *Not Liking* reading for Northern Ireland and for comparator countries, together with the mean achievement of pupils in each category of the scale. Details on how this scale was created and the eight individual items forming the scale can be seen below the table. In this table, countries are listed in descending order of the proportion of pupils expressing the most positive attitude.

The range of pupils falling into the *Like Reading* category was from 17 per cent (Qatar) to 46 per cent (Portugal).<sup>1</sup> The percentage of pupils in Northern Ireland (29 per cent) who fell into this category was similar to the international mean (28 per cent). The Republic of Ireland was the highest ranking comparator country with more pupils than Northern Ireland in the *Like Reading* category (37 per cent). The two highest achieving comparator countries, Hong Kong and Singapore, had a lower *Like Reading* scale score than Northern Ireland and a lower proportion of pupils in the *Like Reading* category than the international average.

Northern Ireland had 20 per cent of pupils in the *Do Not Like Reading* category, five percentage points above the international average (15 per cent). Regarding English-speaking countries, the United States was the English-speaking country with the highest proportion of pupils in this category (22 per cent); the Republic of Ireland, Canada and New Zealand had the lowest proportion of pupils in this category (14 per cent).

Overall, pupils in Northern Ireland who like reading more had higher average achievement than those who like reading less. This pattern is reflected in most countries and in the international average. Although significance tests have not been conducted in the international analysis, based on the size of the standard errors, the differences in achievement scores are likely to be statistically significant.<sup>2</sup> The direction of causality is unknown. Able readers may come to enjoy reading more; on the other hand, pupils who enjoy reading may become better readers.

1 See Exhibit 8.1 in the international PIRLS report

2 Throughout this report, the term 'significant' refers to statistical significance.

**Table 5.1 Pupils like reading<sup>3</sup>**

Reported by Students

Students were scored on the *Students Like Reading* scale according to their degree of agreement with six statements and how often they did two reading activities outside of school. Students who **Like Reading** had a score on the scale of at least 11.0, which corresponds to their “agreeing a lot” with three of the six statements and “agreeing a little” with the other three, as well as doing both reading activities outside of school “every day or almost every day,” on average. Students who **Do Not Like Reading** had a score no higher than 8.2, which corresponds to their “disagreeing a little” with three of the six statements and “agreeing a little” with the other three, as well as doing both reading activities only “once or twice a month,” on average. All other students **Somewhat Like Reading**.

Country	Like Reading		Somewhat Like Reading		Do Not Like Reading		Average Scale Score
	Per cent of Students	Average Achievement	Per cent of Students	Average Achievement	Per cent of Students	Average Achievement	
Ireland, Rep. of	37 (1.2)	580 (2.5)	49 (0.9)	543 (3.0)	14 (0.9)	514 (4.9)	10.4 (0.07)
New Zealand	32 (0.9)	574 (2.7)	53 (0.8)	515 (2.4)	14 (0.6)	497 (3.6)	10.2 (0.05)
Australia	30 (0.9)	565 (2.7)	52 (0.8)	518 (2.8)	19 (0.7)	494 (4.0)	9.9 (0.05)
<b>Northern Ireland</b>	<b>29 (1.3)</b>	<b>590 (3.3)</b>	<b>51 (1.0)</b>	<b>554 (2.7)</b>	<b>20 (0.9)</b>	<b>527 (3.5)</b>	<b>9.9 (0.07)</b>
England	26 (1.1)	589 (3.9)	53 (0.9)	545 (2.9)	20 (1.0)	519 (4.0)	9.8 (0.06)
Finland	26 (1.0)	596 (2.6)	54 (0.9)	568 (2.3)	21 (0.9)	534 (2.2)	9.7 (0.06)
Singapore	22 (0.8)	610 (3.5)	63 (0.8)	560 (3.4)	15 (0.6)	538 (4.2)	9.8 (0.04)
Hong Kong SAR	21 (1.0)	596 (2.6)	62 (0.8)	568 (2.5)	16 (0.8)	550 (3.2)	9.7 (0.05)
<b>International Avg.</b>	<b>28 (0.2)</b>	<b>542 (0.5)</b>	<b>57 (0.1)</b>	<b>506 (0.5)</b>	<b>15 (0.1)</b>	<b>488 (0.8)</b>	

Centre point of scale set at 10.

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

### R7

**What do you think about reading? Show how much you agree with each of these statements.**

*Tick one box for each row.*

	Agree a lot	Agree a little	Disagree a little	Disagree a lot
a) I read only if I have to*.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) I like talking to other people about what I read .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c) I would be happy if someone gave me a book as a present .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d) I think reading is boring*.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e) I would like to have more time for reading .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f) I enjoy reading .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

\* Reverse coded

### R2

**How often do you do these things outside of school?**

*Tick one box for each row.*

	Every day or almost every day	Once or twice a week	Once or twice a month	Never or almost never
a) I read for fun .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) I read things that I choose myself .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Source: Exhibit 8.1, international PIRLS report and adapted from the international version of the PIRLS and TIMSS 2011 Student Questionnaire <sup>4</sup>

3 The comparator countries (Australia, England, Finland, Hong Kong, New Zealand, Republic of Ireland and Singapore) have been included in this and all later tables. Other countries have been included where their data may be of particular interest.

4 <http://timssandpirls.bc.edu>

### 5.1.2 Pupils' attitudes: liking the subject, mathematics

Thirty-six per cent of Y6 pupils in Northern Ireland were in the highest category of *Like Learning Mathematics*. Pupils' attitudes were measured by their responses to five statements about learning mathematics (these statements can be seen below in Table 5.2). The international analysis uses responses to these statements to create the *Students Like Learning Mathematics* scale. Pupils were categorised into three bands: *Like Learning Mathematics*, *Somewhat Like Learning Mathematics*, and *Do Not Like Learning Mathematics* (details of how pupils were assigned to each band are provided in Table 5.2).

Compared with the participating countries in the comparator group, Northern Ireland had a relatively low percentage of pupils in the highest band of the scale. For example in Singapore 48 per cent of pupils were classified in this high *Like Learning Mathematics* category, and in Hong Kong this figure was also higher than for Northern Ireland at 47 per cent. Finland was the only comparator country with fewer pupils than Northern Ireland in the *Like Learning Mathematics* category, at 34 per cent. It may be of interest to note that most of the highest performing countries had very low levels of pupils liking mathematics at this age group.

In Northern Ireland, the average achievement score for pupils categorised in the *Like Learning Mathematics* category was high at 576. Twenty-six per cent of Y6 pupils were in the *Do Not Like Learning Mathematics* category, and the average achievement score for these pupils was lower at 546 (see Table 5.2).

The data in the international averages follow a similar trend; as liking of mathematics decreases, so does achievement. Although significance tests have not been conducted in the international analysis, based on the size of the standard errors, the differences in achievement scores for Northern Ireland are likely to be statistically significant. The direction of causality cannot be inferred from this data. Pupils who like learning mathematics may perform better in the subject, but this relationship could also work in the opposite direction; pupils who perform better in mathematics may have a more positive attitude to their lessons, and may respond to the statements about whether they like learning the subject more positively than other pupils.

**Table 5.2 Pupils like learning mathematics**

*Reported by Students*

Students were scored according to their degree of agreement with five statements on the *Students Like Learning Mathematics* scale. Students who **Like Learning Mathematics** had a score on the scale of at least 10.1, which corresponds to their “agreeing a lot” with three of the five statements and “agreeing a little” with the other two, on average. Students who **Do Not Like Learning Mathematics** had a score no higher than 8.1, which corresponds to their “disagreeing a little” with three of the five statements and “agreeing a little” with the other two, on average. All other students **Somewhat Like Learning Mathematics**.

Country	Like Learning Mathematics		Somewhat Like Learning Mathematics		Do Not Like Learning Mathematics		Average Scale Score
	Per cent of pupils	Average Achievement	Per cent of pupils	Average Achievement	Per cent of pupils	Average Achievement	
Singapore	48 (0.8)	625 (3.1)	33 (0.6)	597 (3.8)	19 (0.7)	577 (3.8)	9.9 (0.03)
New Zealand	47 (1.1)	491 (3.4)	35 (0.8)	486 (3.0)	18 (0.8)	481 (3.4)	9.9 (0.05)
Hong Kong SAR	47 (1.0)	619 (4.0)	36 (0.8)	591 (3.6)	17 (0.8)	582 (3.7)	9.9 (0.04)
Australia	45 (1.2)	535 (3.5)	33 (0.9)	508 (3.6)	22 (0.9)	495 (3.8)	9.7 (0.05)
England	44 (1.4)	548 (4.4)	37 (1.1)	543 (4.0)	19 (1.1)	530 (5.5)	9.8 (0.06)
Ireland, Rep. of	41 (1.6)	535 (3.8)	36 (1.0)	529 (3.2)	23 (1.1)	517 (3.3)	9.6 (0.07)
Northern Ireland	36 (1.3)	576 (3.8)	38 (1.0)	564 (3.5)	26 (1.2)	546 (5.6)	9.4 (0.06)
Finland	34 (1.2)	556 (2.9)	35 (1.0)	548 (3.3)	31 (1.3)	533 (2.6)	9.2 (0.06)
International Avg.	48 (0.2)	509 (0.5)	36 (0.1)	478 (0.6)	16 (0.1)	466 (0.9)	

Centre point of scale set at 10.

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

An “r” indicates data are available for at least 70% but less than 85% of the pupils.

## MS1

**How much do you agree with these statements about learning maths?**

*Tick one box for each row.*

	Agree a lot		Agree a little		Disagree a little		Disagree a lot
	↓		↓		↓		↓
a) I enjoy learning maths .....	<input type="checkbox"/>	—	<input type="checkbox"/>	—	<input type="checkbox"/>	—	<input type="checkbox"/>
b) I wish I did not have to study maths* .....	<input type="checkbox"/>	—	<input type="checkbox"/>	—	<input type="checkbox"/>	—	<input type="checkbox"/>
c) Maths is boring* .....	<input type="checkbox"/>	—	<input type="checkbox"/>	—	<input type="checkbox"/>	—	<input type="checkbox"/>
d) I learn many interesting things in maths .....	<input type="checkbox"/>	—	<input type="checkbox"/>	—	<input type="checkbox"/>	—	<input type="checkbox"/>
e) I like maths .....	<input type="checkbox"/>	—	<input type="checkbox"/>	—	<input type="checkbox"/>	—	<input type="checkbox"/>

\* Reverse coded

Source: Exhibit 8.1, international mathematics report and adapted from the international version of the PIRLS and TIMSS 2011 Student Questionnaire <sup>5</sup>

5 <http://timssandpirls.bc.edu>

### 5.1.3 Pupils' attitudes: liking the subject, science

In Northern Ireland, just over half (51 per cent) of pupils were in the highest category of the *Like Learning Science* scale, a higher percentage than the equivalent for reading and mathematics in Northern Ireland.

For this scale, pupils were scored according to their responses to five statements about learning science. Based on their responses, pupils were categorised into three bands: *Like Learning Science*, *Somewhat Like Learning Science* and *Do Not Like Learning Science*. The statements and details on how pupils were assigned to bands are provided in Table 5.3.

The comparator country with the highest percentage of pupils in the *Like Learning Science* category was the Republic of Ireland, with 59 per cent of pupils in this category. This was followed by Singapore (57 per cent), Australia (55 per cent), New Zealand (55 per cent) and Hong Kong (52 per cent). England and Finland had lower percentages of pupils than Northern Ireland classified in the highest band of *Like Learning Science*, at 44 per cent and 36 per cent respectively.

In Northern Ireland, the average achievement score for pupils in the *Like Learning Science* category was 533, whereas the average achievement score for the 13 per cent of pupils in the *Do Not Like Learning Science* category was lower at 483 (see Table 5.3). As with the mathematics findings, in Northern Ireland (and in the international averages), the lower the level of liking science the lower the achievement scores. The differences in achievement scores are likely to be statistically significant. As noted above, the data cannot identify the direction of causality.

**Table 5.3 Pupils like learning science**

Reported by Students

Students were scored according to their degree of agreement with five statements on the *Students Like Learning Science* scale. Students who **Like Learning Science** had a score on the scale of at least 9.7, which corresponds to their “agreeing a lot” with three of the five statements and “agreeing a little” with the other two, on average. Students who **Do Not Like Learning Science** had a score no higher than 7.6, which corresponds to their “disagreeing a little” with three of the five statements and “agreeing a little” with the other two, on average. All other students **Somewhat Like Learning Science**.

Country	Like Learning Science		Somewhat Like Learning Science		Do Not Like Learning Science		Average Scale Score
	Per cent of Students	Average Achievement	Per cent of Students	Average Achievement	Per cent of Students	Average Achievement	
Ireland, Rep. of	59 (1.5)	529 (3.2)	29 (1.0)	506 (4.4)	12 (1.0)	490 (9.1)	10.2 (0.07)
Singapore	57 (0.7)	600 (3.4)	31 (0.6)	567 (4.3)	12 (0.5)	555 (5.4)	10.1 (0.03)
Australia	55 (1.0)	529 (2.8)	31 (0.7)	506 (3.9)	14 (0.7)	496 (5.2)	10.0 (0.05)
New Zealand	55 (1.1)	512 (2.5)	32 (0.8)	486 (3.7)	13 (0.8)	468 (5.5)	10.0 (0.05)
Hong Kong SAR	52 (1.3)	551 (3.5)	35 (0.9)	523 (4.9)	14 (0.8)	507 (6.6)	9.9 (0.05)
<b>Northern Ireland</b>	<b>51 (1.4)</b>	<b>533 (2.5)</b>	<b>36 (1.1)</b>	<b>509 (3.9)</b>	<b>13 (0.8)</b>	<b>483 (5.4)</b>	<b>9.8 (0.06)</b>
England	44 (1.5)	535 (4.1)	35 (1.1)	528 (4.1)	21 (1.1)	518 (3.9)	9.4 (0.07)
Finland	36 (1.2)	578 (3.2)	39 (1.0)	571 (3.2)	25 (1.1)	561 (3.4)	9.1 (0.06)
<b>International Avg.</b>	<b>53 (0.2)</b>	<b>504 (0.5)</b>	<b>35 (0.1)</b>	<b>469 (0.7)</b>	<b>12 (0.1)</b>	<b>461 (1.1)</b>	

Centre point of scale set at 10.

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

**MS4**

**How much do you agree with these statements about learning science?**

*Tick one box for each row.*

	Agree a lot	Agree a little	Disagree a little	Disagree a lot
a) I enjoy learning science -----	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) I wish I did not have to study science*-----	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d) Science is boring*-----	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e) I learn many interesting things in science -----	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f) I like science -----	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

\* Reverse coded

Like Learning Science 9.7      Somewhat Like Learning Science      Do Not Like Learning Science 7.6

Source: Exhibit 8.1, international science report and adapted from the international version of the PIRLS and TIMSS 2011 Student Questionnaire <sup>6</sup>

6 <http://timssandpirls.bc.edu>

## 5.2 Motivation to read

Table 5.4 shows pupils' self-reported motivation to read in Northern Ireland and comparator countries, along with their average achievement. Countries are listed in order of the percentage of pupils falling into the *Motivated* category. This scale was created by collapsing responses to six different questions. More detail on how the scale was created can be seen below Table 5.4.

The average proportion of pupils in the *Motivated* category was 74 per cent and ranged from 92 per cent (Georgia) to 52 per cent (Hong Kong).<sup>7</sup> Northern Ireland had 65 per cent of pupils in this category. With the exception of the Republic of Ireland, all comparator countries had proportions of pupils below the international average for pupils in the *Motivated* category. Generally, the countries with the highest achievement were those with the lowest proportions of motivated pupils. The Russian Federation is the exception, recording both high achievement and high levels of motivation.

Conversely, as shown by the international averages, there was a general trend within most countries that pupils' achievement rose with their motivation. Northern Ireland, however, was one of the few examples where this was not the case and pupils had equal achievement in the *Somewhat Motivated* and the *Motivated* category, although pupil achievement was lower in the *Not Motivated* category. Northern Ireland had a slightly higher percentage of pupils who were *Not Motivated* to read (7 per cent) than the international average (5 per cent).

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<sup>7</sup> See Exhibit 8.2 in the international PIRLS report



**Table 5.4 Pupils motivated to read**

Reported by Students

Students were scored according to their degree of agreement with six statements on the *Students Motivated to Read* scale. Students **Motivated** to read had a score on the scale of at least 8.7, which corresponds to their “agreeing a lot” with three of the six statements and “agreeing a little” with the other three, on average. Students who were **Not Motivated** had a score no higher than 6.8, which corresponds to their “disagreeing a little” with three of the six statements and “agreeing a little” with the other three, on average. All other students were **Somewhat Motivated To Read**.

Country	Motivated		Somewhat Motivated		Not Motivated		Average Scale Score
	Per cent of Students	Average Achievement	Per cent of Students	Average Achievement	Per cent of Students	Average Achievement	
Ireland, Rep. of	75 (1.0)	554 (2.6)	20 (0.9)	551 (4.1)	4 (0.4)	523 (5.6)	10.0 (0.05)
New Zealand	72 (0.9)	536 (2.1)	23 (0.9)	533 (3.7)	5 (0.4)	483 (6.6)	9.8 (0.04)
Australia	71 (1.0)	532 (2.7)	23 (0.9)	527 (3.2)	7 (0.5)	493 (5.7)	9.7 (0.05)
Northern Ireland	65 (1.2)	561 (2.7)	29 (1.0)	561 (2.9)	7 (0.6)	533 (5.5)	9.4 (0.05)
England	65 (1.4)	551 (2.9)	28 (1.2)	559 (3.2)	7 (0.5)	531 (7.8)	9.4 (0.06)
Singapore	60 (0.7)	576 (3.5)	31 (0.6)	562 (3.6)	8 (0.4)	533 (5.6)	9.3 (0.03)
Finland	59 (1.1)	570 (2.2)	34 (1.0)	571 (2.4)	7 (0.6)	543 (4.4)	9.2 (0.05)
Hong Kong SAR	52 (1.0)	577 (2.4)	34 (0.8)	570 (2.8)	15 (0.8)	551 (3.8)	8.9 (0.05)
International Avg.	74 (0.1)	518 (0.4)	21 (0.1)	503 (0.7)	5 (0.1)	474 (1.3)	

Centre point of scale set at 10.

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

**R9**

**Do you read for any of the following reasons? Show how much you agree with each of these statements.**

*Tick one box for each row.*

	Agree a lot	Agree a little	Disagree a little	Disagree a lot
	↓	↓	↓	↓
a) I like to read things that make me think .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) It is important to be a good reader .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c) My family like it when I read .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d) I learn a lot from reading .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e) I need to read well for my future .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f) I like it when a book helps me to imagine other worlds .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Motivated 8.7 Somewhat Motivated 6.8 Not Motivated

Source: Exhibit 8.2, international PIRLS report and adapted from the international version of the PIRLS and TIMSS 2011 Student Questionnaire <sup>8</sup>

8 <http://timssandpirls.bc.edu>

## 5.3 Pupils' confidence in reading, mathematics and science

### 5.3.1 Pupils' confidence in reading

Table 5.5 shows pupils' reports of their confidence in reading, categorised into three confidence bands, together with pupil average achievement for each confidence band. Northern Ireland and comparator countries are listed in descending order of the proportion of pupils who fell into the *Confident* category. The scale used in this table was made by collapsing pupils' responses to seven individual items. The individual questions and the scale can be seen below Table 5.5.

Israel had the highest proportion (49 per cent) of *Confident* pupils, while Morocco had the lowest (17 per cent);<sup>9</sup> the average being 36 per cent. Northern Ireland had proportions of pupils very close to the average at all three levels of confidence in reading. Pupils in the Republic of Ireland were the most confident English-speaking pupils at reading, with 44 per cent in the *Confident* category, although Finland was the comparator country with the highest proportion of pupils in this category (48 per cent). Three of the four top performing countries internationally (Hong Kong, Singapore and Russian Federation) had some of the lowest percentages of pupils in the *Confident* category. Within most participating countries there was a positive association between reading confidence and average achievement, and this association applied in Northern Ireland.

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9 See Exhibit 8.3 in the international PIRLS report

**Table 5.5 Pupils confident in reading**

*Reported by Students*

Students were scored according to their degree of agreement with seven statements on the *Students Confident in Reading Scale*. Students **Confident** in reading had a score on the scale of at least 10.6, which corresponds to their “agreeing a lot” with four of the seven statements and “agreeing a little” with the other three, on average. Students who were **Not Confident** had a score no higher than 7.9, which corresponds to their “disagreeing a little” with four of the seven statements and “agreeing a little” with the other three, on average. All other students were **Somewhat Confident** in reading.

Country	Confident		Somewhat Confident		Not Confident		Average Scale Score
	Per cent of Students	Average Achievement	Per cent of Students	Average Achievement	Per cent of Students	Average Achievement	
Finland	48 (1.2)	590 (2.0)	47 (1.1)	552 (2.3)	5 (0.5)	507 (6.7)	10.5 (0.05)
Ireland, Rep. of	44 (1.1)	580 (2.1)	49 (1.1)	537 (2.9)	8 (0.6)	490 (5.0)	10.3 (0.05)
Australia	37 (0.9)	568 (2.4)	53 (0.8)	515 (2.5)	10 (0.6)	451 (5.4)	10.1 (0.04)
England	37 (1.1)	589 (2.8)	53 (1.2)	539 (3.0)	10 (0.6)	483 (6.0)	10.0 (0.1)
<b>Northern Ireland</b>	<b>35 (1.0)</b>	<b>591 (3.1)</b>	<b>55 (1.1)</b>	<b>549 (2.8)</b>	<b>10 (0.6)</b>	<b>501 (4.7)</b>	<b>10.0 (0.04)</b>
New Zealand	27 (0.8)	585 (2.9)	61 (0.8)	523 (2.2)	13 (0.6)	471 (4.2)	9.6 (0.04)
Singapore	26 (0.7)	607 (3.3)	61 (0.6)	565 (3.0)	13 (0.6)	504 (5.2)	9.5 (0.03)
Hong Kong SAR	20 (0.9)	601 (2.4)	62 (0.8)	571 (2.6)	18 (0.9)	538 (3.3)	9.2 (0.05)
International Avg.	36 (0.2)	547 (0.4)	53 (0.1)	502 (0.4)	11 (0.1)	456 (0.8)	

Centre point of scale set at 10.

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

## R8

**How well do you read? Show how much you agree with each of these statements.**

*Tick **one** box for each row.*

	Agree a lot	Agree a little	Disagree a little	Disagree a lot
a) I usually do well in reading -----	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) Reading is easy for me -----	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c) Reading is harder for me than for many of the children in my class* -----	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d) If a book is interesting, I don't care how hard it is to read -----	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e) I have trouble reading stories with difficult words* -----	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f) My teacher tells me I am a good reader -----	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g) Reading is harder for me than any other subject -----	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

\* Reverse coded

Source: Exhibit 8.3 international PIRLS report and adapted from the international version of the PIRLS and TIMSS 2011 Student Questionnaire <sup>10</sup>

10 <http://timssandpirls.bc.edu>

### 5.3.2 Pupils' confidence in mathematics

In terms of confidence in mathematics among Y6 pupils in Northern Ireland, just over a third of pupils (35 per cent) were in the highest category of being *Confident* in mathematics, with 44 per cent in the *Somewhat Confident* category, and 21 per cent categorised as *Not Confident* in mathematics (see Table 5.6). As with pupil attitudes, pupil confidence was measured by their responses to a set of statements about their mathematical skills and abilities. Pupils were then categorised into one of the three bands: *Confident*, *Somewhat Confident* and *Not Confident* (details of the statements used and how pupils were assigned to each band are provided in Table 5.6).

Among the comparator group of countries, Northern Ireland had the third highest percentage of pupils classified as *Confident*. Within this group of countries, the Republic of Ireland had the largest percentage of pupils in this category (43 per cent), followed by Australia at 38 per cent. Finland had the same figure as Northern Ireland at 35 per cent.

Among the highest performing countries in mathematics at this age group, the overall levels of pupils' confidence were fairly low, as was the case for positive attitudes towards mathematics. For example, Hong Kong and Singapore both had high mathematics achievement among 9-10 year olds, but low percentages of pupils who are *Confident* in mathematics, at 24 per cent and 21 per cent respectively.

As with pupil attitudes, the findings show that as pupil confidence decreases, so does achievement; pupil achievement in mathematics is higher among those pupils classified as having a higher level of confidence in the subject. In Northern Ireland, among the pupils who were classified as being *Confident* in mathematics the average achievement was very high at 598; and among the pupils who were classified as *Not Confident* in mathematics the average achievement was lower at 519. The differences in achievement data are likely to be statistically significant across the three categories. As with pupil attitudes, the data cannot identify the direction of causality. It could be that pupils who are confident in mathematics are better at it, or the opposite may be true, that pupils who are better at mathematics are more confident in the subject.

**Table 5.6 Pupils confident in mathematics**

*Reported by Students*

Students were scored according to their degree of agreement with seven statements on the *Students Confident in Mathematics* scale. Students **Confident** with mathematics had a score on the scale of at least 10.6, which corresponds to their “agreeing a lot” with four of the seven statements and “agreeing a little” with the other three, on average. Students who were **Not Confident** had a score no higher than 8.5, which corresponds to their “disagreeing a little” with four of the seven statements and “agreeing a little” with the other three, on average. All other students were **Somewhat Confident** with mathematics.

Country	Confident		Somewhat Confident		Not Confident		Average Scale Score
	Per cent of Students	Average Achievement	Per cent of Students	Average Achievement	Per cent of Students	Average Achievement	
Ireland, Rep. of	43 (1.2)	552 (3.7)	41 (1.0)	520 (3.5)	16 (0.8)	489 (4.4)	10.3 (0.05)
Australia	38 (0.9)	550 (3.5)	41 (0.9)	507 (3.1)	21 (0.7)	478 (4.3)	10.1 (0.04)
Northern Ireland	35 (1.3)	598 (4.0)	44 (1.2)	557 (3.0)	21 (0.8)	519 (5.0)	10.0 (0.05)
Finland	35 (0.8)	579 (3.0)	42 (0.7)	543 (2.6)	23 (0.7)	503 (3.2)	9.9 (0.03)
England	33 (1.0)	572 (4.6)	48 (0.9)	538 (3.8)	19 (0.7)	503 (4.4)	10.0 (0.04)
New Zealand	25 (0.7)	520 (3.7)	50 (0.8)	484 (2.9)	25 (0.6)	459 (3.6)	9.6 (0.03)
Hong Kong SAR	24 (0.9)	641 (3.1)	44 (0.9)	600 (5.1)	31 (1.0)	575 (2.9)	9.4 (0.05)
Singapore	21 (0.8)	658 (2.8)	41 (0.7)	614 (3.3)	38 (1.0)	570 (3.1)	9.2 (0.04)
International Avg.	34 (0.1)	527 (0.5)	46 (0.1)	484 (0.5)	21 (0.1)	452 (0.7)	

Centre point of scale set at 10.

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

**MS3**

**How much do you agree with these statements about maths?**

*Tick one box for each row.*

	Agree a lot	Agree a little	Disagree a little	Disagree a lot
	↓	↓	↓	↓
a) I usually do well in maths .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) Maths is harder for me than for many of the children in my class*.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c) I am just <b>not</b> good at maths*.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d) I learn things quickly in maths .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e) I am good at working out difficult maths problems .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f) My teacher tells me I am good at maths .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g) Maths is harder for me than any other subject*.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

\* Reverse coded

Source: Exhibit 8.4, international mathematics report and adapted from the international version of the PIRLS and TIMSS 2011 Student Questionnaire <sup>11</sup>

11 <http://timssandpirls.bc.edu>

### 5.3.3 Pupils' confidence in science

In Northern Ireland, 37 per cent of pupils were categorised as being *Confident* in science, with 40 per cent categorised as *Somewhat Confident*, and 23 per cent categorised as *Not Confident* in science (see Table 5.7). Confidence was measured by pupils' responses to six statements on the *Students Confident in Science* scale. Based on their responses, pupils were categorised into three bands: *Confident*, *Somewhat Confident* or *Not Confident* (Table 5.7 gives details of the statements and how the scale was derived).

Looking across the group of comparator countries, the Republic of Ireland has the largest percentage of pupils categorised as *Confident* in science, at 47 per cent, followed by Australia at 42 per cent. Finland, at 38 per cent, has a very similar figure to Northern Ireland. Among the highest performing countries in science at this age group, the levels of pupils' confidence are fairly low. For example, Singapore and Hong Kong both perform very well overall in terms of science achievement among 9 to 10 year olds, but have low percentages of pupils found to be *Confident* in science, at 26 per cent and 25 per cent respectively.

As with mathematics, pupil achievement was higher among those pupils with a higher level of confidence. In Northern Ireland, among the pupils who were found to be *Confident* in science the average achievement was 537, and among the pupils who were found to be *Not Confident* in science the average achievement was lower at 482. The differences in achievement data are likely to be statistically significant across the three categories. This pattern is also true across the comparator countries; within each country as the level of pupils' confidence decreases, so do the average achievement scores.

**Table 5.7 Pupils confident in science**

Reported by Students

Students were scored according to their degree of agreement with six statements on the *Students Confident in Science* scale. Students **Confident** with science had a score on the scale of at least 10.1, which corresponds to their "agreeing a lot" with three of the six statements and "agreeing a little" with the other three, on average. Students who were **Not Confident** had a score no higher than 8.3, which corresponds to their "disagreeing a little" with three of the six statements and "agreeing a little" with the other three, on average. All other students were **Somewhat Confident** with science.

Country	Confident		Somewhat Confident		Not Confident		Average Scale Score
	Per cent of Students	Average Achievement	Per cent of Students	Average Achievement	Per cent of Students	Average Achievement	
Ireland, Rep. of	47 (1.5)	533 (3.6)	36 (1.1)	516 (3.7)	17 (1.0)	481 (7.0)	10.1 (0.06)
Australia	42 (1.0)	535 (3.2)	36 (0.9)	516 (3.4)	22 (0.9)	484 (4.4)	9.9 (0.04)
Finland	38 (1.1)	587 (3.3)	43 (0.9)	571 (2.6)	19 (0.8)	540 (4.6)	9.7 (0.04)
Northern Ireland	37 (1.4)	537 (2.9)	40 (1.0)	520 (3.0)	23 (1.1)	482 (4.4)	9.7 (0.05)
England	33 (1.3)	549 (4.5)	38 (1.1)	530 (3.8)	29 (1.1)	506 (3.4)	9.5 (0.05)
New Zealand	28 (1.2)	530 (3.4)	40 (1.0)	504 (3.5)	32 (1.0)	463 (3.6)	9.3 (0.05)
Singapore	26 (0.6)	620 (3.6)	36 (0.6)	592 (3.6)	37 (0.7)	552 (4.0)	9.1 (0.03)
Hong Kong SAR	25 (0.9)	560 (4.6)	36 (0.9)	539 (3.8)	39 (1.3)	516 (4.8)	9.1 (0.05)
International Avg.	43 (0.2)	514 (0.5)	36 (0.1)	480 (0.6)	21 (0.1)	446 (0.8)	

Centre point of scale set at 10.

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

## MS6

**How much do you agree with these statements about science?**

*Tick one box for each row.*

	Agree a lot		Agree a little		Disagree a little		Disagree a lot
	↓		↓		↓		↓
a) I usually do well in science .....	<input type="checkbox"/>	—	<input type="checkbox"/>	—	<input type="checkbox"/>	—	<input type="checkbox"/>
b) Science is harder for me than for many of the other children in my class* .....	<input type="checkbox"/>	—	<input type="checkbox"/>	—	<input type="checkbox"/>	—	<input type="checkbox"/>
c) I am just <b>not</b> good at science* .....	<input type="checkbox"/>	—	<input type="checkbox"/>	—	<input type="checkbox"/>	—	<input type="checkbox"/>
d) I learn things quickly in science .....	<input type="checkbox"/>	—	<input type="checkbox"/>	—	<input type="checkbox"/>	—	<input type="checkbox"/>
e) My teacher tells me I am good at science .....	<input type="checkbox"/>	—	<input type="checkbox"/>	—	<input type="checkbox"/>	—	<input type="checkbox"/>
f) Science is harder for me than any other subject* .....	<input type="checkbox"/>	—	<input type="checkbox"/>	—	<input type="checkbox"/>	—	<input type="checkbox"/>

\* Reverse coded

Source: Exhibit 8.4, international science report and adapted from the international version of the PIRLS and TIMSS 2011 Student Questionnaire<sup>12</sup>

12 <http://timssandpirls.bc.edu>

## 5.4 Teaching to engage pupils in learning in reading, mathematics and science

### 5.4.1 Engagement in reading

#### **Pupils' reported engagement in reading lessons**

Table 5.8 shows the engagement of pupils in reading lessons in Northern Ireland and comparator countries, ranked in descending order based on percentage of pupils in the *Engaged* category. This table is based on a scale, which was made by the amalgamation of responses to seven pupil self-report questions. The questions used to make this scale can be seen below Table 5.8.

The proportions of pupils in the *Engaged* category ranged from 71 per cent (Indonesia) to 15 per cent (Finland).<sup>13</sup> Northern Ireland had 37 per cent of pupils in the *Engaged* category, which is below the international mean of 42 per cent. Northern Ireland scored above all comparator countries, with the exception of the Republic of Ireland (43 per cent).

Internationally there was a significant negative association between pupils' reported level of engagement in reading lessons and a country's overall achievement. This is exemplified by Finland, one of the highest achieving countries which also recorded the smallest proportion of *Engaged* pupils. In contrast, the Russian Federation stood out as both high achieving and with high reported levels of pupil engagement.

Within Northern Ireland, in contrast to the international averages, there was no association between engagement and achievement.

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<sup>13</sup> See Exhibit 8.7 in the international PIRLS report



**Table 5.8 Pupils engaged in reading lessons**

Reported by Students

Students were scored according to their degree of agreement with seven statements on the *Engaged in Reading Lessons* scale. Students **Engaged** in reading lessons had a score on the scale of at least 10.5, which corresponds to their “agreeing a lot” with four of the seven statements and “agreeing a little” with the other three, on average. Students who were **Not Engaged** had a score no higher than 7.4, which corresponds to their “disagreeing a little” with four of the seven statements and “agreeing a little” with the other three, on average. All other students were **Somewhat Engaged** in reading lessons.

Country	Engaged		Somewhat Engaged		Not Engaged		Average Scale Score
	Per cent of Students	Average Achievement	Per cent of Students	Average Achievement	Per cent of Students	Average Achievement	
Ireland, Rep. of	43 (1.5)	557 (2.5)	49 (1.2)	550 (3.0)	8 (0.7)	541 (5.6)	10.0 (0.07)
Northern Ireland	37 (1.4)	561 (3.5)	55 (1.2)	559 (2.9)	8 (0.7)	551 (5.4)	9.8 (0.06)
New Zealand	34 (1.1)	534 (3.1)	57 (1.0)	533 (1.8)	9 (0.7)	520 (7.0)	9.7 (0.04)
England	34 (1.5)	551 (4.0)	57 (1.2)	554 (2.8)	9 (0.8)	541 (6.1)	9.6 (0.06)
Australia	33 (1.1)	538 (3.7)	56 (0.9)	526 (2.5)	11 (0.7)	509 (4.4)	9.6 (0.05)
Singapore	31 (0.8)	575 (3.6)	57 (0.7)	568 (3.6)	13 (0.6)	554 (4.4)	9.5 (0.03)
Hong Kong SAR	24 (1.0)	578 (2.5)	58 (0.7)	571 (2.5)	18 (1.0)	563 (3.8)	9.1 (0.06)
Finland	15 (0.8)	568 (3.6)	65 (1.0)	573 (2.1)	20 (1.0)	553 (2.8)	8.7 (0.04)
International Avg.	42 (0.2)	519 (0.5)	50 (0.2)	510 (0.5)	8 (0.1)	494 (1.0)	

Centre point of scale set at 10.

(.) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

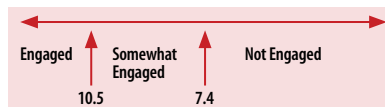
## R5

Think about the reading you do for school. How much do you agree with these statements about your reading lessons?

Tick *one* box for each row.

	Agree a lot	Agree a little	Disagree a little	Disagree a lot
a) I like what I read about in school .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) My teacher gives me interesting things to read .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c) I know what my teacher expects me to do .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d) I think of things not related to the lesson* .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e) My teacher is easy to understand	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f) I am interested in what my teacher says .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g) My teacher gives me interesting things to do .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

\* Reverse coded



Source: Exhibit 8.7, international PIRLS report and adapted from the international version of the PIRLS and TIMSS 2011 Student Questionnaire <sup>14</sup>

14 <http://timssandpirls.bc.edu>

## Teachers' reported approaches to engaging pupils in reading

### Interpreting the data: percentages in tables

The data in this section is derived from teacher reports. Reported percentages refer to pupils and can usually be interpreted as the percentage of pupils whose teachers reported a particular practice or circumstance.

Y6 pupils were sampled by class. The Y6 teacher questionnaire would, in most cases therefore, have been completed by the class teacher of the sampled class. However, in some cases, it might have been completed by different teachers who teach these pupils reading, mathematics and/or science separately.

This means that the teacher-derived data for reading, mathematics and science may differ slightly as the sample of teachers in each group is not necessarily the same or the distribution of pupils within the sample of teachers may differ by subject.

Table 5.9 shows the percentage of pupils in Northern Ireland and comparator countries whose teachers reported using the listed teaching practices in *Most (every or almost every lesson)*, *About Half*, or *Some* of their lessons, based on a scale. Countries are ranked in descending order of the percentage of pupils who were taught via these engaging teaching strategies in *Most* of their lessons. The scale was formed by collapsing teachers' responses to six questions relating to their use of the specified teaching practices. The six questions, and the resulting scale, can be seen in Table 5.9.

The average proportion of pupils whose teachers reported using these engaging teaching strategies in *Most* of their lessons was 71 per cent; the proportions ranged from 94 per cent in Romania to 23 per cent in Denmark.<sup>15</sup> In Northern Ireland this proportion was 78 per cent. Internationally, within countries, including within Northern Ireland, the relationship between teachers' reported use of engaging teaching practices and pupil achievement is unclear, based on the size of the standard errors.

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<sup>15</sup> See Exhibit 8.6 in the international PIRLS report

**Table 5.9 Teaching to engage pupils in learning to read**

Reported by Teachers

Students were scored according to their teachers' responses to how often they used each of six instructional practices on the *Engaging Students in Learning* scale. Students with teachers who used engagement practices in **Most Lessons** had a score on the scale of at least 9.1, which corresponds to their teachers using three of the six practices "every or almost every lesson" and using the other three in "about half the lessons," on average. Students with teachers who used engagement practices in **Some Lessons** had a score no higher than 5.9, which corresponds to their teachers using three of the six practices in "some lessons" and using the other three in "about half the lessons," on average. All other students had teachers who used engagement practices in **About Half the Lessons**.

Country	Most lessons		About Half the Lessons		Some Lessons		Average Scale Score
	Per cent of students	Average Achievement	Per cent of students	Average Achievement	Per cent of students	Average Achievement	
England	91 (2.2)	551 (3.0)	9 (2.2)	548 (11.5)	0 (0.2)	~ ~	10.5 (0.14)
Northern Ireland	r 78 (3.7)	559 (3.1)	21 (3.8)	565 (6.6)	1 (0.6)	~ ~	9.8 (0.13)
Australia	r 77 (3.3)	534 (3.0)	23 (3.3)	523 (4.7)	0 (0.2)	~ ~	10.0 (0.13)
Singapore	71 (2.4)	569 (4.2)	27 (2.4)	560 (6.3)	2 (0.8)	~ ~	10.0 (0.12)
Ireland, Rep. of	67 (3.2)	552 (2.8)	32 (3.2)	552 (4.6)	1 (0.5)	~ ~	9.8 (0.14)
New Zealand	66 (3.0)	537 (2.6)	34 (3.0)	527 (5.0)	0 (0.2)	~ ~	9.6 (0.09)
Hong Kong SAR	60 (4.6)	567 (3.4)	35 (4.7)	576 (4.5)	5 (1.9)	572 (15.1)	9.5 (0.19)
Finland	33 (3.2)	570 (2.9)	61 (3.2)	566 (2.3)	6 (1.4)	574 (7.0)	8.3 (0.11)
International Avg.	71 (0.5)	513 (0.5)	27 (0.5)	509 (1.1)	2 (0.1)	~ ~	

Centre point of scale set at 10.  
 ( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.  
 A tilde (~) indicates insufficient data to report achievement.  
 An "r" indicates data are available for at least 70% but less than 85% of the pupils.

**G15**

**How often do you do the following in teaching this class?**

Tick **one** circle for each row.

Every or almost every lesson  
 About half the lessons  
 Some lessons  
 Never

a) Summarise what pupils should have learned from the lesson ----- ○ — ○ — ○ — ○

b) Relate the lesson to pupils' daily lives ----- ○ — ○ — ○ — ○

c) Use questioning to elicit reasons and explanations ----- ○ — ○ — ○ — ○

d) Encourage all pupils to improve their performance --- ○ — ○ — ○ — ○

e) Praise pupils for good effort ----- ○ — ○ — ○ — ○

f) Bring interesting materials to class ----- ○ — ○ — ○ — ○

Source: Exhibit 8.6., international PIRLS report and adapted from the international version of the PIRLS and TIMSS 2011 Teacher Questionnaire<sup>16</sup>

16 <http://timssandpirls.bc.edu>

## 5.4.2 Engagement in mathematics

### Pupils' reported engagement in mathematics lessons

Pupil engagement was measured by pupils' responses to five statements about their mathematics lessons, and further details on these statements can be found in Table 5.10. The international analysis used responses to these statements to create the *Students Engaged in Mathematics Lessons* scale. Pupils were then categorised into three bands: *Engaged in Mathematics Lessons*, *Somewhat Engaged in Mathematics Lessons*, and *Not Engaged in Mathematics Lessons* (details of how pupils were assigned to each band are provided in Table 5.10).

Table 5.10 shows that in Northern Ireland, 39 per cent of pupils were classified as being *Engaged* in mathematics lessons, 53 per cent *Somewhat Engaged*, and a much smaller percentage of 8 per cent as *Not Engaged*. The Republic of Ireland was the comparator country with the largest percentage of pupils classified as *Engaged* in mathematics lessons, at 45 per cent. This was followed by Australia and England, each with 41 per cent of pupils being categorised at the high end of the scale. The comparator country with the fewest pupils in the high engagement category was Finland, at 21 per cent.

Looking across other TIMSS participants, there does not seem to be a consistent relationship between the countries with the highest levels of pupil engagement and the countries with the highest overall achievement scores; many of the highest performing countries had very low percentages of pupils classified as being engaged in mathematics lessons. This shows that having high overall performance in mathematics is not necessarily indicative of having a high level of reported pupil engagement.

The international averages indicate a trend: a higher level of engagement is associated with higher achievement. However, as with many of the variables regarding pupil attitudes, the data cannot identify the direction of causality: pupils who are good at mathematics may be more engaged in their lessons; alternatively, pupils who are engaged in their mathematics lessons may perform better at mathematics.

Although internationally the data suggests that there is an association between engagement and achievement that is likely to be significant, the apparent differences across the three categories in Northern Ireland are not likely to be significant.

**Table 5.10 Pupils engaged in mathematics lessons**

Reported by Students

Students were scored according to their degree of agreement with five statements on the *Engaged in Mathematics Lessons* scale. Students **Engaged** in mathematics lessons had a score on the scale of at least 10.2, which corresponds to their “agreeing a lot” with three of the five statements and “agreeing a little” with the other two, on average. Students who were **Not Engaged** had a score no higher than 7.4, which corresponds to their “disagreeing a little” with three of the five statements and “agreeing a little” with the other two, on average. All other pupils were **Somewhat Engaged** in mathematics lessons.

Country	Engaged		Somewhat Engaged		Not Engaged		Average Scale Score
	Per cent of students	Average Achievement	Per cent of students	Average Achievement	Per cent of students	Average Achievement	
Ireland, Rep. of	45 (1.3)	538 (3.6)	47 (1.1)	522 (3.3)	8 (0.6)	516 (5.0)	10.0 (0.06)
Australia	41 (1.2)	534 (3.1)	50 (1.1)	506 (3.8)	9 (0.5)	503 (5.3)	9.9 (0.05)
England	41 (1.6)	548 (4.8)	51 (1.4)	540 (3.7)	8 (0.6)	538 (7.7)	9.8 (0.06)
<b>Northern Ireland</b>	<b>39 (1.3)</b>	<b>574 (4.1)</b>	<b>53 (1.1)</b>	<b>558 (3.7)</b>	<b>8 (0.7)</b>	<b>545 (8.2)</b>	<b>9.8 (0.05)</b>
New Zealand	36 (1.0)	495 (3.1)	56 (0.9)	484 (3.0)	8 (0.4)	477 (6.1)	9.7 (0.04)
Singapore	36 (0.8)	626 (3.2)	51 (0.7)	598 (3.4)	13 (0.6)	587 (4.3)	9.6 (0.04)
Hong Kong SAR	33 (1.1)	618 (4.2)	52 (0.9)	595 (3.6)	15 (0.8)	590 (4.7)	9.5 (0.06)
Finland	21 (0.9)	559 (3.1)	59 (0.9)	545 (2.5)	21 (1.0)	536 (3.3)	8.8 (0.05)
<b>International Avg.</b>	<b>42 (0.2)</b>	<b>507 (0.5)</b>	<b>49 (0.2)</b>	<b>482 (0.5)</b>	<b>8 (0.1)</b>	<b>464 (1.0)</b>	

Centre point of scale set at 10.

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

**MS2**

**How much do you agree with these statements about your maths lessons?**

Tick **one** box for each row.

	Agree a lot	Agree a little	Disagree a little	Disagree a lot
a) I know what my teacher expects me to do .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) I think of things not related to the lesson* .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c) My teacher is easy to understand	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d) I am interested in what my teacher says .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e) My teacher gives me interesting things to do .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

\* Reverse coded

Source: Exhibit 8.17, international mathematics report and adapted from the international version of the PIRLS and TIMSS 2011 Student Questionnaire <sup>17</sup>

17 <http://timssandpirls.bc.edu>

## Teachers' reported approaches to engaging pupils in mathematics lessons

For this scale measure, pupils were scored according to their teachers' responses to how often they used each of six instructional practices in their lessons. Table 5.11 provides further information on the statements to which teachers responded, and how the bands were categorised.

Table 5.11 presents the data for Northern Ireland. It shows that the majority of pupils (80 per cent) were taught by teachers who were categorised as using the listed engagement practices in *Most Lessons*; among this group the average achievement score in Y6 mathematics was 560.

Among the comparator countries, Northern Ireland had a relatively high percentage of pupils taught mathematics by teachers who were categorised as using engagement practices in *Most Lessons*, with only England reporting a slightly higher percentage at 86 per cent.

Several high-performing countries had small percentages of pupils taught by teachers who used the engagement practices in most lessons.

While there is an international association between frequency of using the listed engagement practices and pupil achievement, the apparent difference in Northern Ireland is not likely to be significant.



### 5.4.3 Engagement in science

#### Pupils' reported engagement in science lessons

Pupil engagement was measured by pupils' responses to five statements about their science lessons. Based on their responses, pupils were categorised into three bands: *Engaged in Science Lessons*, *Somewhat Engaged in Science Lessons*, and *Not Engaged in Science Lessons*. Details on these statements and how pupils were assigned to each band are provided in Table 5.12.

As seen in Table 5.12, 44 per cent of pupils in Northern Ireland were categorised as being *Engaged* in science lessons, 49 per cent as *Somewhat Engaged*, and a minority (8 per cent) as *Not Engaged*.

Among the group of comparator countries, the Republic of Ireland had the largest percentage of pupils classified as *Engaged* in science lessons, at 51 per cent. This was followed by Australia, with 46 per cent of pupils categorised at the high end of the scale. England had the same percentage of pupils in this high engagement category as Northern Ireland at 44 per cent. The comparator country with the fewest pupils in the high engagement category was Finland, at 23 per cent.

Looking across other TIMSS participants, there does not seem to be a consistent relationship between the countries with the highest levels of pupil engagement and the countries with the highest overall achievement scores; several of the highest performing countries had lower percentages of pupils classified as being engaged in science lessons. This shows that having high overall performance in science is not necessarily indicative of having a high level of reported pupil engagement.

The international averages indicate a trend: a higher level of engagement is associated with higher achievement. However, as with many of the variables regarding pupil attitudes, the data cannot identify the direction of causality: pupils who are good at science may be more engaged in their lessons; alternatively, pupils who are engaged in their science lessons may perform better at science.

Although internationally the data suggests that there is an association between engagement and achievement that is likely to be significant, it is not clear whether the same applies in Northern Ireland.<sup>19</sup>

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<sup>19</sup> One of the apparent differences in Northern Ireland is likely to be borderline significant and would need to be tested statistically.



**Table 5.12 Pupils engaged in science lessons**

Reported by Students

Students were scored according to their degree of agreement with five statements on the *Engaged in Science Lessons* scale. Students **Engaged** in science lessons had a score on the scale of at least 10.1, which corresponds to their “agreeing a lot” with three of the five statements and “agreeing a little” with the other two, on average. Students who were **Not Engaged** had a score no higher than 7.4, which corresponds to their “disagreeing a little” with three of the five statements and “agreeing a little” with the other two, on average. All other students were **Somewhat Engaged** in science lessons.

Country	Engaged		Somewhat Engaged		Not Engaged		Average Scale Score
	Per cent of Students	Average Achievement	Per cent of Students	Average Achievement	Per cent of Students	Average Achievement	
Ireland, Rep. of	51 (1.3)	529 (3.5)	41 (1.0)	506 (4.2)	8 (0.7)	503 (6.3)	10.2 (0.06)
Australia	46 (1.0)	532 (2.9)	44 (0.9)	506 (3.4)	9 (0.6)	498 (6.9)	10.0 (0.05)
Northern Ireland	44 (1.4)	531 (3.3)	49 (1.2)	509 (3.6)	8 (0.7)	495 (7.0)	9.9 (0.05)
England	44 (1.2)	534 (4.1)	47 (1.1)	527 (3.2)	9 (0.7)	520 (5.6)	9.8 (0.05)
Singapore	40 (0.8)	604 (3.3)	49 (0.7)	572 (4.0)	11 (0.5)	567 (5.3)	9.7 (0.04)
New Zealand	39 (0.9)	511 (3.0)	51 (0.9)	490 (3.0)	10 (0.6)	488 (4.7)	9.7 (0.04)
Hong Kong SAR	34 (1.2)	550 (3.7)	50 (1.1)	527 (5.3)	16 (0.8)	528 (4.0)	9.4 (0.06)
Finland	23 (0.9)	578 (3.7)	57 (1.1)	571 (2.8)	20 (1.0)	565 (3.5)	8.8 (0.04)
International Avg.	45 (0.2)	504 (0.6)	47 (0.2)	476 (0.6)	8 (0.1)	457 (1.2)	

Centre point of scale set at 10.

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

**MS5**

**How much do you agree with these statements about your science lessons?**

Tick *one* box for each row.

	Agree a lot	Agree a little	Disagree a little	Disagree a lot
a) I know what my teacher expects me to do .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) I think of things not related to the lesson* .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c) My teacher is easy to understand	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d) I am interested in what my teacher says .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e) My teacher gives me interesting things to do .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f) My teacher is good at letting me know how my learning can be improved .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

\* Reverse coded

Source: Exhibit 8.17, international science report and adapted from the international version of the PIRLS and TIMSS 2011 Student Questionnaire <sup>20</sup>

20 <http://timssandpirls.bc.edu>

## Teachers' reported approaches to engaging pupils in science

For this scale, pupils were scored according to their teachers' responses to how often they used each of six instructional practices in their lessons. Table 5.13 provides further information on the statements to which teachers responded, and how the bands were categorised.

Within Northern Ireland, the majority of pupils (80 per cent) were taught by teachers who used the engagement practices in *Most Lessons*; among this group the average achievement score in Y6 science was 515 (see Table 5.13).

Northern Ireland has a relatively high percentage of pupils taught by teachers who were categorised as using engagement practices in most science lessons compared with the comparator countries, with only England reporting a higher percentage at 85 per cent.

Several high-performing countries had small percentages of pupils taught by teachers who used the engagement practices in most lessons.

While there is an international association between frequency of using the listed engagement practices and pupil achievement, the apparent differences in Northern Ireland are not likely to be significant.

**Table 5.13 Teaching to engage pupils in learning science**

*Reported by Teachers*

Students were scored according to their teachers' responses to how often they used each of six instructional practices on the *Engaging Students in Learning* scale. Students with teachers who used engagement practices in **Most Lessons** had a score on the scale of at least 9.1, which corresponds to their teachers using three of the six practices "every or almost every lesson" and using the other three in "about half the lessons," on average. Students with teachers who used engagement practices in **Some Lessons** had a score no higher than 6.0, which corresponds to their teachers using three of the six practices in "some lessons" and using the other three in "about half the lessons," on average. All other students had teachers who used engagement practices in **About Half the Lessons**.

Country	Most Lessons		About Half the Lessons		Some Lessons		Average Scale Score
	Per cent of Students	Average Achievement	Per cent of Students	Average Achievement	Per cent of Students	Average Achievement	
England	85 (3.1)	529 (3.6)	15 (3.1)	530 (8.9)	0 (0.0)	~ ~	10.3 (0.13)
Northern Ireland	r 80 (3.6)	515 (3.6)	19 (3.6)	525 (7.1)	1 (0.6)	~ ~	9.8 (0.12)
Australia	r 78 (3.4)	522 (3.6)	22 (3.4)	511 (7.3)	0 (0.2)	~ ~	10.1 (0.13)
Singapore	68 (2.5)	581 (4.6)	28 (2.8)	583 (6.6)	4 (1.1)	612 (11.3)	9.8 (0.12)
Ireland, Rep. of	68 (3.1)	513 (3.6)	31 (3.1)	522 (7.1)	1 (0.5)	~ ~	9.8 (0.12)
New Zealand	67 (3.1)	497 (3.5)	32 (3.0)	497 (4.1)	0 (0.4)	~ ~	9.7 (0.10)
Hong Kong SAR	62 (4.7)	538 (4.0)	35 (4.4)	527 (10.8)	3 (1.5)	552 (4.6)	9.3 (0.17)
Finland	33 (3.1)	576 (3.1)	61 (3.1)	567 (3.5)	5 (1.3)	576 (6.0)	8.4 (0.10)
International Avg.	71 (0.5)	487 (0.6)	27 (0.4)	484 (1.2)	2 (0.1)	~ ~	

Centre point of scale set at 10.

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

A tilde (~) indicates insufficient data to report achievement.

An "r" indicates data are available for at least 70% but less than 85% of the students.

G15

How often do you do the following in teaching this class?

Tick **one** circle for each row.

Every or almost every lesson  
About half the lessons  
Some lessons  
Never

a) Summarise what pupils should have learned from the lesson ----- ○ — ○ — ○ — ○

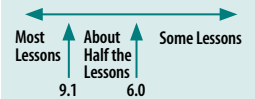
b) Relate the lesson to pupils' daily lives ----- ○ — ○ — ○ — ○

c) Use questioning to elicit reasons and explanations ----- ○ — ○ — ○ — ○

d) Encourage all pupils to improve their performance --- ○ — ○ — ○ — ○

e) Praise pupils for good effort ----- ○ — ○ — ○ — ○

f) Bring interesting materials to class ----- ○ — ○ — ○ — ○



Source: Exhibit 8.14, international science report and adapted from the international version of the PIRLS and TIMSS 2011 Teacher Questionnaire <sup>21</sup>

## 5.5 Conclusion

Overall, pupils in Northern Ireland who were classified in the *Like Reading* category had the highest average achievement in the subject. This association between liking the subject and achievement was also seen in mathematics and science. In mathematics and science, the pupils who were categorised as *Like Learning Mathematics / Like Learning Science* were also the pupils with the highest achievement in the subject.

The pupils who were classified as being *Confident* in reading, mathematics and science were also the pupils who had higher average achievement scores.

Internationally, in all three subjects there is an association between pupil engagement and achievement that is likely to be significant. However, the apparent achievement differences across the levels of engagement in Northern Ireland are not likely to be significant. This is true for reading and mathematics and may be borderline significant for science.

In Northern Ireland, a relatively high percentage of pupils across reading, mathematics and science were taught by teachers who were classified as using the listed engagement practices in *Most Lessons*.

<sup>21</sup> <http://timssandpirls.bc.edu>

In several cases, the highest-performing countries overall in reading, mathematics and science had a low percentage of pupils categorised as *Liking* each subject, being *Confident* in the subject and being *Engaged* in their lessons. This is evident in the data from the two highest achieving comparator countries, Hong Kong and Singapore, and is also the case for Northern Ireland.