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Chapter 2
Features of policy and provision

Mary Lewis and Peter Archer

Introduction

The focus in this chapter is on the structural characteristics of schools, and the wider educational context within which the teaching and learning of reading, mathematics and science takes place. Before drawing on data about these characteristics from PIRLS and TIMSS 2011 (PT 2011), it may be useful to make some very general observations about the history and nature of Irish education with a view to highlighting features of the Irish system that may seem unusual from an international perspective. One such feature is the relatively recent emphasis on the role of education in economic development. A second is the development of a multilateral negotiation process between the various education stakeholders that is bound, on one side, by a largely centralised educational administration and, on another, by a written Constitution that supports both the family as the primary educator and the right of every religious denomination to manage its own schools. A third feature of Irish education that is of interest in this context is the very significant involvement of denominational bodies (particularly the Roman Catholic Church) in the ownership and patronage of schools. Another aspect of Irish education that is often commented upon by international observers is the relatively large proportion of mostly rural primary schools that have fewer than 50 pupils and which tend to be under-represented in large-scale international studies, including PT 2011.

According to an official description of the Irish education system (Department of Education and Science, 2004), "education has always been highly valued in Ireland" (p.5). The authors of this description go on to note that before the establishment of a national system of primary education in 1831, "a vast network of schools existed" and that, even in "times of great political, economic and social difficulty" (p. 5), Irish people availed of opportunities for education wherever they arose. Irish education between the foundation of the State in 1922 and the 1960s has been characterised as being concerned with religious, moral and intellectual formation rather than with the preparation of young people for productive careers in an industrial economy (Tussing, 1978). That characterisation is supported by two reports by an independent body comprising leading figures in education (Council of Education, 1954; 1962). The second of these reports described the idea of expanding second-level education in order to promote economic development as "untenable, utopian, socially and pedagogically undesirable and economically impossible" *(*quoted in Ó Buachalla, 1988, p. 68).

Some significant changes in thinking about education in Ireland occurred in the 1960s, prompted probably, at least partly, by the publication of *Investment in Education* (1965). In particular, "the state's interest in education broadened (particularly to include economic considerations), its financial contribution to education increased, and it became committed to planning" (Kellaghan, 1989, p. 192). Similar changes in thinking occurred in many other countries, but at least a few decades earlier than was the case in Ireland (Barber, 1989; Coombs, 1985). O'Sullivan (2005), commenting on what had happened in Ireland, refers to a more substantial shift in the paradigm within which educational matters may be understood – from being theocentric (where, for example, enabling students to have a relationship with a God is one of the main functions of a school) to mercantile (where, for example, the market

economy is a major influence and accountability for state funding is required in educational management).

For the next 20 years, expansion (in the sense of promoting increased participation in second- and third-level education) became a major policy objective that was pursued with considerable success. By the late 1980s, the extent to which the needs of the economy were influencing education was being raised as a concern by a growing number of commentators (e.g., Brennan, 1991; Mulcahy, 1989; O'Sullivan, 1989) and concerns of this kind became a feature of a debate that occurred between the publication of a Green Paper (1992) and a White Paper (1995). This debate resulted, according to Coolahan (1994), in a new awareness of the legitimate plurality of educational purposes that encompassed both cultural values of education as well as those of enterprise and innovation "in a balanced and harmonious way" (p. 150).

O'Sullivan (2005) is dismissive of the idea that the shift in thinking that occurred after the Green Paper was significant and he argues that the mercantile paradigm remains dominant in the Irish education system as it does in many other education systems. Nevertheless, the mission statement of the Department of Education and Science (2004) and official documents, such as its Statement of Strategy 2011-2014, refer to the contribution of education and training not only to Ireland's economic progress but also to its civic and community development as well as to the promotion of culture and heritage. Furthermore, contributors to debates about policy issues in education (e.g., those on reform of junior cycle curriculum and on school patronage) frequently argue for a balanced approach to educational aims and philosophy. This is also, of course, a feature of debates about education in other countries and appears to be taking on an international dimension in initiatives such as the work of the Commission of the European Union on a Framework of Key Competences (Saavala, 2013) and the OECD Skills Strategy (OECD, 2012b).

Governance of Irish education can be difficult to explain to international audiences. Administration of the system is largely centralised in the sense that overall responsibility for most matters rests with the Minister for Education and Skills through the Department of Education and Skills and bodies under its aegis, such as the National Council for Curriculum and Assessment (NCCA). At the same time, there is scope for involvement from many different interest groups. Education policy making has always involved participation by stakeholders – or "partners", as they tend now to be termed – including teacher unions, management bodies, churches and organisations representing parents. Up to the late 1980s and early 1990s, involvement of partners tended to be achieved through bilateral negotiations held in private. Since then, a more inclusive multilateral approach has been in place with much of the interaction between partners taking place in public. For example, a National Education Convention was held in 1993 (Coolahan, 1994). Walshe (1999) states that "the Convention attracted significant interest abroad" (p. 37). A public consultation process was also held in 2004 (Kellaghan & McGee, 2005). Examples that were more specifically focussed include a forum of early childhood education in 1998 and a forum of patronage and pluralism in 2011.

Although the State pays the salaries of teachers in almost all first- and second-level schools, over 90% of primary and a sizeable majority of post-primary schools are privately owned denominational institutions. The number of schools that are fully private, in terms of their funding sources, is very small. The origins of the seemingly paradoxical combination of centralised policymaking and administration and the relatively large number of private schools may be found in the Irish Constitution (Bunreacht na hÉireann). Article 42 of the Constitution dealing with education begins by acknowledging that "the primary and natural educator of the child is the Family" and goes on to recognise the "inalienable right and duty of parents to provide, according to their means, for the religious and moral, intellectual,

physical and social education of their children". Although the Constitution precludes the State from obliging parents to send their children to schools established or designated by the State, it does include the following provision: "The State shall, however, as guardian of the common good, require in view of actual conditions that the children receive a certain minimum education, moral, intellectual and social". The Constitution also places an obligation on the State to provide for free primary education. Elsewhere, the Constitution guarantees the right of every religious denomination to manage its own affairs and recognises that these affairs include the ownership and management of schools.

Later in this chapter, some data from PIRLS and TIMSS relating to school size will be presented. However, it is important to note here that such surveys, which are designed to be representative of the population of pupils, tend to contain relatively few small schools (those with less than 50 pupils) – something which is at least partly dealt with by weighting (see Inset 1.1 in Chapter 1). In Ireland, compared to many other countries, a relatively large proportion of primary schools (19%) have an enrolment of less than 50 pupils (Department of Education and Skills Statistical Report for 2011/2012) while less than 30% have enrolments of more than 200 pupils. On the basis of a census of primary schools, 94% of these smaller schools are located in villages or open countryside (see Archer & Sofroniou, 2008).

School size, location and ethos may be considered as elements of the wider educational landscape that impact on teaching and learning. PT 2011 yielded a considerable amount of data on these and many other structural characteristics that shape the educational environment of Fourth class pupils in Ireland. The remainder of this chapter examines system-level and school-level features of policy and provision in a context that takes account of differences and similarities between Ireland and other countries that participated in PT 2011. Findings at system and school levels, particularly in respect of Fourth class pupils, in the 151 primary schools in Ireland that took part in PT 2011 are presented with reference to the international average for the relevant variable where appropriate. Some data are also presented for a set of key comparison countries (including top-performing countries, and other English-speaking countries). The data for both studies draw on two main types of publication. PIRLS data are drawn from the PIRLS encyclopedia (Mullis, Martin, Minnich, Drucker, & Ragan, 2012, Volumes I and II) and the report on the international reading results (Mullis, Martin, Foy, & Drucker, 2012). TIMSS data are drawn from the TIMSS encyclopedia (Mullis, Martin, Minnich, Stanco, et al., 2012, Volumes I and II) and the reports on the international results in mathematics (Mullis, Martin, Foy, & Arora, 2012) and in science (Martin, Mullis, Foy, & Stanco, 2012).

System-level characteristics

In this section, the focus is on system-level national policies, including compulsory schooling, school entry age and grade promotion, provision for parental involvement, and teacher qualifications and certification. A number of features of the official or intended curriculum in reading, mathematics and science are also examined.

Compulsory schooling

Schooling in Ireland is compulsory between the ages of six and 16 years, although 16- and 17-year-olds are required to remain in school until they have completed three years of post-primary education (Education (Welfare) Act, 2000). Children must be at least four years old when they start school. In 34 of the 50 countries that took part in TIMSS, attendance at school is compulsory from the age of six upwards. In a further five countries, children are required to attend school from the age of four (Northern Ireland) or five (England, Malta, the Netherlands, United Arab Emirates) while in Finland, Lithuania, Poland, Thailand and

Sweden compulsory schooling begins at seven years. Five countries had no national policy on school attendance age, while in the United States the policy varies by state.

In many countries that took part in TIMSS, the minimum school-leaving age is lower (16/50) or higher (12/50) than that in Ireland. In some, it is possible to leave school at 13 (Croatia), 14 (Korea, Turkey), or 15 years of age (e.g., Austria, Chinese Taipei, Hong Kong SAR, Slovenia and Thailand) but, in others, the minimum school-leaving age is 17 or even 18 years of age (e.g., Belgium, Germany, the Netherlands, Poland).

There are few differences between PIRLS and TIMSS participants with regard to policies on compulsory schooling. In 26 of the 45 countries that took part in PIRLS, compulsory schooling begins at six years of age while, in a further six countries, children must attend school from when they are seven years old. In the remaining eight countries for which information is available, children are required to attend school from the age of four (Northern Ireland) or five (e.g., England, the Netherlands). The minimum school-leaving age is 16 years in 21 of the countries that took part in PIRLS, but, as with TIMSS, ranges from 13 to 18 years.

Ireland is one of only six countries (along with England, Malta, Northern Ireland, New Zealand, and Trinidad and Tobago) that took part in PIRLS 2011 in which more than 90% of Fourth class pupils started school aged five years or younger. Of the Fourth grade pupils in all countries that took part in PIRLS, one-quarter (25%) began attending primary school when they were five years or younger, nearly half (48%) did so at six, while the remainder were seven years of age (26%) or older (1%).

Primary schools in Ireland are unusual in that they enrol large numbers of pupils who are younger than the compulsory age of attendance at six years. In effect, this means that nearly half of four-year-olds and almost all five-year-olds are enrolled in the Infant classes of primary schools. There is often confusion about whether pupils in Infant classes in Ireland should be classified as pre-primary (ISCED 0) or primary (ISCED 1)[1]. The Department of Education and Skills frequently uses the latter classification and most Irish people would consider pupils in Infants classes as attending primary school. However, in international contexts such as PIRLS and TIMSS, Infant classes are often classified as pre-primary. The manual for ISCED (OECD, 1999) partly adds to the confusion, as the table for Ireland includes eight grades under primary/ISCED 1, but also notes that "Programme is divided into two ISCED levels in the UOE [UNESCO/OECD/EUROSTAT] data collection. For UOE reporting, ISCED level 0 comprises the first two years of this programme" (p. 92). The main basis for the distinction is the length of the school day, which is shorter for Infants classes.

Grade promotion

Most countries taking part in PT 2011 had national or regional policies on grade promotion and retention. In Ireland, primary school pupils are automatically promoted from one grade to the next and are only allowed to repeat a year for educational reasons and in exceptional circumstances. A similar approach is found in the Nordic countries (Denmark, Finland, Norway, and Sweden) and in eight other countries including Australia, Chinese Taipei, Malta, and New Zealand. Elsewhere, grade promotion is determined by academic performance (e.g., France, Italy, the Netherlands, Czech Republic, Korea) or more commonly, by some

[1] ISCED, or the International Standard Classification of Education, is a multidimensional framework designed to facilitate international comparisons of educational statistics and to reflect educational pathways in the OECD indicators (OECD, 1999).

combination of automatic promotion in the early grades and academic performance in subsequent grades (e.g., Germany, Portugal, Russian Federation, Singapore). England, Japan and Lithuania are unusual in that they have no national policy on grade retention and promotion, while in Canada and the United States the policy varies across states.

The nature of parental involvement

This section relies on submissions from participating countries regarding their national policies to involve parents in school management. The submissions varied considerably and covered one or more of various strands reflecting different roles (e.g., participants in management, recipients of information about their own children's progress, providers of support for the work of the school, contributors to policy making). Such variation makes meaningful comparisons difficult, although some general points may be made.

Formal policies to involve parents in the education of their children and in the achievement of school objectives had been introduced in most countries that took part in PT 2011. In about half of countries across both studies, school governing bodies were mandated to include parents. Ireland did not explicitly include this in its submission, although parents are represented on boards of management in accordance with legislation. Additionally, in common with many other countries, parents are encouraged to form Parents' Associations or Parent Teacher Associations, the objective of which is to support schools by promoting parental involvement, organising and supervising events for students out of school, and engaging in fundraising activities. In Ireland's case, the Education Act (1998) requires schools to support the establishment of such associations and to give them a role in determining school policy. Most of Ireland's comparison countries, as identified in Chapter 1 of this volume (Eivers & Clerkin, 2013), have parent representatives on school boards of management – this is the case in Australia, England, New Zealand, Northern Ireland, Hong Kong SAR and the Russian Federation. In Finland, schools are required by law to communicate frequently with parents about pupil progress and behaviour. This practice was included also in the submissions of a number of other countries including Australia, Ireland, Denmark, New Zealand, Northern Ireland, Slovenia, the Slovak Republic and Sweden. In the United States, the emphasis is more on encouraging parent involvement, and while there is support in many federal programmes for parents to participate in the education of their children, these programmes "do not apply to all schools and students" (Mullis, Martin, Minnich & Drucker, 2012, p. 22).

Ireland is one of very few countries that mentioned enhanced parental involvement through an initiative such as the Home/School/Community Liaison scheme as part of its strategy to combat educational disadvantage. However, given the centrality of parent involvement in successful initiatives to address disadvantage (e.g., Slavin & Madden, 2003), it is likely that many countries have a similar approach (Archer & Weir, 2005; Henderson, 2002).

Teacher qualification and certification

In Ireland, initial teacher education is undergoing change. At the time that PT 2011 was being administered, qualification as a primary teacher was through one of two possible routes:

- Concurrent model: Completion of a three-year B. Ed. programme, or
- Consecutive model: Those who have already completed a basic degree complete an eighteen-month post-graduate diploma in education.

Since September 2012, the concurrent model has changed to a four-year degree programme, while post-graduate programmes will be extended to two years with effect from September 2014.

Although the precise nature of teacher qualification (e.g., degree or diploma) was not specified for a few participating countries, it is clear that for the majority, a three-year or four-year degree through a university or teacher college was the most common teacher preparation route. In PIRLS, at least 33 countries indicated that such a qualification was the main teacher preparation route, with a further five countries (Finland, Croatia, Czech Republic, Slovak Republic and France) reporting that a masters' degree was required. In TIMSS, 40 countries required a degree and four of the five just listed – France did not participate in TIMSS – required completion of a masters' degree. High-performing Singapore was one of the few countries not to require prospective primary teachers to hold a degree – routes to teaching include two- and four-year diploma courses, and courses that attract mid-career professionals to teaching. Those examples aside, the majority of Singaporean teachers are university graduates.

As well as a basic degree, many countries had additional certification requirements for newly-qualified teachers, as summarised in Table 2.1. For example, Irish teachers are required to undertake a supervised practicum, pass a qualifying examination and complete a probationary period in order to be certified as a primary teacher. Since 2012, all newly-qualified teachers in Ireland must also participate in the National Induction Programme for Teachers. However, at the time of participation in PT 2011, Ireland was one of slightly more than half of countries where mentoring/induction programmes were *not* a compulsory feature of teacher qualification (Table 2.1).

A large majority of countries that took part in PIRLS and/or TIMSS required newly-qualified teachers to undertake a supervised practicum, while passing a qualifying examination to become a teacher was a requirement in most PIRLS and TIMSS countries. However, 28% of TIMSS participants (or 14 countries) – including Australia, Finland, and New Zealand – did not require new teachers to pass a qualifying examination. A probationary period was a requirement in Ireland and in approximately half of countries in each of the PIRLS and TIMSS studies.

Table 2.1: Qualification and certification requirements for primary teachers, Ireland and all PIRLS and TIMSS countries

	Supervised practicum	Qualifying exam	Probationary period	Mentoring / induction
Ireland	Yes	Yes	Yes	No*
% of all countries requiring				
PIRLS (N=45)	91	80	49	42
TIMSS (N=50)	88	72	52	46

* Participation in an induction programme was not a requirement at the time PT 2011 was administered.

The relationship between the national requirements for teacher certification and performance on PIRLS and TIMSS is not straightforward. Some of the highest performing countries (e.g., Singapore and Japan) required teachers to complete all four components shown in the table while other high-performing countries (Finland, Chinese Taipei and Hong Kong SAR) required no more than two of the four. Overall, slightly less than half of countries reported that a mentoring or induction programme was mandatory. This requirement was part of the teacher qualification route in a number of top-performing countries, however. Three of the top five performers in reading (Russian Federation, Singapore, and Northern Ireland) and in mathematics (Singapore, Korea and Japan) had a

mentoring programme, in addition to four of the top five performers in science (Korea, Singapore, Japan and Russian Federation).

Curriculum

Ireland is one of a large majority of countries taking part in PT 2011 that reported having a nationally defined curriculum for both pre-primary and primary education. Pre-primary education was available in all participating countries, but mandatory in only ten countries across the two studies (Austria, Bulgaria, Colombia, Denmark, Hungary, Israel, Kazakhstan, the Netherlands, Poland, and Serbia). Among PIRLS participants, 30 of the 45 participating countries had a national pre-primary curriculum while three had regional (state/provincial) curricula. Of the countries with a national curriculum, 25 included language, reading and writing skills in the curriculum. For TIMSS, 35 of 50 countries had a nationally defined pre-primary curriculum, while two had regional curricula. Amongst those 35 countries, only one (Poland) did not have both science and mathematics included in the national pre-primary curriculum.

Almost every country that took part in PT 2011 had a national primary curriculum covering, among other topics, reading, mathematics and science. Partial exceptions included Qatar (in the case of reading) and Iran (mathematics), where ministry guidelines rather than a national curriculum informed instruction. Also, some countries (e.g., Denmark, Germany and the United States) had regional or federal curricula, but these "local" curricula were typically linked to national standards.

The primary curriculum in Ireland was published in 1999 and introduced to schools on a phased basis over a number of years, beginning with English in 2000. For each of reading, mathematics and science, more than half of countries reported that the curriculum in their country was currently under revision. In Ireland, the reading curriculum is currently under revision, while the mathematics and science curricula are not. This is despite the fact that most countries introduced their reading, mathematics and science curricula more recently than in Ireland. For example, only eight PIRLS countries had a national reading curriculum that pre-dates Ireland's. Among Ireland's comparison countries, only England's reading and mathematics curricula pre-date those in Ireland, while only England and Hong Kong have science curricula that pre-date the science curriculum in Ireland (Table 2.2).

Table 2.2: Reading, mathematics and science curricula by year of introduction, Ireland and comparison countries

	Reading	Mathematics	Science
Australia	varies by state	varies by state	varies by state
England	1999*	1999*	1999*
Finland	2004	2004	2004
Hong Kong SAR	2004	2002	2002
Ireland	2000*	2002	2003
Korea, Rep.**	–	2007*	2007*
New Zealand	2010	2010	2010
Northern Ireland	2008	2007	2007
Russian Federation	2004*	2004*	2004*
Singapore	2003*	2007*	2008*
United States	varies by state	varies by state	varies by state

*under revision.

** Korea did not participate in PIRLS.

There is a written curriculum for Fourth grade reading in all PIRLS countries and for Fourth grade mathematics and science in all countries that took part in TIMSS. In at least two-thirds of countries in each of the studies, but not in Ireland, the curriculum is accompanied by Ministry notes and directives (Table 2.3). A mathematics and science instructional guide is available in about the same proportion of TIMSS countries, while a reading instructional guide is available in just 60% of the countries that took part in PIRLS. Mandated textbooks had been introduced in slightly more than half of countries across both studies, but are not a feature of reading, mathematics and science curricula in English-speaking countries with the exception of the United States. Top-performing Korea, Hong Kong and Singapore all have mandated textbooks and, in addition, recommend specifically developed instructional activities as part of their curricula in each of the measured domains. Recommended instructional activities are also common in English-speaking countries, but have not been introduced in Ireland or Northern Ireland.

Table 2.3: Format in which reading, mathematics and science curricula are made available in Ireland, and percentage of PIRLS and TIMSS countries indicating format is available

	Reading		Mathematics		Science	
	IRL	PIRLS (N=45)	IRL	TIMSS (N=50)	IRL	TIMSS (N=50)
Ministry notes and directives	No	71%	No	68%	No	66%
Instructional guide	Yes	60%	Yes	70%	Yes	66%
Mandated textbooks	No	51%	No	56%	No	54%
Recommended activities	No	42%	No	48%	No	50%

In all countries that took part in PT 2011, curricular goals and objectives for reading, mathematics and science were specified for Fourth grade pupils. Additionally, in Ireland, there are prescribed methods of instruction and assessment standards for reading, mathematics and science. Both these aspects of instruction were prescribed for mathematics and science in more than half of TIMSS countries (56%). For reading, just over half of PIRLS participants (51%) had prescribed methods of instruction while a greater majority (64%) had prescribed assessment standards. Fewer countries (one-third of countries for reading, and about four-in-ten for mathematics and science) had prescribed instructional materials.

Among Ireland's comparison countries, only Korea, Hong Kong and Singapore had prescribed instructional materials. In Northern Ireland and in New Zealand, none of these aspects of instruction were prescribed while in Australia, England and the United States only the reading curriculum had prescribed assessment standards. Finland (also with prescribed assessment standards only for reading) and the Russian Federation (which does not prescribe any of these aspects of instruction) are similar to the English-speaking comparison countries in this regard. Their approach is very different from that of the highly prescriptive curriculum that is characteristic of Korea, Hong Kong and Singapore, and of Ireland to a lesser extent.

Curriculum: Official time allocation

Primary schools in Ireland are open for 183 days each year, and provide about 4.7 hours of daily instruction (i.e., excluding time for breaks and roll call). Irish Fourth class pupils receive, on average, 854 instructional hours per year – over 40 hours less than the international PIRLS and TIMSS averages (905 hours and 897 hours, respectively). However, there is not a clear relationship between total instruction time and performance on PIRLS and TIMSS. Among high-performing countries, for example in Singapore and Hong Kong,

pupils receive over 1000 hours instruction time per annum, while pupils in Korea and Finland receive less than 800 hours.

Ireland is among more than two-thirds of PIRLS participants (69%) and three-quarters of TIMSS participants (76%) that had national policies allocating instructional time to Fourth grade reading, mathematics and science. Most reported allocating more time to language and/or reading (20-40%) than to mathematics (13-22%) or science (7-13%). In Ireland, the percentage of time that is officially allocated to these aspects of the curriculum, though consistent with the trend described, is relatively low. However, Irish primary schools also have two hours per week of "discretionary curriculum time", some of which may be allocated to reading, mathematics or science.

Reading, on which Ireland performed very well on the PIRLS assessment (only five countries did significantly better), is allocated nearly one-fifth (18%) of instructional time. The share of time that is officially allocated to mathematics is 13%. Fourth class pupils in Ireland were significantly outperformed by their peers in 13 countries in mathematics, while in science, which is allocated only 4% of time, they were significantly outperformed by pupils in 17 countries. As shown in Table 2.4, most of the comparison countries have policies that either vary by state (Australia and United States) or that do not specify the amount of time to be allocated to reading, mathematics and science (Northern Ireland, England, New Zealand and Finland). In respect of those top-performing countries that do officially allocate time, it is clear that all three of the assessed curriculum domains attract a considerably greater share of available instructional time than is allocated in Ireland. This pattern is also evident in the data for nearly all participating countries in PIRLS and TIMSS. For example, only Austria, at 2-3%, officially allocated less time to science instruction than Ireland.

The OECD's annual publication, Education at a Glance, contains data on intended instruction time per subject as a percentage of total compulsory instruction time, for all OECD countries (OECD, 2012a). The data for the 9-11-year-olds (i.e., the same age group as in PT 2011) show that the official time allocations for reading, mathematics and science are similar to those found in PT 2011. Ireland is also very close to the OECD and EU averages for time allocated to social studies and to arts. However, Ireland allocated 10% of compulsory instruction time to religion, considerably higher than the OECD average of 4%, and exceeded only by Israel. In contrast, Ireland allocated 4% of compulsory time to physical education, less than half the OECD average of 9%, and lower than in any other country.

Table 2.4: Percentage of curricular time intended for reading, mathematics and science instruction, Ireland and comparison countries (official allocation)

	Reading	Mathematics	Science
Australia	Varies by state	Varies by state	Varies by state
England	Not specified	Not specified	Not specified
Finland	Not specified	Not specified	Not specified
Hong Kong SAR	18	12-15	12-15
Ireland	18	13	4
Korea, Rep. *	–	14	10
New Zealand	Not specified	Not specified	Not specified
Northern Ireland	Not specified	Not specified	Not specified
Russian Fed.	36	16	6
Singapore	33	22	8
United States	Varies by state	Varies by state	Varies by state

* Korea did not participate in PIRLS.

School-level characteristics

In this section, school-level features of provision are considered. There are three main focus points: implementation of the curriculum, some demographic characteristics of schools, and availability of key instructional resources.

Curriculum: Instructional time

The amount of time devoted to various aspects of the curriculum in the classroom may be different from that which is prescribed in national policies. Data from PT 2011 allows some exploration of the relationship between curriculum practice and policy in relation to reading, mathematics and science.

The amount of instructional time devoted to a subject is a function of the total amount of instructional time and the percentage of that total time devoted to a particular subject. Class teachers were asked how much time per week they spent on each of reading, mathematics and science. This, multiplied by the number of weeks in the school year, was used to calculate national total instructional hours per year for each of the three domains. The information supplied by class teachers indicates that Irish pupils spent slightly more time than the PIRLS average in reading lessons, slightly less than the TIMSS average in mathematics lessons, and considerably less time than the TIMSS average in science lessons (Table 2.5).

Table 2.5: Hours of instructional time per year spent on reading, mathematics and science, Ireland and comparison countries (teacher reports)

	Reading (cross-curricular)	Mathematics	Science
Australia	197	230	65
England	123	188	76
Finland	99	139	98
Hong Kong SAR	102	158	88
Ireland	159	150	63
Korea, Rep.*	–	121	92
New Zealand	220	168	52
Northern Ireland	155	232	72
Russian Federation	130	104	49
Singapore	127	208	96
United States	246	206	105
PIRLS	146	–	–
TIMSS	–	162	85

* Korea did not participate in PIRLS.

Irish Fourth class pupils have 150 hours of mathematics instruction per annum, (TIMSS average: 162 hours) and an average of 63 hours per year of science lessons (TIMSS average: 85 hours). Only for cross-curricular reading instruction does the amount of time in Ireland (159 hours) exceed the study average (146 hours). Expressed as percentages of the international averages, cross-curricular reading in Ireland is given 109% of the PIRLS average time, mathematics receives 93% of the TIMSS average time, and the time given to science teaching in Ireland is only 74% of the TIMSS average.

Among Ireland's comparison countries, only three (United States, New Zealand and Australia) allocated more time to reading instruction in practice. Only three countries spend less time on mathematics instruction (Finland, Korea and Russian Federation) while only two

spend less time than Ireland on science (New Zealand and Russian Federation). At 232 hours per annum, Northern Ireland spends most time on mathematics instruction – 82 hours more per annum than is spent on mathematics in Ireland, and 143% of the TIMSS average. For science, there is less variation between countries in the amount of instructional time allocated, with most countries spending far less time on science than on mathematics. The United States spends most time at science (105 hours annually) followed closely by the three top performers in this domain, Korea (92 hours), Singapore (96 hours), and Finland (98 hours). Japan, in fourth place, devotes 91 hours per annum to science.

The position of Ireland, in terms of the percentage of instructional hours per year allocated to reading, mathematics, and science in the classroom, relative to the comparison countries, is clearly shown in Table 2.6. Very broadly, the data highlight the relatively greater share of instructional time that is devoted to reading in Ireland. The table also shows that science is allocated relatively little time, as in most of Ireland's comparison countries. The share of time allocated to mathematics in Ireland is average, both by international standards and relative to the selected comparison countries. (Where Ireland's position relative to other countries differs slightly in Tables 2.5 and 2.6, this is because absolute values [number of hours] are shown in Table 2.5, while Table 2.6 is based on percentages of total hours).

Table 2.6: Percentage of instructional hours per year spent on reading, mathematics and science, Ireland and comparison countries (teacher reports)

	Reading (cross-curricular)	Mathematics	Science
Australia	20	23	6
England	12	19	8
Finland	13	18	13
Hong Kong SAR	10	15	8
Ireland	19	18	7
Korea, Rep.*	–	15	12
New Zealand	24	18	6
Northern Ireland	16	24	7
Russian Fed.	20	16	7
Singapore	13	21	10
United States	23	19	10
PIRLS	16	–	–
TIMSS	–	18	10

* Korea did not participate in PIRLS.

A comparison of the percentage of curriculum time that is officially allocated to reading, mathematics and science with the actual number of hours devoted to each of these domains by class teachers shows some discrepancy between the two. In particular, the trend described in the previous section in relation to official policies, whereby proportionately more time is reported to be allocated to reading than to mathematics or science, is not supported by the teacher reports described in this section[2]. As shown in Table 2.5, the average annual instructional hours devoted to mathematics in the classroom internationally

[2] Some of the discrepancy may be attributable to differently phrased questions. The National Curriculum Questionnaire asked about "language/reading instruction" while the Teacher Questionnaire asked about "English [or test language] instruction and/or activities".

(among all TIMSS countries) exceeds the number of hours given to reading (among all PIRLS countries). In several of Ireland's comparison countries (Australia, England, Finland, Hong Kong, Northern Ireland and Singapore), teachers reported spending more time on mathematics than on reading.

Evaluating curriculum implementation

Visits by inspectors, research programmes, school self-evaluation and national or regional assessments are all methods used by PIRLS and TIMSS participating countries to evaluate implementation of Fourth grade reading, mathematics and science curricula. School self-evaluation was the most commonly used method in all three curriculum domains (Table 2.7). More than 80% of countries reported using this method for reading, mathematics, and science. Inspector visits (particularly for mathematics and science) and national or regional assessments (more so for reading and mathematics) were also widely used. Research programmes, used to a lesser extent, were, nonetheless, part of curriculum evaluation in more than half of countries across both studies.

Table 2.7: Methods used to evaluate curriculum implementation, Ireland and all PIRLS and TIMSS countries

	Reading		Mathematics		Science	
	IRL	PIRLS (N=45)	IRL	TIMSS (N=50)	IRL	TIMSS (N=50)
Inspector visits	Yes	69%	Yes	78%	Yes	78%
Research programmes	Yes	56%	Yes	58%	No	54%
School self-evaluation	Yes	84%	Yes	82%	No	82%
National/ regional assessments	Yes	78%	Yes	76%	No	56%

Of the 45 countries that took part in PIRLS, 10 (including Ireland, Northern Ireland, United States, Hong Kong and the Russian Federation) reported using all four methods to evaluate implementation of the reading curriculum. Twelve TIMSS countries (including our comparison countries of Northern Ireland, United States, Korea and the Russian Federation) used all four methods to evaluate mathematics and science curricula. Ireland reported using all four methods to evaluate mathematics, but relied on inspector visits only for evaluation of the science curriculum.

Population, school size, and size of Fourth grade classes

At 65 people per square kilometre, Ireland has a lower population density than many of the countries that took part in PT 2011. Only 15 other countries in PIRLS, and 16 in TIMSS, had lower population densities. The variation that exists among countries in this regard is shown in Table 2.8, where the population density values per square kilometre for Ireland's comparison countries range from as low as three in Australia to as high as 7,125 in Singapore.

The population distribution in Ireland is also different to that in most other participating countries. According to data obtained from principals, nearly twice as many Fourth grade pupils in Ireland (36%) as internationally (19%) were living in areas with 3,000 people or fewer. Using a textual definition that classified school locations on an urban-rural continuum, a sizeable percentage of Irish Fourth class pupils (18%) was categorised as attending schools in "remote rural" areas, compared to international averages of 9% for PIRLS and 10% for TIMSS. While, internationally, pupils attending schools in more populated urban centres had higher average achievement in reading, mathematics and science

than their counterparts in schools located in smaller rural areas, the opposite is true for Ireland.

Table 2.8: Average school size, population density, class size and school-level PTR, Ireland and comparison countries

	Mean school size	Pop. density (per sq. km)	PTR*	Mean class size#
Australia	488	3	–	26
England	340	398	23	27
Finland	295	18	14	21
Hong Kong SAR	773	6,721	16	33
Ireland	279	65	16	26
Korea, Rep.	1,002	503	24	30
New Zealand	354	16	15	27
Northern Ireland	288	133	20	24
Russian Fed.	630	9	17	22
Singapore	1,645	7,125	19	37
United States	555	34	14	24
PIRLS	529	–	–	24
TIMSS	583	–	–	25

*PTR is the number of pupils enrolled in primary school divided by the number of primary school teachers, nationally.
Class size is the average class size (reported by teachers) for Fourth grade pupils who took part in PT 2011.

Across all countries participating in PIRLS and TIMSS, average school size varied from 177 in Austria to 1,645 in Singapore. The average size of primary schools in Ireland was 279 pupils, much smaller than the PIRLS (529) and TIMSS (583) international averages. Contributing to the relatively small average school size in Ireland is the fact that almost one-fifth of primary schools here have less than 50 pupils which, as noted in the introduction, is a relative rarity by international standards. Broadly, average school size tends to be larger in countries with high population densities. However, as shown in Table 2.8, all six of Ireland's comparison countries with lower population densities had a larger average school size than Ireland.

In PT 2011, a measure of pupil-teacher ratio (PTR) was used that is based not on the numbers of pupils in classrooms, as is usually the case, but on the total number of primary school pupils in a country divided by the total number of primary school teachers. A PTR of 16:1 was calculated for Ireland. This is in the average range for participants in both studies (minimum and maximum values are 9 and 29 for PIRLS, and 9 and 27 for TIMSS) and is somewhat lower than the PTR in Northern Ireland (20:1) and England (23:1), as shown in Table 2.8.

Fourth classes in Ireland contained, on average, 26 pupils, similar to both the PIRLS international average (24) and the TIMSS international average (25). There are some differences in class size among the top performers in reading, mathematics, and science. Compared to Ireland, the average number of pupils in Fourth grade classes is smaller in Finland (21) and the Russian Federation (22), but larger in Korea (30) and Hong Kong (33). Singapore has an average class size of 37 for its Fourth grade pupils, the largest among PIRLS participants. Among TIMSS participants, Singapore is second only to Yemen, which has an average of 48 pupils in Fourth grade classes. Azerbaijan, with a reported class size of 18, has, on average, the smallest number of pupils in Fourth grade classes among participants across both studies.

Computer and science laboratory availability

There is considerable variation among the countries that took part in PT 2011 in the extent to which Fourth grade pupils were reported as having computers for instructional purposes in their schools (Table 2.9). Ireland, with 35% of Fourth class pupils in schools with one computer for every 1-2 pupils, is somewhat below both the PIRLS international average (41%), and the TIMSS international average (38%). Ireland is poorly placed also relative to most of its comparison countries, including Northern Ireland, where a very high proportion of Fourth grade pupils (77%) were in schools with one computer for every l-2 pupils.

Of all participants in both TIMSS and PIRLS, England had the best computer-to-pupil ratio (90% of Fourth grade pupils were in schools with one computer for every 1-2 pupils), followed by the Slovak Republic with 81% of pupils in such schools. Among countries that participated in TIMSS, the poorest ratios were reported for Iran, Tunisia, and Yemen, with 7% of pupils or fewer in schools with this level of computer availability. Among PIRLS countries, Austria, Croatia and Morocco had the lowest computer-to-pupil ratios with 11-12% of pupils in schools with a computer for every 1-2 pupils. A relatively small proportion of Fourth grade pupils were in schools that had no computers for instruction (8% for TIMSS, and 7% for PIRLS). For those pupils, compared to all other groups of pupils in schools with varying computer-to-pupil ratios, there was a notably lower level of average achievement.

Countries participating in TIMSS also varied greatly in the extent to which Fourth grade pupils had access to a science laboratory. On average, internationally, more than one-third of Fourth grade pupils (36%) attended schools with a science laboratory. Provision was best in Korea, Kuwait, Singapore and Japan, with practically all Fourth grade pupils in these countries attending schools that had a science laboratory. In most European countries, however, fewer than one-in-five pupils had access to a science library, a situation that may reflect school size as well as variations in practice. Only in three countries (Ireland, Northern Ireland and Lithuania) did no pupils have access to a science laboratory in their schools. As shown in Table 2.9, provision was also somewhat limited in Ireland's comparison countries, apart from Singapore, Korea and, to a lesser extent, Hong Kong. Broadly, pupils in countries where school size was larger than average were more likely to have a computer laboratory in their school. For example, eight of the 10 countries with best provision had school sizes above the TIMSS average size. Pupils in schools that had a science laboratory had slightly higher average achievement in science than those attending schools without a science laboratory.

Table 2.9: Percentages of Fourth grade pupils having access to computers and science laboratory, Ireland and comparison countries

	One computer per 1-2 pupils	Science laboratory
Australia	65	13
England	90	9
Finland	55	16
Hong Kong SAR	56	37
Ireland	35	0
Korea, Rep.	22	100
New Zealand	70	5
Northern Ireland	77	0
Russian Fed.	28	23
Singapore	51	100
United States	65	25

Library resources

School and class libraries can provide an additional source of reading material to support the efforts of teachers and enhance pupils' learning experiences. Among the countries that participated in PT 2011, just 13% of Fourth grade pupils, on average, attended schools that had no school library. The countries with the highest percentages of Fourth grade pupils in schools without a school library were, for PIRLS, Morocco (67%), Ireland (48%) and Colombia (36%). For TIMSS, the highest percentages were found in Yemen (77%), Morocco (70%), and Flemish-speaking Belgium (60%). Among Ireland's comparison countries (Table 2.10), those with the smallest average school size – Ireland, Northern Ireland and Finland – also had the highest percentages of Fourth grade pupils attending schools that had no school library. In all other comparison countries, a school library was available to practically all Fourth grade pupils.

On average, nearly one-third (32%) of Fourth grade pupils in TIMSS attended schools that had school libraries with more than 5000 book titles. The corresponding PIRLS international average was slightly smaller, at 27% (Table 2.10). Apart from England, Finland, Ireland, and Northern Ireland, all of the countries shown in Table 2.10 exceeded both international averages by a considerable amount. The countries with the largest average school size (Singapore and Hong Kong) had the highest percentages of pupils with access to school libraries with more than 5000 books. Data for TIMSS show that the same is true of Korea, in which 92% of pupils were in schools that had a well-resourced school library. Average achievement in reading, mathematics, and science was positively associated with size of school library, with pupils in schools with well-resourced libraries having the highest achievement.

Table 2.10: Percentages of Fourth grade pupils having access to school and class libraries, Ireland and comparison countries [#]

	School-level			Class-level		
	Mean school size	No school library	5000+ books	Mean class size	No class library	50+ books
Australia	488	1	54	26	9	48
England	340	7	10	27	13	70
Finland	295	21	4	21	49	22
Hong Kong SAR	773	0	79	33	5	75
Ireland	279	48	7	26	2	87
Korea, Rep.*	1,002	1	92	30	–	–
New Zealand	354	0	45	27	1	29
Northern Ireland	288	31	3	24	3	89
Russian Fed.	630	1	63	22	23	36
Singapore	1,645	0	77	37	8	44
United States	555	1	62	24	1	92
PIRLS	529	13	27	24	28	32

[#]Only PIRLS data are presented since there is little difference between values for PIRLS and TIMSS at school level, and no class-level data are available for TIMSS.

*Korea did not participate in PIRLS; school-level data are sourced from TIMSS.

Information was provided also on the existence and size of classroom libraries. Internationally, 28% of Fourth grade pupils had no classroom library, and their average reading achievement was slightly below that of pupils who had a classroom library. Morocco (70%), Colombia (63%), and Denmark (62%) had the highest percentages of Fourth grade

pupils in schools with no classroom library. In nearly half (47%) of PIRLS countries, less than 25% of pupils had no classroom library.

Among Ireland's comparison countries (Table 2.10), there is considerable variation with practically all Fourth grade pupils in the United States, New Zealand and Northern Ireland – as well as Ireland itself – having a classroom library, and a relatively large percentage of pupils in Finland (49%) not having one. In the United States, England, Australia, New Zealand, Singapore and Hong Kong, large percentages of pupils had access to both classroom and school libraries. In Ireland and Northern Ireland, classroom libraries are much more common than school libraries and in the Russian Federation there is greater availability of school libraries than classroom libraries.

On average, nearly one-third (32%) of Fourth grade pupils internationally attended schools with classroom libraries that had more than 50 book titles. The percentage of pupils with access to at least 50 books was nearly three times greater than the international average in the United States (92%), Northern Ireland (89%) and Ireland (87%). Finland and the Russian Federation, with the smallest average class sizes, also had the smallest percentages of pupils with access to more than 50 books in a classroom library. Overall, however, there was no clear relationship between average class size and size of classroom library.

Conclusion

Features of the educational system that shape and define the learning and teaching environment of Fourth class pupils in Ireland have been the main theme of this chapter. Historically-important influences were discussed in the introduction, which drew attention to the relatively late shift in the dominant educational ideology towards an awareness of the role of education in economic development, the mainly centralised educational administration that is both informed and constrained by a diversity of stakeholders and interest groups, and the disproportionately large number of small rural schools that evolved in a country of low population density. National policies in education were then reviewed, drawing on data obtained in PT 2011. Implementation of some of these policies at school level was examined subsequently, as well as aspects of the school environment relevant to the experiences of Fourth class pupils. The overall purpose of these analyses was to compare policy and practice in Ireland with that of other countries participating in PIRLS and TIMSS, and with reference to the achievements of Fourth class pupils in reading, mathematics, and science.

Ireland's experience was broadly similar to that of the majority of PIRLS and TIMSS participants regarding national policy requirements for compulsory schooling, teacher qualifications, and parental involvement. Some differences worth highlighting in this brief summary relate to curriculum policy. There are two main observations. The first is that the reading curriculum in Ireland, though currently under revision, is older than the reading curriculum in all but eight of the countries that took part in PIRLS. Further, the reading, mathematics and science curricula in Ireland pre-date those in almost all of Ireland's comparison countries – yet, unlike many of the newer curricula in our comparison countries, the curricula in Ireland have not been reviewed since their introduction. A second point of difference is the extent to which aspects of the curriculum are prescribed. Although presented in the format of a written document with an instructional guide, the curriculum in Ireland is issued without lists of mandated textbooks, recommended activities, or accompanying official notes and directives. In many other countries, across both studies, including top-performing Korea, Hong Kong, and Singapore, official curricular information or guidance is made available in a more diverse range of formats. In other respects, however, the curriculum in Ireland could be described as highly prescriptive. Both methods of instruction and assessment standards are prescribed for each of the three curriculum

domains assessed in PT 2011 – a practice that also exists in Korea, Hong Kong and Singapore, but is not much used in any of Ireland's other comparison countries.

A comparison of national policy with implementation of policy at school level revealed interesting discrepancies with regard to allocation of instructional time (perhaps partly attributable to a slight difference in the questions asked of teachers and in the National Curriculum Questionnaire). Officially, the majority of countries, including Ireland, reported allocating more time to reading/language instruction than to mathematics or science. In the classroom, however, more time is spent on average on mathematics (amongst all TIMSS countries) than on reading (amongst all PIRLS countries). This trend is observed also in most of our comparison countries, although not in Ireland. In fact, compared to these key countries, and to Northern Ireland and Australia in particular, the number of hours per year spent on mathematics instruction in Ireland is relatively low.

The amount of time devoted to science in Ireland is limited when compared with the experiences of other countries, both in terms of the official and the implemented curriculum. Other indications from PT 2011 also suggest that, compared to reading and mathematics and relative to other countries, science, for Fourth class pupils in Ireland, is not prioritised. For reading and mathematics, several different methods (inspector visits, research programmes, school self-evaluation and national/ regional assessments) are used to evaluate curriculum implementation, but, for science, the only method of evaluation reported was inspector visits. Though provision of a science laboratory for Fourth grade pupils is not widespread in countries that took part in TIMSS (apart from some notable exceptions including Singapore, Korea, and Japan), Ireland, was one of only three countries in which no Fourth grade pupils have access to a school science laboratory. Further, as described in more detail in Chapter 5 (Clerkin, 2013), Irish teachers were less likely than the PIRLS or TIMSS study averages to have a specialisation in science, to feel confident teaching science, to engage in science-related Continuing Professional Development, or to assign science-related homework.

Ireland's Fourth class pupils also have limited access to computers in school, with only one in three attending schools that have one computer for every 1-2 pupils. This is somewhat fewer than the international average for both PIRLS and TIMSS. Further, Ireland is poorly placed relative to most of its comparison countries, including Northern Ireland, where a high proportion of Fourth grade pupils were in schools with one computer for every 1-2 pupils.

Countries differed with regard to provision of library facilities, with some investing more in school libraries and others (such as Ireland) tending to favour classroom libraries. Nearly half of Fourth class pupils in Ireland had no school library, compared to a PIRLS average of just 13%. Provision of class libraries was much better, with most Fourth class pupils in Ireland having a classroom library with more than 50 books, compared to only 32%, internationally.

The demographic context within which Fourth class pupils in Ireland attend school has some unusual features. Ireland has a relatively low population density among countries that took part in PT 2011 and a considerably higher proportion of pupils in Ireland than in other participating countries live in "remote rural" locations. At 279, the average size of primary schools in Ireland is approximately half that of the PIRLS and TIMSS international averages. With nearly one-fifth of primary schools in Ireland having fewer than 50 pupils, small schools in areas of low population density are not uncommon. For pupils in other countries with sparsely populated regions, however, this feature of school enrolment is not typical. On the contrary, in all of the comparison countries that had lower population densities than Ireland, average school size was generally much larger. Patterns of population distribution are relevant also to achievement outcomes. Fourth class pupils in Ireland living

in smaller rural areas did better on average in reading, mathematics, and science than those attending schools in more populated urban centres, whereas the opposite is true internationally.

On other aspects of school, Fourth class pupils in Ireland had similar experiences to their peers in many other countries. Average Fourth class size in Ireland was 26, slightly above the PIRLS (24) and TIMSS (25) international averages, although considerably below those of top-performing Singapore (37), Hong Kong (33), and Korea (30). The primary school pupil-teacher ratio, at 16:1 for Fourth class pupils in Ireland, was also in the average range for pupils in both studies.

Additional references

This section does not repeat the core references already listed in Chapter 1. These include the three international reports and the Irish national report on PT 2011, and those related to other key studies such as National Assessments and PISA.

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