

A Teacher's Guide to the Reading Literacy Achievements of Irish 15-Year Olds

Outcomes of OECD's Programme for International Student
Assessment (PISA)

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Educational Research Centre

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Preface

In the current information-based society, the ability to understand and use a wide variety of texts is becoming increasingly important. For example, there is some evidence from a recent International Adult Literacy Survey (IALS, 1994), in which Ireland participated, that literacy levels have a strong association with occupational status and income.

The Programme for International Student Assessment (PISA) is a collaborative project of the Organisation for Economic Co-operation and Development (OECD). Its purpose is to address the question of how well young people are equipped for future participation in society, in the labour force, as consumers, and as individuals. In 2000, students in 32 countries/regions completed written tests of reading, mathematical and scientific literacy. Reading literacy, however, was the main focus of the assessment.

In December 2001, the OECD published an initial international report of outcomes on PISA, and Ireland simultaneously released a national report, which describes the outcomes in the context of the Irish education system. Subsequent to this, the OECD published a thematic report that focused in more detail on the outcomes of students on the assessment of reading literacy and a number of background measures of engagement in reading.

The current report contains a summary of the outcomes of Irish students on the PISA assessment of reading literacy. Some of the analyses are reported here for the first time: these include the achievements of Irish students on a number of tasks (questions) that were drawn from IALS, and the performance of students taking the Junior Certificate English examination at higher, ordinary, and foundation levels. Other outcomes are drawn from the initial international and national reports, and the recently released OECD thematic report on reading literacy.

To help illustrate the nature of PISA, the appendices to this report contain three sample passages from the assessment of reading literacy, a total of 14 questions, a commentary on the nature of the reading tasks, and data on the performance of Irish students on the tasks. Readers with a particular interest in the nature of the assessment are encouraged to read the appendices before reviewing the overall outcomes. Chapters 1 and 2 provide readers with an overview of the PISA design, and the framework for the assessment.

The report seeks to answer questions such as: How well can Irish students read compared to their counterparts in other countries? Are there areas in reading literacy where performance is particularly strong or weak? How large is the performance gap between high and low achievers? What percentages of Irish students might be classified as high and low achievers? These questions are addressed in Chapter 3. What are the extent and nature of gender differences in reading achievement? What school, student, and background factors are associated with differences in achievement? Do schools in Ireland differ from one another with respect to achievement? See Chapters 4 and 5. Are achievements on PISA and the Junior Certificate examination closely related to each other? See Chapter 6. Have reading standards in Ireland changed since IALS in 1994? See Chapter 7. What policy and research issues need to be addressed in light of the PISA 2000 results? See Chapter 8.

Readers who would prefer a more rapid overview of the outcomes documented in the current report are directed to the introductory Chapters 1 and 2; the summary sections at the end of Chapters 3 to 7; and the concluding Chapter 8.

This report is aimed chiefly at teachers of English in second-level schools in Ireland, although literacy education forms part of the work of all teachers. An attempt has been made to minimise the use of technical and statistical terms. However where such terms are used for the first time, they have been shaded, and the reader is referred to the glossary of terms at the end of the report. In addition, it should be noted that the PISA reading literacy framework uses specific terms to describe aspects of literacy. These terms are also shaded and explanations are given in the glossary.

We hope that this report will bring about, and advance, discussion on the important and complex area of reading standards, and the teaching of reading literacy in Ireland, not only in second-level schools, but in primary schools as well.

We would like to acknowledge a number of individuals for their important contributions during the process of producing this report. Firstly, thanks to Carl Ó Dálaigh (Department of Education and Science), Chair of the PISA national committee up to August 2003, and to Doreen McMorris (Department of Education and Science), current Chair of the PISA national committee, for continued support for our work on PISA, and advice on the content of this report. Thanks also to Tom Mullins (PISA committee member, National University of Ireland, Cork) for his invaluable advice on the content, layout and focus of the report. Thanks to the other PISA committee members for their comments and feedback on earlier drafts of this report: Declan Kennedy (National University of Ireland, Cork), Bill Lynch (National Council for Curriculum and Assessment), and Elizabeth Oldham (University of Dublin, Trinity College). Thanks to Mary Rohan (Educational Research Centre), for continued administrative support. Thanks to Séamus Ó hÚallacháin for proofing the report. Thanks also to the individuals involved in the rating of the PISA reading literacy tasks with respect to the Junior Certificate English syllabus and examinations: Denis Bates, Ray Frawley, Tom Mullins, and James O'Rourke. Finally, thanks to Carmel Hinchion, Marjorie Kinsella, and Finbarr Murphy for their detailed and thoughtful reviews of earlier drafts of this report, and to Tom Mullins for co-ordinating the review.

Chapter 1

PISA: An Overview

PISA ...

- ...is an internationally standardised assessment of 15-year olds, jointly developed by participating countries and administered to over 250,000 students in 32 countries in 2000.
- ...focuses on how young people near the end of compulsory schooling can use their knowledge and skills to meet real-life challenges.
- ...assesses literacy skills in the areas of reading, mathematics and science.
- ...assesses students in three 3-yearly cycles, in 2000 (reading was the focus), 2003 (mathematics), and 2006 (science).
- ...assessed reading skills in depth in 2000, and to a lesser extent, mathematics and science skills.
- ...emphasises the mastery of processes, the understanding of concepts, and the ability to function in various situations, within each assessment domain.
- ...involves the administration of written assessments involving both multiple-choice items, and items requiring students to write their own answers.
- ...describes a profile of skills and knowledge among students at or near the end of compulsory schooling.
- ...examines relationships between student achievement and student and school background characteristics.
- ...will allow the development of trend indicators that can track changes in achievement over time.

INTRODUCTION

The Programme for International Student Assessment (PISA) is an international assessment of the skills and knowledge of 15-year olds. PISA is carried out under the auspices of the Organisation for Economic Co-operation and Development (OECD). The first cycle was implemented in 2000. Representative samples of students enrolled in educational programmes in 28 OECD countries, and four additional countries, participated (Table 1.1). These students sat written tests of reading, mathematical and scientific literacy. They also completed a questionnaire that sought information about their home characteristics, attitudes and learning habits. Principal teachers of participating schools completed a questionnaire that asked about the school contexts in which teaching and learning occurred.

Table 1.1 *Countries Participating in PISA 2000*

<i>OECD Countries</i>		<i>Non-OECD Countries</i>	
Australia	Hungary	Norway	Brazil
Austria	Iceland	Poland	Latvia
Belgium	Ireland	Portugal	Liechtenstein
Canada	Italy	Spain	Russian Federation
Czech Republic	Japan	Sweden	
Denmark	Korea	Switzerland	
Finland	Luxembourg	United States	
France	Mexico	United Kingdom	
Germany	New Zealand		
Greece	Netherlands*		

*The school response rate for the Netherlands was too low to permit the computation of reliable student achievement estimates.

PISA's FOCUS

The primary focus ('major domain') of PISA 2000 was on the assessment of reading literacy skills. A comprehensive test was developed, and all students were asked to complete some reading items. Mathematical literacy and scientific literacy were 'minor domains', with fewer test items (questions). A little over half of participating students completed mathematics and/or science items. Since each assessment cycle entails assessment in all three domains, performance of countries over time can be monitored. PISA examines literacy skills that students have acquired at or near the end of compulsory schooling. Rather than assessing mastery of curricular content, PISA assesses 'real-life literacy'. This entails the assessment of knowledge and skills that students may need for effective participation in society.

DESIGN OF PISA

The population of interest in PISA 2000 consisted of 15-year olds engaged in full-time education in second-level schools. It did not include young people who had left school before age 15 (just under 3% of 15-year olds in Ireland). Schools were selected first. Then, up to 35 students within selected schools were chosen at random. In Ireland, 139 schools agreed to participate, giving a school response rate of 88%. Within schools, 86% of chosen students took part. The student response rate reflects absence on the day on which the test was administered, as well as the non-participation of students exempted by their principals according to specified guidelines. The guidelines identified three main types of exemption: students with functional (physical) disabilities, students with general or specific learning disabilities, and students with limited proficiency in English (defined as less than one year of instruction in English).

A rotated test booklet design was used in PISA 2000. Each student completed 1 of 9 available booklets distributed at random. While each booklet included some reading literacy items (tasks), mathematical and scientific literacy items each appeared in 5 of the 9 booklets. Just under one half of all items were in a multiple-choice format. The remainder required written responses of varying length (between one or two words and four or five lines).

The international School and Student questionnaires in PISA 2000 addressed a broad range of issues of interest to OECD member countries. Individual countries could also include questions of national interest in their versions of the questionnaires. The School questionnaire focused on school management, organisation and resources. The Student questionnaire sought information on equity-related matters (e.g., socioeconomic status, parental education), students' attitudes towards and engagement in reading, and their use of self-regulated learning strategies. Since students were selected at random from each school, rather than sampled as whole classes, a Teacher questionnaire was not administered. Table 1.2 illustrates a range of variables included in the School and Student questionnaires. It also shows some additional variables obtained from the Department of Education and Science Post-primary Schools Database that were used in analyses of the Irish data.

Table 1.2 *A Selection of the Information Collected in the PISA 2000 Questionnaires*

Student Background	Student Engagement in Reading
Gender	Diversity of reading
Socioeconomic status	Frequency of leisure reading
Parents' education	Attitude to reading
Family structure	Borrowing library books
Student Home Educational Climate	School Structure
Parent engagement	Type (secondary, vocational, etc.)*
Number of books in the home	Enrolment size*
Student as Learner	Disadvantaged status*
Early school leaving intent	Gender composition*
Absence from school	School Resources
Completion of homework on time	Student-teacher ratio
Self-regulated learning attributes	Class size
(academic self-concept, preference for	School Climate
co-operative, competitive learning)	Disciplinary climate

*Variables drawn from Department of Education and Science Post-Primary Schools Database.

PISA IN CONTEXT

The PISA assessment can be situated in the broader context of the OECD Education Indicators (OECD-INES) programme, which seeks to develop indicators of student achievement, as well as of social, cultural, economic and educational factors that influence, or are associated with, achievement. These indicators, including PISA results, appear in an annual OECD publication, *Education at a Glance*. The results of PISA have also been documented in several international and national reports. A list of key PISA publications and information on how these can be obtained is given in the Bibliography (page 39).

Chapter 2

The PISA Reading Literacy Framework

OVERVIEW

This Chapter describes the PISA assessment of reading literacy. First, the definition and framework for reading literacy are presented. Then the application of the definition in the context of the PISA reading literacy framework is discussed. To illustrate types of reading tasks given to students, three sample reading texts and 14 tasks (questions) can be found in Appendix 1. These are accompanied by scoring guides and information on how Irish students performed. A commentary on these texts and tasks is provided in Appendix 2.

PISA'S DEFINITION OF READING LITERACY

The PISA definition of reading literacy emphasises the importance of reading literacy for students' own personal and educational development and for their participation in society. The definition focuses both on basic comprehension skills such as retrieving salient information from text, and on higher-order skills such as reflecting on and evaluating text.

The PISA 2000 Definition of Reading Literacy

Reading literacy is understanding, using and reflecting on written texts, in order to achieve one's goals, to develop one's knowledge and potential, and to participate in society. (Measuring Skills and Knowledge: A New Framework for Assessment, p. 20)

TEXT TYPES (GENRES)

In PISA, students' understanding of two text types—continuous and non-continuous—was assessed. *Continuous texts* consist of sentences arranged into paragraphs and longer texts. These include narrative, descriptive, expository, argumentative/persuasive and injunctive texts. *Non-continuous texts*, or documents, are often organised in tabular format, and include advertisements, charts and graphs, forms, maps, schematics (e.g., diagrams accompanying technical descriptions) and tables. Each reading literacy item (question) in PISA can be categorised according to whether it refers to a continuous or non-continuous text.

READING PROCESSES

PISA measures three broad aspects of reading:

- *Retrieving information*, which involves locating one or more pieces of information in a text.
- *Developing an interpretation*, which involves forming a broad initial understanding of the text, and processing the organisation of information.
- *Reflecting on and evaluating the content/structure of a text*, which involves relating a text to one's experience, knowledge and ideas.

Each PISA question can also be categorised according to whether it is primarily a retrieve, interpret or reflect/evaluate item. Table 2.1 on the next page gives a more detailed breakdown of the skills associated with these processes.

Table 2.1 *Examples of Reading Processes Assessed in PISA*

<i>Retrieve</i>	<i>Interpret</i>	<i>Reflect/Evaluate</i>
Identify the main idea or topic; explain the purpose of a map or graph; match a piece of text to a question about the purpose of the text; locate and select relevant information in a text, including character, time and setting	Compare and contrast information by integrating two or more pieces of information from the text; draw inferences about the relationship between different sources of information; identify and list supporting information to infer an author's intent	Assess claims in the text against own knowledge or against other claims in the text; evaluate the quality and appropriateness of text; identify information that might strengthen the author's argument; evaluate the author's use of technical features in accomplishing a goal

READING CONTEXTS (PURPOSES)

In the PISA 2000 reading literacy framework, context refers to the uses and purposes for which texts were constructed, and includes the situations in which reading a text takes place, (defined as how the author intended the text to be used). The reading literacy items in PISA 2000 can be categorised according to the following contexts: reading for private (personal) use; reading for public use; reading for work (occupational); and reading for education.

QUESTION TYPES

Four question or item types were included in the PISA 2000 assessment of reading literacy:

- *Traditional multiple choice items* in which the student selects the correct response from among several alternative answers.
- *Complex multiple choice items* in which the student chooses a correct response for a series of items (e.g., true/false statements).
- *Closed-constructed response items* in which the student writes a short answer to a question. There is usually a restricted range of possible correct responses.
- *Open-constructed response items*, in which the student provides a longer written response. There is usually a broad range of possible correct responses. Unlike other item types, the scoring of these questions typically requires judgement on the part of trained markers. Such questions feature more frequently than the other response types in the assessment of students' ability to reflect on and evaluate texts.

These dimensions of reading—Text Types, Reading Processes, and Reading Contexts—were brought together in a series of texts (48 in all). A number of tasks (items or questions) was developed, based on each text. Altogether, there were 141 tasks. More detailed discussions of the PISA reading literacy framework can be found in *Measuring Student Knowledge and Skills: A New Framework for Assessment* and in *Reading for Change: Performance and Engagement Across Countries*. Table 2.2 on the next page shows the numbers of reading items by the three dimensions of reading literacy, as well as a breakdown by item type.

Table 2.2 *Distribution of Reading Literacy Items in PISA 2000 by the Three Dimensions of the Reading Literacy Framework, Together With Item Type*

<i>Dimension</i>	<i>No. of Items</i>	<i>Percent of Items</i>	<i>Dimension</i>	<i>No. of Items</i>	<i>Percent of Items</i>
Text Type			Reading Process		
Continuous	89	63.1	Retrieve	42	29.8
Non-continuous	52	36.9	Interpret	70	49.6
Total	141	100	Reflect/Evaluate	29	20.6
			Total	141	100
Reading Context			Item Type		
Educational	39	27.7	Traditional multiple choice	56	39.7
Occupational	22	15.6	Complex multiple choice	7	5.0
Personal	26	18.4	Closed-constructed response	15	10.6
Public	54	38.3	Open-constructed response	63	44.7
Total	141	100	Total	141	100

Source: *Measuring Students' Knowledge and Skills* (Tables 2 and 3)

Chapter 3

Achievement Outcomes in Reading Literacy

OVERVIEW

In this chapter, performance on the PISA 2000 assessment of reading literacy is reported with reference to the following:

- An overall 'combined reading literacy' scale, based on all 141 reading literacy items.
- Three reading process subscales—Retrieve, Interpret and Reflect/Evaluate. Each subscale represents a subset of the reading items. Subscales were constructed after the overall scale had been developed. They are based on smaller numbers of items than the overall scale, as indicated in Table 2.2 (page 6).
- Two text type subscales—Continuous and Non-continuous. These scales are based on subsets of items associated with continuous and non-continuous texts.

HOW STUDENT OUTCOMES ARE DESCRIBED

Description of the Reading Literacy Scales

Each student in the PISA assessment responded to reading questions in one of nine test booklets. The reason for this was to obtain a broad coverage of the types of skills associated with the domain of reading. However, regardless of which set of reading items a student responded to, it is possible, using special scaling techniques, to place them on an equivalent scale. In PISA, the overall reading literacy achievement scale has a mean of 500 and a standard deviation (measure of dispersion) of 100 (These are referred to as the OECD mean and standard deviation, respectively, in this report). Means and standard deviations on this scale vary across participating countries/regions. The test item difficulties are on the same scale as the student scores (see Figure 3.1 on the next page). This allows us to examine particular items to gain a better understanding of what students with particular scores can do. Specifically, at any given point on the scale, the probability of a student with that score getting an item with the corresponding level of difficulty correct is .62. That is, about three out of five times, a student with a particular score will get an item with that level of difficulty correct. This level of difficulty is a function of the scaling used.

Description of the Reading Literacy Levels of Proficiency

The reading literacy scales were transformed into five categories of proficiency. The difference between one level and the next is about 72 score points. The highest level, Level 5, is unbounded (open), meaning that some high-achieving students who responded to PISA have an ability that is higher than the most difficult reading literacy items and therefore are likely to succeed on most or all PISA reading literacy items. Conversely, students with a score below Level 1 are unlikely to succeed at even the easiest PISA reading literacy items. The PISA proficiency levels were set up so that all students at a given level are expected to respond correctly to at least half of the items they attempt at that level. Further, they are expected to respond correctly to fewer than one-half of items at higher levels, and more than one-half of items at lower levels.

Linking Student Performance to the Difficulty of the Items

Figure 3.1 below illustrates the proficiency levels on the PISA combined reading literacy scale with reference to both student ability and item difficulty. The figure shows the cut-points (boundaries) for each level, the scores of Irish students at various points on the scale, and the item difficulties of the first four questions from a narrative passage called *The Gift*. Question 1 is located at Level 3 on the proficiency scale. It has a difficulty (537) that is close to the Irish student mean (527). The question requires a written response in which the student must justify two opposing points of view with support from the text. Both the full credit and partial credit versions of Question 3 are found on the scale. Full credit is given for a fuller, more sophisticated response to this question, which requires students to recognise that the author is using descriptive language as a device to evoke suspense. The item difficulty associated with a full credit response (645) is close to the Irish student score at the 90th percentile (641). Appendices 1 and 2 provide a fuller description of these and other items, and the texts on which they are based.

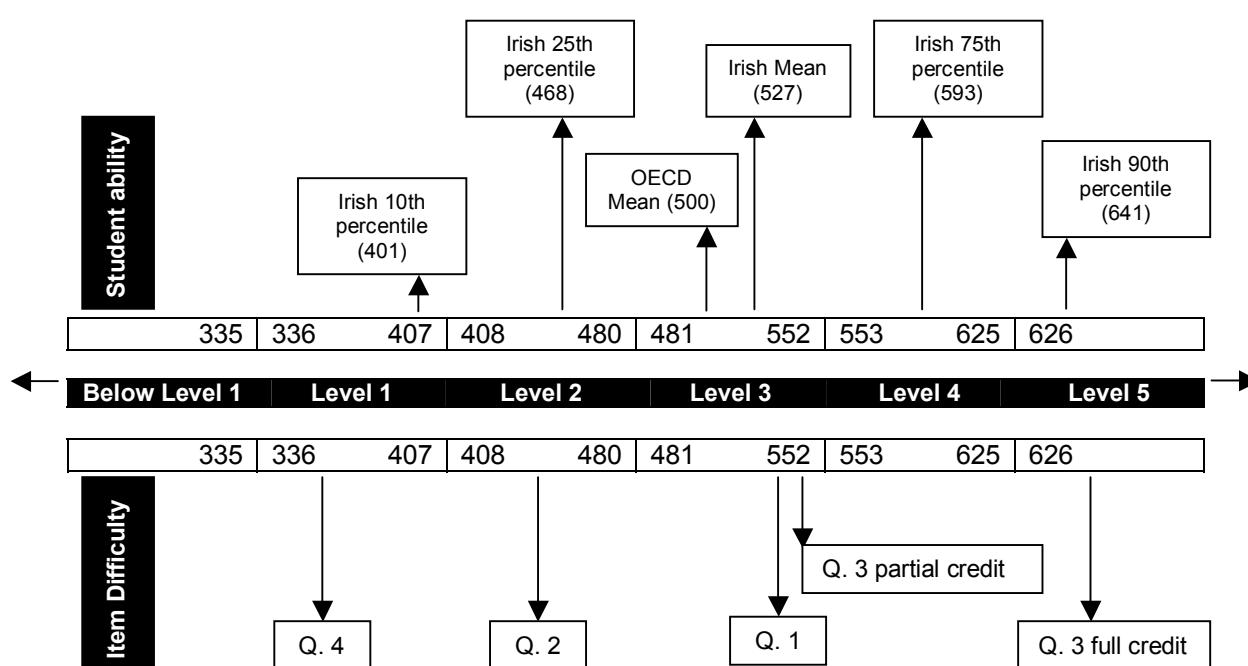


Figure 3.1 *The PISA 2000 Reading Literacy Scale: Cut-points for Proficiency Levels, Irish Student Ability, and Item Difficulty*

HOW IRISH STUDENTS PERFORMED ON PISA

Overall Performance on the PISA Combined Reading Literacy Scale

Ireland achieved the fifth highest mean combined reading literacy score (527) among the 27 OECD countries for which PISA results are available (Table 3.1). Although Ireland ranked fifth overall, just one country, Finland, achieved a mean score (547) that was statistically significantly higher. Ireland's mean score was not significantly different from those of eight other countries including Canada, Australia, and the United Kingdom. Countries with lower mean scores than Ireland include Spain, Greece, Portugal and Mexico. The difference between Ireland's mean score and the OECD country average of 500 is 27 points, or just over one quarter of an OECD standard deviation ($\frac{1}{4}$ sd).

Although the USA had a reading score that is 23 points lower (about $\frac{1}{4}$ sd) than Ireland's, it was not significantly lower. This is because the sampling procedures used in the USA

resulted in less precise estimates of achievement than in many other countries including Ireland.

Table 3.1 Mean Achievement Scores and Standard Deviations on Combined Reading Literacy—Ireland and OECD Countries

Country	Mean	SD	Country	Mean	SD
Finland	546.5	90	USA	504.4	105
Canada	534.3	95	Denmark	496.9	98
New Zealand	528.8	108	Switzerland	494.4	102
Australia	528.3	102	Spain	492.6	85
Ireland	526.7	94	Czech Rep.	491.6	96
Korea Rep. of	524.8	70	Italy	487.5	91
UK	523.4	101	Germany	484.0	111
Japan	522.2	86	Hungary	480.0	94
Sweden	516.3	92	Poland	479.1	100
Austria	507.1	93	Greece	473.8	97
Belgium	507.1	107	Portugal	470.2	97
Iceland	506.9	92	Luxembourg	441.3	100
Norway	505.3	104	Mexico	422.0	86
France	504.7	92			
			OECD Mean	500.0	100

	Mean achievement significantly higher than Ireland
	Mean achievement not significantly different from Ireland
	Mean achievement significantly lower than Ireland

Source: *Ready for Life* (Table 3.1)

Overall Performance on the PISA Reading Literacy Proficiency Levels

Performance on the combined reading literacy scale can also be interpreted with reference to the proportions of students in a country scoring at each of the 5 proficiency levels. Table 3.2 on the next page indicates the proportions of Irish and OECD students at each level. In addition, the table provides an indication of the types of tasks that students at each level can be expected to complete correctly. The descriptions associated with each level were derived from a consideration, by an OECD-wide reading expert group, of the content and processes evoked by items at that level.

Proportionally more students in Ireland (14%) than across the OECD (9%) achieved Level 5—the highest level on the combined reading literacy scale. Among the countries with more students than Ireland scoring at this level were Finland (19%) and Canada (19%). Just 11% of Irish students, compared with the OECD country average of 18%, achieved Level 1 or below. Among countries with greater percentages of students than Ireland scoring at Level 1 or below are Portugal (27%), Germany (23%) and Hungary (23%).

Differences Between High and Low Achievers

An indication of the dispersion of scores on PISA reading literacy can be obtained by considering the performance of high and low achievers. The benchmarks used here are performance scores at the national 10th and 90th percentiles. In Ireland, students scoring at the 10th percentile on the combined reading literacy scale achieved a mean score of 401. While 35 points ($\frac{1}{3}$ sd) higher than the corresponding OECD country average (366), it is, nonetheless, lower than the scores of students at the same benchmark in some countries with mean scores similar to Ireland, such as Korea (433). Irish students at the 90th percentile achieved a score of 641. Again, this is 17 points ($\frac{1}{6}$ sd) higher than the corresponding OECD country average of 623, but lower than the scores of high achievers in some countries with similar mean scores to Ireland, e.g., New Zealand (661) and Australia (656). It can be

concluded that the strong overall performance of Irish students is reflected in their scores at the 10th and 90th percentiles which are above the corresponding OECD country average scores. However, there is some evidence that Irish students scoring at the 90th percentile in particular are underperforming relative to their counterparts at the same benchmark in other countries with overall mean scores not significantly different from Ireland's.

The greater the difference between the scores at these two benchmarks, the larger the disparity between high and low achievers. It is therefore of interest to compare this performance gap across countries. The gap in Ireland is 240 points ($2^2/5$ sd). The OECD average difference is 257 ($2^3/5$ sd). The difference in Ireland is larger than in Korea (175 points, or $1^3/4$ sd) and Japan (224 points, or $2^1/4$ sd) and similar to Sweden (238 points). It is interesting to note that countries with similar average achievement, i.e., similar means, can vary substantially with respect to how widely achievement is dispersed. Countries with overall mean scores similar to Ireland's, but with greater dispersions of achievement, include the United Kingdom (260 points, or $2^3/5$ sd) and New Zealand (279 points, or $2^4/5$ sd). Korea and Japan are examples of countries with similar mean scores to Ireland but with less dispersion.

Table 3.2 *Summary Descriptions of Proficiency Levels on the Combined Reading Literacy Scale, and Percentages of Irish and OECD Students Achieving Each Level*

Level	Summary Description	Percent of Students	
		Ireland	OECD
Level 5	Can complete at least 50% of the most complex PISA reading tasks, including managing information that is difficult to locate in complex texts, evaluating texts critically, and drawing on specialised information.	14.2	9.5
Level 4	Can complete at least 50% of difficult PISA reading tasks, such as locating embedded information, constructing meaning from nuances of language, and critically evaluating a text.	27.1	22.3
Level 3	Can complete at least 50% of PISA reading tasks that are of moderate complexity, including recognising relationships between pieces of information, each meeting multiple criteria, drawing links between different parts of a text, and relating text information to familiar everyday knowledge.	29.7	28.7
Level 2	Can complete at least 50% of basic PISA reading tasks, including locating one or more pieces of information which may require meeting multiple criteria, making low-level inferences of various types, and using some outside knowledge to understand text.	17.9	21.7
Level 1	Can complete at least 50% of the most basic PISA reading tasks, such as locating a single piece of information, identifying the main theme of a text, and making a simple connection with everyday knowledge.	7.9	11.9
Below Level 1	Completes fewer than 50% of the most basic (Level 1) PISA reading tasks.	3.1	6.0
Total		100	100

Source: *Ready for Life* (Table 3.3). Total number of students (Ireland) = 3854

Performance on the Reading Process Subscales

As indicated earlier, reading subscales based on retrieving information, interpreting information, and reflecting on/evaluating the content or structure of texts were constructed. The OECD means and standard deviations on these scales vary slightly from those of the overall reading literacy scale (Table 3.3). The performance of Irish students on the Retrieve subscale is broadly in line with their performance on the combined reading literacy scale. They achieved a mean score of 524, and a ranking of 7th. Ireland achieved a mean score of 527 on the Interpret scale, and a ranking of joint 4th with New Zealand. Only one country,

Finland, achieved a mean score on these two subscales that was significantly higher than Ireland’s mean score. Ireland ranked third on the Reflect/Evaluate subscale with a mean score of 533. This was not significantly different from the highest-scoring country on that subscale—Canada (543).

Table 3.3 Mean Scores and Standard Deviations on the Reading Process Subscales—Ireland and OECD

Country /Area	Retrieve		Interpret		Reflect/Evaluate	
	Mean	SD	Mean	SD	Mean	SD
Ireland	524.3	100	526.5	97	533.2	90
OECD	497.7	111	501.0	100	501.8	106

Source: *Knowledge and Skills for Life*, Tables 2.3b, 2.3c and 2.3d; Total number of students (Ireland) = 3854

In general, scores on the reading process subscales are similar to the overall scores within countries. However, there are some exceptions. For example, students in Sweden and the USA achieved mean scores that were not significantly different from Ireland’s on the combined scale and on the Retrieve and Interpret subscales, but they achieved significantly lower scores than Ireland on the Reflect/Evaluate scale.

Proficiency levels were also developed for the reading literacy subscales, using the same cut-off points as for the combined scale. The proportions of Irish students represented at each proficiency level on the three subscales are broadly similar to the proportions at each level on the combined reading literacy scale. Irish students did marginally better on the Reflect/Evaluate subscale, with 44% achieving Levels 4 or 5. About 41% of students achieved Levels 4 or 5 on both the Retrieve and Interpret subscales. These are all higher than the OECD country averages of 31% (Retrieve), 32% (Interpret), and 33% (Reflect/Evaluate). Some countries show appreciable differences in the percentages of students at each proficiency level across the three subscales. In Finland, for example, 26% of students achieve Level 5 on the Retrieve subscale, whereas just 14% do so on the Reflect/Evaluate subscale. In contrast, in Mexico, 1% of students achieve Level 5 on the Retrieve subscale compared to 5% on the Reflect/Evaluate subscale.

Performance on the Text Type Subscales

Ireland ranked 4th on the Continuous text scale, with a mean score (528) that was 27 points ($\frac{1}{4}$ sd) higher than the OECD country average (501). On the Non-continuous scale, Irish students ranked 6th, with a mean score (530) that was 30 points ($\frac{3}{10}$ sd) higher than the OECD country average (Table 3.4). While the performance of Irish students was about the same on Continuous and Non-continuous texts, students in a number of countries performed better on one text type than on the other. For example, students in France had a mean score (500) that was almost identical to the OECD country average on Continuous texts, yet a mean score (518) that was significantly higher than the OECD country average on Non-continuous texts.

Table 3.4 Mean Scores and Standard Deviations on the Text Type Subscales—Ireland and OECD

Country /Area	Continuous		Non-Continuous	
	Mean	SD	Mean	SD
Ireland	528	94	530	100
OECD	501	101	500	109

Source: *Reading for Change* (Table 4.10). Total number of students (Ireland) = 3854

In Ireland, 12% of students achieved Level 1 or below on both the Continuous and Non-continuous text scales. These percentages compare favourably with the OECD country averages of 18% and 20%, respectively. In Ireland, 42% of students achieved Levels 4 or 5 on the Continuous text scale, and 44% achieved the same proficiency levels on the Non-continuous scale. These also compare favourably with the OECD country averages of 32% and 34%, respectively. As with performance across the reading process subscales, some countries showed appreciable differences in the percentages of students at each proficiency level on the text type subscales. For example, 6% of students in the Czech Republic achieved Level 5 on the Continuous texts subscale, compared with 12% for Non-continuous texts.

SUMMARY

Irish 15-year olds achieved a mean score on the PISA combined reading literacy scale that was significantly higher than the OECD country average. Just one country, Finland, achieved a significantly higher mean score than Ireland, while seven countries had mean scores that were not significantly different from Ireland's. On the combined reading literacy proficiency scales, 11% of Irish students, compared with the OECD average of 18%, scored at Level 1 or below, indicating particularly weak reading skills in about 1 in 10 Irish students. On four of the five reading literacy subscales (Retrieve, Interpret, Continuous and Non-continuous), only students in Finland significantly outperformed Irish students. On the fifth (Reflect/Evaluate), the mean score of Irish students was not significantly different from that of the highest-scoring country, Canada.

Chapter 4

Associations Between Student and School Characteristics and Performance on PISA Reading Literacy

OVERVIEW

PISA allows us to examine associations between a number of student and school characteristics and performance on reading literacy. In the first part of this chapter, we look at associations between student characteristics (e.g., gender, socioeconomic status, engagement in reading) and performance on reading literacy. In the second, we examine associations between school characteristics (e.g., school designated disadvantaged status, school negative disciplinary climate) and reading literacy. Where an achievement difference between groups is said to be statistically significant, it can be taken that there is less than a 5% probability that the difference could have arisen by chance. In this chapter, we sometimes refer to differences between groups in terms of standard deviations. These are based on the Irish standard deviation of 94 rather than the international one of 100 unless otherwise stated. In some tables, we make reference to all available cases—since the information in question may not be available for all of the students that responded to the PISA assessment. The reader may wish to refer back to Table 1.2 on page 3, which lists some of the key variables about which information was obtained following administration of the PISA School and Student Questionnaires, as well as additional variables from other sources.

STUDENT CHARACTERISTICS AND PERFORMANCE

Student Gender

In all OECD countries in PISA 2000, female students achieved a significantly higher mean score than male students on the PISA combined reading literacy scale. Differences, described here in terms of the OECD standard deviation of 100, ranged from 51 points ($\frac{1}{2}$ sd) in Finland to 14 points ($\frac{1}{7}$ sd) in Korea. In Ireland, the difference was 29 points ($\frac{3}{10}$ sd)—the same as the OECD country average difference. This difference was also reflected in a greater percentage of Irish males (14%) than females (8%) scoring at Level 1 or below on the combined reading literacy scale, and a greater percentage of females (17%) than males (11%) scoring at Level 5 (the highest level) (Table 4.1).

Table 4.1 Percentages of Male and Female Students Scoring at Each Combined Reading Literacy Proficiency Level—Ireland and OECD

	Percent of Students						Total
	Below Level 1	Level 1	Level 2	Level 3	Level 4	Level 5	
<i>Ireland</i>							
Males	4.0	9.5	21.4	29.9	24.1	11.2	100
Females	2.0	6.2	14.3	29.6	30.4	17.4	100
<i>OECD</i>							
Males	8.0	14.2	23.3	27.9	19.4	7.2	100
Females	3.7	9.3	20.0	29.6	25.4	11.9	100

Source: *Knowledge and Skills for Life* (Table 5.1a). number of students (Ireland) = 1930 females, 1896 males, 28 missing gender.

Significant mean score differences in favour of female students in Ireland were also observed on the Retrieve, Interpret, and Reflect/Evaluate scales, with the difference being greatest on the Reflect/Evaluate scale (37 points, $\frac{2}{5}$ Irish sd of 94) and smallest on the Retrieve scale (22 points, $\frac{1}{4}$ sd)—a pattern observed in most OECD countries. The difference in favour of female students in Ireland and across OECD countries was greater for Continuous than for Non-continuous texts.

Student Home Background

PISA generated a measure of socioeconomic status (SES) by asking students to indicate the occupations of their parents/guardians. Each occupation is located on an international socioeconomic index ranging from 0 to 90. In Ireland, students were categorised as high, medium or low SES according to whether they fell into the top, middle or bottom thirds of the distribution of SES scores based on their parents' combined occupations (Table 4.2). The differences between the mean scores on combined reading literacy of high and medium SES students (29 points, $\frac{3}{10}$ sd), and of medium and low SES students (37, $\frac{2}{5}$ sd) were significant. The correlation (measure of the strength of the linear relationship) between combined parents' SES and performance on combined reading literacy can be considered to be moderate ($r = .31$). A measure of the educational attainment of students' parents was also obtained. The correlation between the combined measure of parent educational attainment and student performance on PISA combined reading literacy is in the weak to moderate range ($r = .21$).

Table 4.2 Mean Combined Reading Literacy Scores of Irish Students With Varying Levels of Socioeconomic Status

Level	Percent of Students	Mean Score (Reading)
High	38.1	558.6
Medium	28.0	529.0
Low	30.7	492.5
No response	3.2	458.5
All available cases	96.8	526.7

Source: *Ready for Life* (Table 4.11). Total number of students = 3854

Student Engagement in Reading

In PISA, a composite (combined) variable, engagement in reading, was constructed from students' responses to questions in three areas: frequency of leisure reading, diversity of reading, and attitude to reading. First, each area is discussed separately, and then the combined engagement measure is considered.

Frequency of Leisure Reading

Students indicated the amount of time they spent reading for enjoyment on a typical school day. The distribution of responses for Irish students, and the associated mean scores, are given in Table 4.3. One-third of Irish students reported never reading for enjoyment. There is a mean score difference of 66 points (close to one proficiency level; see Chapter 3) between students who never read and those who read regularly (30-60 minutes a day) in their leisure time. The correlation between frequency of leisure reading and performance on PISA combined reading literacy is in the moderate range ($r = .26$).

Table 4.3 Mean Combined Reading Literacy Scores of Irish Students Reporting Varying Levels of Leisure Reading

Frequency of Leisure Reading	Percent of Students	Mean Score (Reading)
No time	32.9	491.0
30 minutes or less per day	30.5	535.6
30 to 60 minutes per day	20.2	557.5
60 minutes or more per day	15.2	551.9
No response	1.3	448.5
All available cases	98.7	526.7

Source: *Ready for Life* (Table 4.32). Total number of students = 3854

Diversity of Reading

Students also indicated the frequency with which they voluntarily read six types of texts (magazines, comics, fiction books, non-fiction books, e-mails/web pages, and newspapers) (presented in Table 4.4). The most frequently read materials were newspapers and magazines. Over one-quarter of students reported that they never read fiction texts in their leisure time. The strongest correlations between individual components of diversity and combined reading literacy were for fiction books ($r = .32$) and non-fiction books ($r = .26$). The correlation between frequency of reading newspapers and performance on PISA reading literacy was weak, and not significant ($r = .05$). When students' scores across the six text types were combined to form an overall index of diversity of reading, the correlation between the overall index and combined reading literacy was again moderate ($r = .25$).

Readers may notice a discrepancy between Tables 4.3 and 4.4. The percentage of students who say that they never read for enjoyment is higher than the percentages for magazines, fiction books and newspapers. This is probably because students may not have considered materials like magazines and newspapers in answering the question about reading for enjoyment. Also, there are differences in the wording and response options on the questions underlying the two tables. The first question asks "each day, about how much time do you usually spend reading for enjoyment?" while the second question asks "how often do you read these materials because you want to?".

Table 4.4 Frequency with which Irish Students Reported Reading Six Types of Reading Materials for Enjoyment

	Magazines	Comics	Fiction Books	Non-Fiction	E-mail / Web Pages	Newspapers
Never	5.9	64.8	26.2	39.9	47.6	6.3
A Few Times a Year	11.5	17.3	29.3	29.3	10.5	8.0
Once a Month	20.6	7.6	16.7	14.0	8.4	10.1
Several Times a Month	34.3	5.3	14.8	9.0	14.3	26.2
Several Times a Week	26.4	3.2	10.8	5.4	17.1	48.1
No Response	1.3	1.9	2.2	2.4	2.1	1.2
Total	100	100	100	100	100	100

Total number of students = 3854.

Attitude to Reading

Students indicated their level of agreement with each of nine statements designed to assess attitude to reading, such as 'I read only if I have to', 'Reading is one of my favourite hobbies', 'I like talking about books with other people', and 'I cannot sit still and read for more than a few minutes'. An overall index (composite) of attitude to reading was constructed. A difference of 62 points ($\frac{2}{3}$ sd) was observed between the mean scores of students with a 'good' attitude to reading (i.e., those in the top third of the distribution of

attitude scores) and those with 'medium' attitude (those in the middle third). A difference of 97 points (just over 1 sd) was found between the mean scores of those with 'good' and 'poor' attitudes (Table 4.5). The correlation between attitude to reading and performance on the combined reading literacy scale is in the moderate to strong range ($r = .43$).

Table 4.5 Mean Combined Reading Literacy Scores of Irish Students with Varying Levels of Attitude Towards Reading

<i>Level</i>	<i>Percent of Students</i>	<i>Mean Score (Reading)</i>
High	30.8	582.5
Medium	33.3	520.5
Low	34.9	486.0
No response	1.1	440.7
All available cases	100	526.7

Source: *Ready for Life* (Table 4.33). Total number of students = 3854

Engagement in Reading Composite

A composite scale consisting of students' responses to items on the frequency of leisure reading, diversity of reading, and attitude to reading scales was created. This had an OECD country average of 0, and a standard deviation of 1. Ireland's score on the engagement measure was fourth lowest, or $\frac{1}{5}$ of a standard deviation below the OECD country average. Only Belgian, German and Spanish students achieved lower scores than Ireland on this measure. Countries in which students reported high levels of engagement included Finland ($\frac{1}{2}$ sd over the OECD country average for engagement), Iceland ($\frac{1}{4}$ sd over), Korea ($\frac{1}{4}$ sd over), and Japan ($\frac{1}{5}$ sd over). In Ireland, the correlation between engagement in reading and combined reading literacy is in the moderate range ($r = .39$).

Gender Differences in Engagement

Across OECD countries, female students achieved a significantly higher average engagement score than male students, with males scoring $\frac{1}{5}$ of a standard deviation below the OECD country average, and females scoring $\frac{1}{5}$ of a standard deviation above. The mean engagement score for Irish male students was $\frac{2}{5}$ of a standard deviation below the overall OECD average score, while that of Irish females was around the overall OECD average. Only Germany and Belgium have lower levels of engagement among male students than Ireland. The relatively large differences in engagement between male and female students in Ireland and in many other countries may provide one clue as to why females achieve higher mean scores than male students in PISA reading literacy.

Student Self-Regulated Learning

Self-regulated learning can be viewed as a process of active and constructive learning, involving an interplay between cognitive and motivational goals. It has been argued that students who can regulate their own learning are better equipped to become independent, life-long learners across a range of subjects and situations. PISA obtained information on students' reported use of several aspects of self-regulated learning using a supplementary 55-item questionnaire, which was administered in 20 OECD countries including Ireland. Individual items were combined to form composites or aspects, examples of which are in Table 4.6.

Among the aspects of self-regulated learning that correlated most strongly with performance on PISA combined reading literacy in Ireland were intrinsic motivation or interest in reading ($r = .38$), academic self-concept ($r = .29$) and use of control strategies ($r = .21$). However, some had weak or non-existent associations with achievement. These included instrumental

motivation ($r = .06$) and preference for co-operative learning ($r = .01$, not significant). While some aspects of self-regulated learning are associated with reading literacy, they are also associated with one another, making it difficult to understand the precise ways in which they may influence students' learning (see Chapter 5).

Table 4.6 *Some Aspects of Self-Regulated Learning Assessed in the Supplementary PISA Student Questionnaire*

<i>Aspect</i>	<i>Description</i>
Use of control strategies	Setting goals before beginning a learning activity; checking for understanding of material studied; seeking clarification when concepts are not understood
Control expectations	Belief that it is possible to achieve one's learning goals
Instrumental motivation	Studying to get a good job; to ensure one's future will be financially secure
Intrinsic motivation (interest in reading)	Becoming 'absorbed' in reading tasks; reading in spare time
Academic self-concept	Confidence in own ability to learn things quickly; belief that one is good in most subjects
Verbal self-concept	Confidence in own ability to complete tasks relating to English classes quickly and to a high standard
Preference for competitive learning	Preference to strive to learn more than others
Preference for co-operative learning	Preference to work co-operatively with others on learning tasks

Intent to Leave School Early

In Ireland, but not in other countries, students were asked to indicate whether they intended to complete a programme leading to the Leaving Certificate examination. Fourteen percent of students indicated that they intended to leave school early. These students had a mean score on the PISA combined reading literacy scale that was 111 points ($1\frac{1}{5}$ sd) lower than the mean score of students not intending to leave early.

SCHOOL CHARACTERISTICS AND PERFORMANCE

School Size

Irish schools in PISA were categorised according to whether they were large (81 or more 15-year olds enrolled), medium (41-80) or small (17-40). The mean scores of students in large, medium and small schools were 533, 513 and 512 respectively. Whereas the difference between the mean scores of students in large and medium schools (20 points, $\frac{1}{5}$ sd) was moderate, that between students in medium and small schools (1 point) was small and not significant.

School Type/Sector

Schools in Ireland were also categorised as being in the secondary, community or comprehensive, and vocational sectors (Table 4.7). The difference in mean scores in favour of students in secondary schools compared to students in community/comprehensive schools (21 points, $\frac{1}{5}$ sd) was significant. The difference in favour of students in community/comprehensive schools compared to students in vocational schools (38 points, $\frac{2}{5}$ sd) was also significant.

Table 4.7 Mean Combined Reading Literacy Scores of Irish Students Attending Secondary, Community/Comprehensive and Vocational Schools

School Type	Percent of Students	Mean Score (Reading)
Secondary	62.7	543.2
Community/Comprehensive	22.4	521.9
Vocational	14.9	483.7
All cases	100	526.7

Source: *Ready for Life* (Table 4.34). Total number of students = 3854

School Socioeconomic Status

In Ireland, school designated disadvantaged status was used as an indicator of school-level socioeconomic status because of its relevance to policy (in Chapter 5, school and student level SES are examined together). Students in schools in the Department of Education and Science's Disadvantaged Area Scheme (i.e., 'designated' schools) achieved a mean score of 490 on the PISA combined reading literacy scale, while their counterparts in non-designated schools achieved a mean score of 540 (Table 4.8). The difference of 50 points ($\frac{1}{2}$ sd) in favour of students in non-designated schools was significant.

Table 4.8 Mean Combined Reading Literacy Scores of Irish Students Attending Designated Disadvantaged and Non-Designated Schools

Disadvantaged Status	Percent of Students	Mean Score (Reading)
Designated	25.6	490.4
Non-designated	74.4	539.2
All cases	100	526.7

Source: *Ready for Life* (Table 4.37). Total number of students = 3854

School Negative Disciplinary Climate

Although negative disciplinary climate is presented as a school-level variable in PISA, it is based on responses of students. They were asked to indicate the frequency with which several activities occurred in their English classes such as 'Students don't listen to what the teacher says' and 'Students cannot work well'. An overall measure of school disciplinary climate was formed by combining students' responses to such items, and averaging them to the school level. Students were then categorised according to whether they attended schools with high, average or low negative disciplinary climate, based on the third of the distribution of disciplinary climate scores into which their school fell. Differences in achievement between students in schools with high and average levels of negative disciplinary climate, and between schools with average and low levels, were small and not significant. However, the difference in achievement between students in schools with high and low levels (24 points, $\frac{1}{4}$ sd) was significant.

Student-Teacher Ratio

Principal teachers provided information on school enrolment size (the number of male and female students in a school, including special education students, and, in Ireland, students enrolled in Post Leaving Certificate courses) and the number of full- and part-time teachers in the school. A variable, student-teacher ratio, was computed by dividing this number of students by the number of teachers in the school (where full-time teachers received a weighting of 1, and part-time teachers 0.5). The mean student-teacher ratio was 15. Students were classified according to whether they attended schools with high, medium or low student-teacher ratios, depending on the third of the distribution of student-teacher ratios into which their school fell. Differences in reading achievement between students in schools

with high and medium student-teacher ratios, and between students in schools with medium and low ratios, were small and not significant.

Provision of Support for Low Achievers

It will be recalled that 11% of Irish students achieved a mean reading literacy score that was at or below proficiency level 1. Overall, 6% of Irish students reported being in receipt of learning support in English in school at the time of the PISA assessment. Of this 6%, half may be classed as low achievers (scoring at or below Level 1) and half as moderate to high achievers (scoring at or above Level 2). This suggests that around half of students in receipt of additional support in English literacy at the time of the assessment were not low achievers as defined by PISA. It also suggests that around 8% of students who may be classed as low achievers were not in receipt of learning support at the time of the assessment.

SUMMARY

Female students in Ireland and in all other participating OECD countries outperformed their male counterparts on the PISA combined reading literacy scale. Differences favouring females were also found for the reading literacy subscales in Ireland and almost all other OECD countries. The magnitude of these differences in Ireland were similar to the OECD average differences. Other student variables associated with performance on PISA combined reading literacy included home background (socioeconomic status), engagement in leisure reading, interest in reading, academic self-concept, and use of learning strategies during reading and study. School variables associated with performance included school designated disadvantaged status, school type (whether secondary, community/comprehensive or vocational), and school disciplinary climate. Relative to other OECD countries, engagement in reading among male students in Ireland was particularly low. The proportion of students in receipt of learning support in English in school is almost evenly split between low achievers (at proficiency Level 1 or below) those achieving at higher levels (at Level 2 or above).

Chapter 5

Explaining Performance on PISA Reading Literacy

ADVANTAGES OF STATISTICAL MODELLING TECHNIQUES

Many of the **variables** (background characteristics) associated with achievement are themselves interrelated. In addition, an apparent link between a variable and achievement may actually occur because both were related to a third variable which was not considered. In this chapter, we examine associations between achievement and a range of **explanatory variables** simultaneously. This minimises the chance of being misled by spurious associations which can occur if only one variable at a time is examined. We examine these variables using statistical modelling techniques. These involve selecting key variables and then estimating how much of achievement each predicts, adjusting for the other variables that are also present in the model. Appropriate checks carried out in the course of building the model allow us to determine how well it describes the patterns of student achievement.

ASPECTS OF THE PISA SURVEY DESIGN

Inter-relatedness of Background Characteristics

There are limitations to the interpretations and conclusions that can be drawn from studies such as PISA, which are **cross-sectional** in design. Students are not allocated combinations of characteristics at random, as would occur in a scientific experiment. If this were the case, variables connected with students' achievement would be explicitly arranged and controlled by the design. In a cross-sectional survey we can highlight important associations, but we cannot conclude that varying a certain characteristic on its own will improve student achievement by a given amount. For example, home ownership of a computer is generally positively associated with achievement, but both are related to socioeconomic status. Examining the impact of owning a computer in isolation can result in an over-estimation of its impact on achievement. However, if we examine socioeconomic status and computer ownership simultaneously, then a more accurate estimate of the association between computer ownership and achievement is possible. That said, we cannot make causal statements regarding the amount of academic improvement which *would* result from owning a computer.

Relationships Between Achievement and Background Characteristics over Time

This leads us to a second limitation of cross-sectional studies. While they provide us with a snapshot of a system at a given point in time, they don't provide us with information about changes in the relationships between achievement and explanatory variables over time. Thus, in the PISA design, change within individuals is not measured. This can be done only in a **longitudinal** study. Such studies follow the same group of people over time, allowing a richer understanding of the relationships between explanatory variables and achievement. For example, variables such as socioeconomic status and parental education are commonly found to be associated with academic performance. However, such characteristics also act as proxy (substitute) measures of the characteristics of students upon initial entry to the education system. Their apparent effect upon current performance is therefore overestimated due to the relationship between these characteristics and the students' prior history of achievement. Since a measure of prior achievement is not available in PISA, we cannot

control for students' earlier gains from passing through the educational system in estimates of relationships between current achievement and background factors.

VARIATION BETWEEN SCHOOLS IN ACHIEVEMENT OUTCOMES

In a study such as PISA, where students cluster into schools, we can divide the total variation in achievement into two components: differences between schools and differences within schools. PISA did not gather information about the particular classes students were in. Therefore, individual differences within schools reflect both the variation between classes and between students. The percentage of variation in achievement in reading literacy attributable to differences between schools in Ireland is 18% (Figure 5.1). This suggests that the Irish educational system is relatively homogeneous at the school level with respect to reading achievement. It also suggests that the major sources of variation in achievement are to be found between classes and among individual students. For comparison, a country such as the USA (which has a medium level of between-school differences in achievement), has a value for between-school variation of 30% for reading literacy. A country with a relatively high between-school variation is Germany, with a value of 60%. Large between-school variation is likely to reflect a high degree of selectivity of students into schools (either explicitly by entrance tests, or implicitly by differences in intake composition). Therefore, if we wish to look for major sources of variation in achievement in the relatively homogeneous Irish school system, we are more likely to find them within schools, at the classroom/teacher level, or among variables corresponding to individual students.

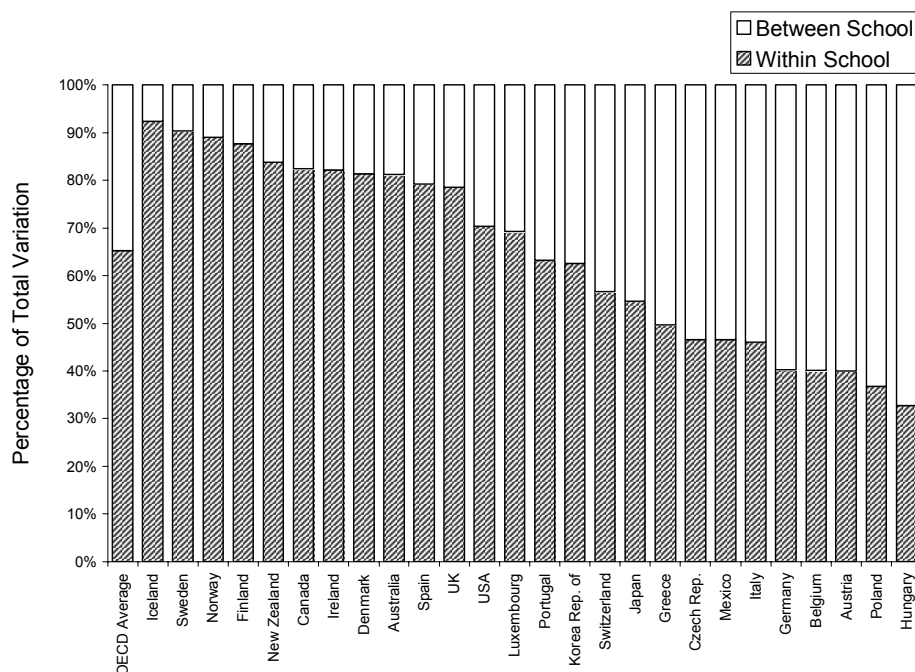


Figure 5.1 Proportions of Between- And Within-School Variation in Combined Reading Literacy—Ireland and OECD Countries

ESTIMATING EFFECTS OF BACKGROUND AND STUDENT CHARACTERISTICS ON ACHIEVEMENT

Variables in the Model of Achievement in Reading Literacy

In this section, we highlight some of the main variables that, when adjusted for other explanatory variables, were found to maintain a substantive association with reading literacy. The model we developed for reading literacy contains three school-level variables

(negative disciplinary climate, school type, and designated disadvantaged status), and twelve student-level variables (current grade level, attitude to reading, instrumental motivation, preference for competitive learning, preference for co-operative learning, frequency of absence from school, early school leaving intent, academic self-concept, frequency of completion of homework on time, socioeconomic status, number of siblings, and an index of the number of books in the home).

Interpreting the Model of Achievement in Reading Literacy

It was pointed out earlier (pages 7-8, see also page 53) that the mean reading literacy score for Ireland was 527 (sd = 94) and that the mean \pm 1 standard deviation (433 to 621 points) encloses a little over 68% of students; while the mean \pm 2 sd (339 to 715 points) covers about 95% of students. We can use these values to assist our interpretation of the estimated relationship between an explanatory variable and achievement. We report estimated score point differences in achievement between groups of a **categorical variable directly** (e.g., vocational schools compared to secondary schools). We convert **continuous variables** into 'high', 'medium' and 'low' groups, using the values closest to the 33rd and 67th percentiles on their scales as cut-off points (e.g., high compared to low attitude to reading). Score point differences are converted into standard deviations using the Irish (94) rather than the OECD (100) standard deviation. This gives an indication of the amount of variation in achievement in Ireland corresponding to the differences between the groups we are comparing.

The spacing between the benchmarked proficiency levels developed for PISA reading literacy scales is about 72 points. Using this information, we can also interpret the estimated change in achievement associated with each explanatory variable in terms of proficiency level increments. The skill changes corresponding to an increment of one proficiency level depend on where we are looking on the scale and can be found in Table 3.2 on page 10 of this report.

Examples of Some School-Level Effects on Achievement

In the fitted model, students in vocational schools have a predicted reading literacy score which is 21 points ($\frac{1}{5}$ sd) lower than students in community/comprehensive schools, with just over 1 point of a difference between secondary and community/comprehensive schools. In contrast, these differences *without* adjustment for other variables are 38 points ($\frac{2}{5}$ sd) and 21 points ($\frac{1}{5}$ sd), respectively (Table 4.7). The model also suggests that students from schools designated disadvantaged scored 22 points lower ($\frac{1}{4}$ sd) than those in schools not designated. Even after adjusting for differences due to school type and the other variables in the model, we found that negative disciplinary climate still has an effect on achievement. Students in schools which are at the mean of the 'high negative disciplinary climate' group scored 11 points ($\frac{1}{8}$ sd) lower than those from schools at the mean of the 'low' group.

Examples of Some Student-Level Effects on Achievement

A student in second year (grade 8) is likely to achieve a score that is 61 points ($\frac{2}{3}$ sd) lower than a student in third year (grade 9), and 93 points (almost 1 sd, or $\frac{3}{10}$ proficiency levels) lower than a student in transition year (grade 10), while a student in transition year is expected to score 31 points higher ($\frac{1}{3}$ sd) than a student in third year. A student scoring at the mean of the high socioeconomic status grouping scored 22 points ($\frac{1}{4}$ sd) higher than a student at the mean of the low grouping. Students from large families of 6 siblings scored on average 20 points ($\frac{1}{5}$ sd) lower than those with no siblings. The differences for students scoring at the mean of the high compared to the low grouping of each self-regulated learning variable were: instrumental motivation = 12 points ($\frac{1}{10}$ sd), preference for competitive

learning = 9 points ($1/10$ sd), preference for co-operative learning = -10 points ($-1/10$ sd), and academic self-concept = 32 points ($1/3$ sd).

Interactions Between Explanatory Variables in the Model

When the association between one explanatory variable and reading literacy varies with the value of a second explanatory variable, an interaction can be said to exist. There were two interactions in the model. These were attitude to reading by the index of number of books in the home, and absence from school by early school leaving intent. The interaction of attitude to reading with index of books in the home shows that the difference between achievement scores of students coming from homes with many books (500 books or more) and no books appears to vary with attitude to reading. This achievement difference is about 34 points ($1/3$ sd, almost half of one proficiency level), for students with an attitude to reading score at the mean of the 'low' group, and notably larger, at 67 points ($1/10$ sd, almost one proficiency level) for students with an attitude to reading score at the mean of the 'high' group. This suggests that the association between books in a student's home and achievement in reading is stronger when attitude to reading is good compared to when it is poor. The interaction between absence from school and early school leaving intent is more complex, but suggests that students who intend to leave school prior to completing the Leaving Certificate are expected to score a minimum of 39 points ($2/5$ sd) lower than those without such intent.

Associations Between Gender and Achievement

There was no significant effect associated with student gender. Furthermore, there were no interactions between gender and any of the school- or student-level variables, so gender does not appear in the model of reading literacy. The variation in achievement corresponding to differences in gender is therefore explained by the other student-level variables. Further research might examine these to explore the variables which distinguish differences between male and female students' reading literacy in Ireland.

How Well Does the Model Explain Achievement in Reading Literacy in Ireland?

The model of reading literacy described here explains 78% of the variation in achievement at the school level, and 47% at the student/class level. The additional variation explained by adding the school-level variables to a reduced model containing the student-level variables is 19% at the school level, and just 3% at the student/class level.

COMMENTS ON THE MODEL OF ACHIEVEMENT IN READING LITERACY

Socioeconomic Status and Home Background

Given the extensive literature on the relationship between socioeconomic background and achievement, it is not surprising that socioeconomic status (SES) predicted achievement in the model. However, the magnitude of difference between students scoring at the means of the high and low SES groups, is smaller than, or about the same as, estimated effects for other variables in the model. These include early school leaving intent, frequency of absence from school, books in the home, attitude to reading, and completion of homework on time. While such variables are likely to be interrelated with SES in a complex manner, it is clear that aspects of students' environments other than those represented by the simple measure of SES are important in explaining student achievement in reading. At the school level, the effects of variables such as designated disadvantaged status and school type (sector) on achievement are confirmed.

Student level SES and school disadvantaged status were examined simultaneously in the model (amongst other measures at both the student and school levels). This addresses the issue of how 'disadvantaged' individuals perform in non-designated schools. No interaction between school designated status and student SES was found. Therefore, we can conclude that the performance difference between low SES and high SES students does not change appreciably when comparing designated to non-designated school types. We can also conclude from this finding that the deficit in literacy associated with attending a designated school compared to a non-designated school does not appear to vary with a student's SES or any of the other home background measures.

Self-Regulated Learning Variables and Attitude to Reading

Certain aspects of self-regulated learning associated with performance, including instrumental motivation, academic self-concept, and competitive learning, were included in the model. Others, such as control strategies and control expectations, did not improve the model sufficiently to warrant their inclusion. While some recent research has called for instruction in self-regulated learning strategies, only moderate associations with achievement were found for these variables in the model presented here. It is clear, therefore, that more research is needed before conclusions about the impact of such instruction upon reading literacy can be drawn. The manner in which aspects of self-regulated learning are measured in studies like PISA also warrants examination. In contrast to the self-regulated learning variables, attitude to reading, which was derived from a series of questions related to interest in reading and intrinsic motivation to read, had a strong association with reading literacy.

Student Gender

It is noteworthy that, in the presence of the other variables, student gender no longer explained differences in achievement. Further, gender did not interact with any of the other student-level variables. This suggests that the manner in which achievement is related to these variables does not differ between males and females. Female students in Ireland achieved a mean reading literacy score 29 points (almost $\frac{1}{3}$ sd) higher than their male counterparts. It can be concluded that the variables in the model explain the differences in achievement scores associated with gender. What has *not* been addressed in the current study is exactly which combination of these variables might account for achievement differences between males and females.

Differences in Achievement Within Schools

There is large variation in achievement within Irish second-level schools. This suggests that it is at the classroom/teacher and student levels of future models of reading literacy that further explanatory variables might be usefully added. The lack of any classroom or teacher variables in PISA places limits on the amount of variation within schools that one might explain. The model reported here contained an extensive set of student level variables and resulted in a model that succeeded in explaining 47% of variation in achievement within schools. This leaves a little over half of the variation in reading literacy within schools unexplained. In PISA 2003, a questionnaire for teachers of mathematics has been added to the survey design for Ireland, to try to address this issue in the case of mathematical literacy.

SUMMARY

Statistical modelling was used to examine the effects of three school-level and twelve student-level variables on reading literacy achievement simultaneously. Irish schools did not vary much in average reading literacy, compared to other countries. Allowing for designated disadvantaged status and school sector, the disciplinary climate of the school still has an effect on student achievement. Student self-regulated learning strategies mainly have modest effects, after adjusting for other characteristics. The inclusion of the other student-level variables accounts for the variation corresponding to student gender. The effect of attitude to reading varies with the number of books at home. Student socioeconomic status is associated with reading literacy, but other aspects of their backgrounds show stronger relationships with achievement.

Chapter 6

Links Between PISA Reading Literacy and the Junior Certificate English Syllabus and Examinations

OVERVIEW

As indicated in Chapter 3, Irish students did comparatively well on the PISA assessment of reading literacy and on all subscales developed by the OECD. Irish students performed particularly well on the Reflect/Evaluate subscale, with a mean score that was 3rd highest out of the 27 OECD countries participating. There are a number of possible reasons for Irish students' relatively strong performance in reading literacy. One possible explanation is that aspects of the Junior Certificate English syllabus are similar to aspects of the PISA reading literacy framework and assessment.

In this chapter, links between the PISA assessment of reading literacy and the assessment of Junior Certificate English are drawn. Actual performance on the assessments as well as their content are compared. The performance of students taking the Junior Certificate English examination at the three syllabus levels is also described, taking early school leaving intent and gender differences into account.

SIMILARITIES AND DIFFERENCES BETWEEN PISA READING LITERACY AND JUNIOR CERTIFICATE ENGLISH

In the PISA national report, aspects of the Junior Certificate English syllabus and examinations were compared with aspects of the PISA reading literacy framework and assessment. This analysis revealed considerable overlap between PISA reading literacy and Junior Certificate English in terms of reading processes and reading contexts. For example, the current Junior Certificate syllabus for English distinguishes between personal, social and cultural literacies, which correspond to the multiple functions (informative, reflective) and contexts (private, public, educational, and occupational) of reading described in the PISA reading literacy framework.

However, some differences were also apparent. Because PISA focuses on preparedness for everyday (adult) life, there is a greater proportion of non-continuous or functional texts, compared with the Junior Certificate English syllabus and examination. Further, almost half of the PISA reading literacy items are multiple choice and, although some of the remaining items require an extended written response, this is usually only four or five lines in length. Therefore the response formats of the PISA assessment are different to the essay-type response formats expected in the Junior Certificate English examination.

COMPARING PERFORMANCE ON PISA READING LITERACY WITH PERFORMANCE ON JUNIOR CERTIFICATE ENGLISH

Close to 95% of students who took the PISA assessment of reading literacy sat the Junior Certificate English examination in 1999 or 2000, and their outcomes on the examination were compared to outcomes on the PISA assessment. Grades on the Junior Certificate English examination were converted to a 12-point Junior Certificate Performance Scale such that a 12

corresponds to an A at higher level and a 1 corresponds to an F at foundation level (Table 6.1). Different forms of this performance scale were examined (i.e., one with 10 points, another with 14 points), and the 12-point one was found to be optimal. The correlation between students' scores on the PISA assessment of reading literacy and their Junior Certificate Performance Scale scores in English is strong ($r = .74$), but the strength of this relationship is likely to be weaker within individual schools, and it would, of course, vary across schools. Moreover, English is not the only curriculum area that would be expected to be associated with performance on the PISA assessment of reading literacy.

Table 6.1 *Junior Certificate Performance Scale*

Syllabus Level	Junior Certificate Performance Scale Score											
	12	11	10	9	8	7	6	5	4	3	2	1
Higher	A	B	C	D	E	F						
Ordinary				A	B	C	D	E	F			
Foundation							A	B	C	D	E	F

COMPARING THE CONTENT OF PISA READING LITERACY WITH THE CONTENT OF JUNIOR CERTIFICATE ENGLISH

Method Used to Rate Aspects of the PISA Reading Literacy Items

A test-syllabus rating analysis, the outcomes of which are described in full in the PISA national report, involved rating the expected familiarity of students with each PISA literacy item (question) along a number of item aspects or dimensions. The documents referred to in the course of rating were recent Junior Certificate examination papers, teacher guidelines, and syllabus documents. It should be noted that ratings for foundation level were made using examination papers only, since neither a separate foundation level syllabus document nor teacher guidelines is available. The framework consists of a 3×3 table containing three aspects or dimensions of an item (process, context of application, and format), crossed with the three syllabus levels (higher, ordinary, and foundation). Each PISA reading literacy item was rated for each aspect by curriculum experts, who were practising teachers, on its expected familiarity to a typical third-year student. Ratings range from 1 ('not familiar') to 3 ('very familiar') (Table 6.2).

Table 6.2 *Descriptions of Test-Syllabus Aspect Scales and Percentages of Ratings Assigned to Reading Literacy Items, Cross-Classified by Scale and Syllabus Level (N Items = 141)*

Scale Description	% of Items			Total	
	Not Familiar	Somewhat Familiar	Very Familiar		
<i>Process</i>					
Higher	Expected familiarity with the reading process underlying items and texts	3.7	14.7	81.6	100
Ordinary		9.6	36.8	53.7	100
Foundation		25.0	47.1	27.9	100
<i>Context/Application</i>					
Higher	Expected familiarity with the application of specific reading process underlying items in the type of context	13.2	25.7	61.0	100
Ordinary		18.4	54.4	27.2	100
Foundation	(genre, text length, density, complexity) suggested by the item and stimulus text	50.7	47.1	2.2	100
<i>Format</i>					
Higher	Expected familiarity with the application of the specific reading process underlying items in the type of format suggested by the item and stimulus text	50.0	15.4	34.6	100
Ordinary		52.2	23.5	24.3	100
Foundation		72.1	22.8	5.1	100

Note. Ratings on these scales are made considering the typical third year student at each syllabus level.

Results of Item Ratings at the Item Level

The aspect scale ratings assigned to all PISA reading literacy items for each syllabus level are shown in Table 6.2. There appears to be a high degree of similarity between the two assessments in terms of the processes assessed, especially for higher and ordinary levels, where over 90% of items were rated 'somewhat familiar' or 'very familiar' on this aspect. In the case of foundation level, 25% of items were rated 'not familiar' with respect to the reading processes tapped, indicating less overlap between the assessments. Regarding the context of application of the items, there was again a high degree of overlap in the case of both higher and ordinary levels, but less so for foundation level. Since ratings on this scale took text genre and density into account, it suggests that foundation level students would not be expected to deal with texts and items of this type or complexity of around half of those in the PISA assessment. The two assessments differed most with respect to item format. Between 50% and 72% of items (depending on syllabus level) were unfamiliar to students in terms of the format in which they were presented. This is largely due to the fact that multiple choice response formats are not used in the Junior Certificate English examinations, although students are probably familiar with multiple choice items in other contexts.

Results of Item Ratings at the Student Level

Taking into account the particular PISA reading items that students responded to, as well as the level at which they took the Junior Certificate English examination, familiarity scores for each aspect were computed for each student. Correlations between the aggregated process, context/application, and format ratings and the performance of students on the PISA assessment of reading literacy are moderate to strong (.46 for format, .54 for context, and .55 for process).

PERFORMANCE OF STUDENTS AT EACH JUNIOR CERTIFICATE ENGLISH SYLLABUS LEVEL

Mean Scores at Each Syllabus Level

Here, we examine the performance of students taking the Junior Certificate examination at each of the three syllabus levels. There is a substantial difference between the foundation level mean of 337 and the higher level mean of 566 (around $2\frac{1}{3}$ sd), although the mean of the foundation level group is not as reliable as for the other two due to the small number of students in this group. The mean score of foundation level students is just above the national 3rd percentile on the PISA reading scale, while that of higher level students is at the national 64th percentile.

The mean scores can also be interpreted in the light of PISA reading proficiency levels, described in Chapter 3. Foundation level students have a mean score (337) that is at the bottom of Level 1, ordinary level students have a mean score (452) that is in the middle of Level 2, and higher level students have a mean score (566) that is towards the bottom of Level 4.

A summary of the reading skills associated at these levels may be found in Chapter 3. A range of sample tasks may be found in Appendix 1, with a commentary in Appendix 2.

Percentages at Each PISA Proficiency Level at Each Syllabus Level

Table 6.4 shows the percentages of students at each PISA proficiency level cross-classified against the syllabus level at which they took the Junior Certificate English examination. It is

clear that almost all of the students with a reading score at or below Level 1 took Junior Certificate English at ordinary or foundation level. Further, a substantial percentage (39%) of foundation level students are at Level 1, and 50% are below Level 1, suggesting serious reading literacy difficulties in this group. However, a substantial number of ordinary Level students score at level 1 (21%) or below Level 1 (7%). Just under 2% of higher level students, in contrast, had a PISA reading literacy score that is at or below Level 1. Part of the explanation of the poor performance of some higher level students could be that they were not motivated to respond to PISA on the day of the assessment. At the upper end of the scale, almost all of the students with a reading score at Level 4 or 5 took the Junior Certificate English examination at higher level. No foundation level students attained a PISA reading literacy score that was above Level 3.

Table 6.3 *Percentages of Students at Each Pisa Reading Literacy Proficiency Level, Cross-Classified by Junior Certificate English Examination Syllabus Level*

Syllabus Level	Below Level 1	Level 1	Level 2	Level 3	Level 4	Level 5	Total
Higher	0.3	1.2	9.8	31.5	36.4	20.8	100
Ordinary	6.6	20.9	35.7	27.4	8.5	0.9	100
Foundation	49.5	39.3	9.7	1.9	0.0	0.0	100

Number of students at higher = 2583; ordinary = 1173; foundation = 57.

A Consideration of Gender and Early School Leaving Intent

The differences in achievement across the three syllabus levels which are evident in the data described here may be examined in the light of differences in the prevalence of early school leaving intent amongst the three groups, as well as the gender differences observed in the distribution of males and females across the three syllabus levels.

Boys are over-represented in the foundation (67%) and ordinary level (59%) groups, and somewhat under-represented in the higher level group (45%). Early school leaving intent is much more prevalent in the foundation and ordinary groups. It was noted in Chapter 4 that about 14% of Irish students taking the PISA assessment indicated that they intended to leave school prior to completing the senior cycle. Only 5% taking higher level English, compared with 31% taking ordinary level, and 60% taking foundation level, expressed this intent. Further, a cross-classification of gender with early school leaving intent reveals that most of the students intending to leave (73%) are male. However, it should be borne in mind that students taking the PISA assessment included those who took the Junior Certificate examinations about ten months prior to taking the PISA assessment (in 1999) and those who took it two months after taking the PISA assessment (in 2000). Students' intention to leave school early may change somewhat after they sit the Junior Certificate examinations.

INTERPRETING LINKS BETWEEN PISA READING LITERACY AND JUNIOR CERTIFICATE ENGLISH

Nature and Extent of Overlaps Between the Two Assessments

Overall, there is a considerable overlap between performance on the PISA assessment of reading literacy and performance on the Junior Certificate English examination. There is also an overlap between the two assessments in terms of some of the processes they assess and the contexts in which those processes are assessed. However some differences in item formats and across syllabus levels are also apparent. Of course, English is not the only curriculum area that would be expected to influence performance on PISA, since students

read texts in all curricular areas, and also engage in reading outside the context of school and homework/study.

Comments on Foundation and Ordinary Level English

Almost all students who took Junior Certificate English at foundation level may be classified as low achievers (at or below Level 1), some of whom are probably able to complete basic reading tasks but all of whom are unlikely to be able to succeed at more complex reading tasks. Further, three-fifths of the foundation level group indicated that they intended to leave school before completing the senior cycle. Thus most students taking foundation level English may be described as being at the margins of the education system, in terms of low achievement, early school leaving intent, or both. Around three-tenths of students taking English at ordinary level may also be categorised as such. These findings raise questions about the content, delivery, and assessment of the Junior Certificate English curriculum, especially ordinary and foundation levels. They also raise questions about the manner in which students with intent to leave the system are identified as they proceed through it. We discuss these issues further in Chapter 8.

Implications for Teaching

These findings suggest that teachers may have an important role to play in encouraging students to stay in school prior to, and following, the Junior Certificate examination. The overlap in achievement on the PISA assessment of reading literacy in the ordinary and foundation level groups leads one to hypothesise that encouraging more able students to take ordinary level rather than foundation level English might increase their chances of completing second level education to Leaving Certificate level, particularly for boys, who are over-represented at foundation level nationally. Of course, we would need more information about how students actually come to take foundation level English in order to draw more specific conclusions. Further examination of this issue, particularly in the context of monitoring of the *Junior Certificate School Programme*, is warranted. Outcomes of some small-scale research projects carried out as part of the *Junior Certificate School Programme Literacy Strategy* such as the readalong project, whole school approach to literacy development, and paired reading approaches, will be of interest in this regard, since aspects of the strategy might be fruitfully implemented in all schools.

SUMMARY

The comparatively strong performance on PISA reading literacy may in part be due to similarities between the PISA reading literacy framework and the Junior Certificate English syllabus (although students are likely to develop literacy skills in other subject areas and outside the context of school). Ratings of each PISA reading literacy item by curriculum experts, based on the content of the Junior Certificate English syllabus, revealed that the reading processes and contexts in which they are assessed are likely to be familiar to Irish students. Students taking the Junior Certificate examination at foundation level were expected to be less familiar with some of the reading processes and contexts assessed, and the item formats used in the PISA assessment were also less familiar in general. The broad content similarities were borne out in a strong association between performance on both assessments. Further analyses indicated large differences in performance on PISA reading literacy between the three syllabus levels (higher, ordinary, and foundation). Male students and students expressing intent to leave school prior to completing senior cycle were more strongly represented in the low achieving groups, at ordinary, and especially foundation levels.

Chapter 7

The Performance of Irish 15-Year Olds on an International Adult Literacy Scale

OVERVIEW

Between 1994 and 1998, 24 countries/regions, including Ireland, participated in the International Adult Literacy Survey (IALS)—a survey of the literacy skills of adults aged 16 to 65. Three areas were assessed: prose literacy, quantitative literacy and documents literacy. In PISA 2000, a subset of the 15-year old students in participating countries attempted 15 of the IALS prose items (questions). In this chapter, we compare the performance of the PISA students in Ireland on these items with the performance of the original IALS sample.

PERFORMANCE OF IRISH ADULTS ON THE IALS PROSE LITERACY SCALE

On the IALS prose literacy scale, which assessed ability to read and understand continuous texts, Irish adults (aged 16-65 years) ranked 14th of 22 countries/regions. They performed significantly less well than adults in 10 countries/regions, better than adults in five, and about the same as adults in six. Proficiency levels were also used in reporting performance on the IALS scales. Table 7.1 provides descriptions of the skills associated with each level.

Table 7.1 *Skills Associated With the IALS Prose Proficiency Levels*

<i>Level (Interval)</i>	<i>Summary Description</i>
Level 5 (375-500)	The reader is likely to be able to search for information in dense text that contains plausible, competing information, make high-level inferences and use specialised knowledge.
Level 4 (326-375)	The reader is likely to be able to locate requested information through text-based inferences, integrate or contrast pieces of information, sometimes presented in relatively lengthy texts containing distracting information.
Level 3 (276-325)	The reader is likely to be able to identify several pieces of information that are located in different sentences or paragraphs rather than a single sentence, integrate or compare or contrast information across paragraphs or sections in the text.
Level 2 (226-275)	The reader is likely to be able to locate one or more pieces of information in the text; some distracting information may be present in adjacent sentences; low-level inferences may be required.
Level 1 (0-225)	The reader is likely to be able to locate one piece of information in the text that is identical or synonymous to the information given in the directive.

There are some important differences between the PISA and IALS proficiency scales that should be noted:

- In IALS, the probability of an adult at a particular point on the prose literacy scale getting an item at that point on the scale correct was set at .80. Thus, an adult at the bottom of Level 3 has an 8 in 10 chance of getting an item at the bottom of Level 3 correct. This is somewhat higher than the corresponding value of .62 used in PISA (see Chapter 3). A consequence of this is the small proportions of adults scoring at the highest IALS proficiency levels in many countries, since the criterion for achieving skills associated with a particular level is higher than in PISA.
- Unlike PISA, IALS does not include a 'below Level 1' category. Therefore, Level 1 on the IALS prose scale includes adults with very limited skills, and adults who can

reasonably be expected to demonstrate the skills associated with Level 1 (as described in Table 7.1).

- Achievements on the PISA and IALS scales are not directly comparable since the PISA scale has an OECD mean of 500 (sd = 100) and the IALS scale has an international mean of 250 (sd = 50). However, scaling methods were used which allow us to place the performance of PISA students on the IALS scale.

When performance on the IALS prose scale was reported in terms of proficiency levels, 23% of Irish 16- to 65-year olds were found to be achieving at Level 1 (the lowest level), 30% at Level 2, 34 % at Level 3, and 14% at Levels 4 or 5 (Table 7.2, Column 2). The situation among Irish 16- to 24-year olds (a subgroup of the Irish IALS sample) was marginally better, with 16% achieving at Level 1, 29% at Level 2, 40% at Level 3, and 15% at Levels 4 or 5 (Table 7.2, Column 3). The OECD suggests that Level 3 or higher is necessary to meet the literacy challenges of modern society. However, since the IALS prose scale represents a continuum of skills, with adults having different probabilities of achieving different tasks along the scale, we would caution *against* the interpretation that 53% of Irish adults (16-65 years) and 44% of Irish young adults (aged 16-24 years) had insufficient literacy skills.

Table 7.2 Percentages of all IALS Adults, Young IALS Adults, and PISA 15-Year Olds in Ireland Performing at Various Levels on the IALS Prose Literacy Scale

	IALS Adults (16-65 years, 1994/95)	IALS Adults (16-24 years, 1994/95)	PISA Students (15 years old, 2000)
Levels 4 or 5	13.5	15.2	13.0
Level 3	34.1	40.3	43.0
Level 2	29.8	28.5	35.4
Level 1	22.6	15.9	8.6
Total	100	100	100

Total number of IALS participants = 2423; number of IALS participants aged 16-24 = 599; number of PISA participants attempting IALS questions = 1290.

THE PERFORMANCE OF PISA 15-YEAR OLDS ON THE IALS PROSE LITERACY SCALE

As part of the PISA assessment, a subset of 15-year olds in each participating country was administered a set of texts and associated tasks abstracted from the IALS assessment of prose literacy. One of the texts, a newspaper editorial entitled *Technology Creates the Need for New Rules*, is reproduced in Appendix 1 of this report, along with a commentary in Appendix 2. Following the implementation of test equating procedures, it was possible to place the performance of students in PISA on the IALS prose proficiency scale described above. Fifteen-year olds in four countries—Finland, Japan, Korea, and Canada—achieved significantly higher mean scores than Ireland on the scale, while students in two countries—Australia and New Zealand—achieved mean scores that were not significantly different. The strong performance of Irish students participating in PISA is apparent when one compares the proportions of PISA students at each IALS level (Table 7.2, Column 4) with the proportions of 16-25 year olds who achieved the corresponding levels in 1994/95 (Column 3). It is estimated that fewer 15-year olds (9%) are at Level 1, while more (35%) are at Level 2. The proportions of PISA 15-year olds in 2000 and of IALS 16 to 24-year olds in 1994/95 performing at Level 3 and at Levels 4 or 5 on the IALS scale are about the same.

INTERPRETING THE PERFORMANCE OF 15-YEAR OLDS

Some care needs to be exercised in concluding, on the basis of the PISA data, that reading standards among Irish adults, and young adults in particular, have improved since the IALS was administered in Ireland in 1994/95. PISA 2000 assessed only young people who were in school at age 15 (about 97% of the age cohort), while the IALS assessed the full range of adults, including early school leavers. However, in IALS, response rates were quite low (for example, 60% in Ireland), and the effect of this is unclear. In addition, there is no evidence that the reading skills acquired by 15-year olds are maintained by all students as they continue in the education system or leave school. This suggests that additional corroborating evidence is needed before it can be concluded that there has been an increase in the reading proficiency of Irish adults.

SUMMARY

Notwithstanding differences between PISA and the earlier International Adult Literacy Survey (IALS), administered to representative samples of adults in some OECD countries between 1994 and 1998, it was possible to place the performance of PISA students on the IALS prose literacy scale. This exercise showed that fewer Irish 15-year olds in PISA (9%) than Irish adults (16-24 years) in IALS (16%) achieved only the lowest IALS prose literacy proficiency level. However, readers are cautioned that additional evidence would be required before it could be concluded that basic reading standards among Irish adults have improved in recent years.

Chapter 8

Conclusion

OVERVIEW

One of the main purposes of PISA is to provide participating OECD member countries with information on the functioning of their education systems in a comparative context, and to facilitate policy development at a national level. In this chapter, major outcomes of the PISA 2000 assessment of reading literacy are reviewed from an Irish perspective and implications for policy development are drawn. Five broad topics are addressed: achievement in reading literacy; gender differences; differences in achievement between and within schools; student variables associated with reading literacy; and links between the Junior Certificate English examination and the PISA assessment of reading literacy. The chapter concludes with some comments on further research needed, and future survey cycles of PISA.

ACHIEVEMENT ON PISA READING LITERACY

Clearly, Irish students performed comparatively well on the PISA assessment of reading literacy. Students in just one country, Finland, achieved mean scores on combined reading literacy, and on four of five reading literacy subscales (Retrieve, Interpret, Continuous texts and Non-continuous texts) that were significantly higher than Ireland's. On the Reflect/Evaluate subscale, the mean score of Irish students was not significantly different from that of the highest scoring country, Canada. The mean scores of Irish students on combined reading literacy and on all five reading literacy subscales were higher than the corresponding OECD country average scores. Further, the proportion of low-scoring Irish students (those scoring at or below proficiency Level 1 on the PISA combined reading literacy proficiency scale) (11%) was below the OECD country average (18%). A comparison between the performance of Irish students in PISA and Irish adults in the 1994/95 International Adult Literacy Study provided some preliminary evidence that improvements in basic literacy standards may have been made in recent years.

While it is clear that the performance of Irish students was strong, some concern must be expressed at the proportion of 15-year olds scoring at or below Level 1 on the combined reading literacy proficiency scale. These students performed poorly on, or were unable to complete, the most basic reading comprehension tasks set by PISA. They are therefore likely to experience difficulties in their future education and in the world of work. Some of the students who are not in school at age 15 and therefore not assessed in PISA (just under 3%) could also be expected to have correspondingly low literacy skills. Because reading standards in Ireland are relatively high, those with poor skills are likely to be at an even greater disadvantage from an individual point of view than their counterparts in countries with lower average levels. It seems important, therefore, to redouble efforts to address low levels of achievement in literacy among students at both primary level (where about 10% of students have been shown to have serious reading difficulties) and second level. The effects of some recent developments will need to be monitored carefully, and adjustments made as needed. These developments include the establishment of specific targets for literacy as part of the National Anti-Poverty Strategy, the implementation of the *Reading Recovery* programme in some designated disadvantaged primary schools, and implementation of a modified English syllabus, with a greater emphasis on literacy, as part of the *Junior Certificate School Programme* (JCSP).

A consistent finding arising from the analyses of the reading literacy data for Ireland is the association between low achievement in reading literacy and intent to leave school before completion of the senior cycle. In Chapter 5, it was noted that students intending to leave school early scored a minimum of 39 points ($\frac{2}{5}$ sd) lower than students not intending to leave early, after allowing for the effects of a range of other variables on achievement. In Chapter 6, it was observed that the majority of students indicating an intention to leave school early were male. These findings support efforts to address early school leaving through initiatives such as the *School Completion Programme*, which provides additional support, both in school and out of school, to students between 4 and 18 years of age, who are at risk of leaving school early. Such initiatives seem particularly pertinent to the needs of 15-year olds, as it is soon after the completion of compulsory schooling (now age 16) that most students who leave school early decide to do so. An important challenge for programmes designed to encourage students to stay in school is how to address low literacy levels among them.

Another finding that may merit closer analysis is that, of the 6% in receipt of learning support at the time of the PISA assessment, half were low achievers (scoring at or below Level 1) and half were moderate to high achievers (scoring at or above Level 2). While some of the low-achieving students may have performed poorly on the assessment day for reasons other than having low literacy levels, this finding does have implications for the identification of students in need of ongoing support in their literacy development, and how this support might be best allocated. An examination of the distribution of learning support resources across the second level school sector is warranted.

GENDER DIFFERENCES IN READING LITERACY

Given the recent concerns about gender differences in the Certificate examinations expressed by teachers, and also in recent media reports, differences between the performance of male and female students on PISA reading literacy are of interest. First, the size of the difference on combined reading literacy in Ireland (29 points, $\frac{3}{10}$ sd in favour of female students) was about the same as the OECD country average difference. This indicates that, while the difference should indeed be a matter of concern, particularly in the case of lower-achieving students, such a difference is not unique to Ireland, or to the English language. Second, a difference in favour of female students in achievement in reading literacy is also found on a number of measures relating to reading attitudes and behaviours such as the frequency with which they read for pleasure, and their attitudes towards reading. These measures are related to achievement in reading literacy. Therefore such associations may be worth exploring further, especially in the context of longitudinal or experimental research. Third, the finding that the gap between male and female students in PISA was narrower on the non-continuous scale than on the continuous scale in Ireland and elsewhere suggests that a stronger approach to developing narrative reading skills in male students, especially in the early years of schooling, may be warranted. Fourth, in the model of reading literacy described in Chapter 5 of this report, the effect of gender on reading literacy was found to be non-significant, and gender was not found to interact with other variables in the model. Hence, the variation in achievement corresponding to gender was accounted for by the other explanatory variables retained in the model such as attitude to reading. In the future, it may be possible to establish which specific variables account for achievement differences between male and female students.

DIFFERENCES IN ACHIEVEMENT BETWEEN AND WITHIN SCHOOLS

As indicated in Chapter 5, the variation in PISA combined reading literacy that is attributable to differences between schools is relatively low in Ireland in comparison with the OECD country average (18% vs. 35%). This indicates that, from an international comparative point of view, the education system in Ireland is fairly homogeneous at the school level. Nevertheless, differences in performance in reading literacy were observed between certain categories of schools. In particular, attendance at a vocational school (compared with secondary, community and comprehensive schools), and attendance at a designated disadvantaged school (compared with a non-designated school) were shown to have negative associations with achievement. These effects, which were found when other measures such as student home background were controlled for, point to the need to address differences between categories of schools as a matter of policy. A particular issue here is the way in which students select second-level schools, and the ways in which schools select students.

While general initiatives designed to alleviate disadvantage such as the *Disadvantaged Areas Scheme* and the *Home-School Community Liaison Scheme* (HSCL) might be expected to have some positive effects on students' reading achievement at both primary and second levels, it is unclear how strong these effects are, or how they operate. It would be useful to evaluate the effects of such schemes in improving students' reading achievement, and to identify any measures that are necessary to optimise them.

As indicated in Chapter 5, differences within schools in Ireland are relatively large, indicating a broad spread of achievement within schools. These differences may be attributable to classes and/or to individual students in Ireland. The design of PISA 2003 in Ireland has been adjusted to allow for a more comprehensive exploration of the nature of within-school differences and their implications for policy.

READING-SPECIFIC STUDENT CHARACTERISTICS AND READING LITERACY

In addition to gender, Chapter 4 revealed associations between a range of school and student characteristics (variables), and performance on the PISA combined reading literacy scale. The student variables included home background, frequency of leisure reading, diversity of reading (the frequency with which students read a range of reading materials), attitude to reading, intent to leave school before completion of the senior cycle, and variables related to self-regulated learning (e.g., interest in reading, academic self-concept, and use of control strategies). The school variables included school type (whether secondary, vocational, or community/comprehensive), student-teacher ratio and school designated disadvantaged status.

A limitation of the analyses presented in Chapter 4 is that many of these variables are themselves related to one another. Therefore, in Chapter 5, we looked at the simultaneous associations between achievement and a range of student and school variables in a statistical model of achievement. Here, we consider whether the reading-specific student characteristics such as diversity of reading, attitude to reading, and the use of control strategies during reading or study maintained their associations with reading literacy, when evaluated in the context of the other student and school variables.

Like student gender, the effects of several reading-specific characteristics, including diversity of reading, verbal self-concept, and use of control strategies, were explained by other variables and were not included in the final model. This indicates that the associations

between these characteristics and reading literacy cannot be considered independently of other school and student characteristics.

An important interaction included in the final model of reading described Chapter 5 is that between attitude to reading (a reading-specific variable) and the index of number of books in the home (a measure of home educational environment). There is a stronger association between books in a student's home and achievement in reading, when students' attitude is good compared to when it is poor. One might hypothesise that students with better attitudes to reading benefit more from home environments that are rich in print resources. Alternatively, one might equally argue that a more positive attitude to reading emerges when a student has a relatively supportive home educational environment in comparison with a less supportive one. Either way, these findings serve to underline the importance of supporting students and their parents in developing a home environment that is conducive to reading and study.

THE JUNIOR CERTIFICATE EXAMINATION AND PISA READING LITERACY

As indicated in Chapter 6, there is considerable overlap between performance on the Junior Certificate in English and on the PISA assessment of reading literacy. The overlap relates to the processes tested in the two assessments, and the contexts in which they are assessed. It can be argued that, in some respects, the Junior Cycle English syllabus and Junior Certificate English examination prepared students for the PISA assessment.

PISA provides an independent measure of the performance of students at different levels of Junior Certificate English examination. While it is not surprising that the vast majority of students who sat foundation level English in either 1999 or 2000 achieved at or below Level 1 on PISA, it is significant that 28% of students taking ordinary level syllabus in those years also achieved scores at or below Level 1. This suggests an overlap in the competence of students taking ordinary and foundation levels, and points to a need to review the purpose and focus on foundation level English and the basis upon which students make choices about which level to take. Such a review would need to take into account the number who did not achieve grade D or higher in Ordinary level English (257 of 19811 students in 2002, or just over 1%) coupled with the large proportion of Ordinary-level students achieving Level 1 or below on PISA reading literacy. One might hypothesise, for example, that many of the higher-performing students at foundation level (including many male students) could be encouraged to take ordinary level as a way of increasing the likelihood that they will not leave school before completion of the Leaving Certificate examination.

ISSUES HIGHLIGHTED FOR FURTHER RESEARCH

The outcomes on the PISA 2000 reading literacy assessment and the analyses described in this report have highlighted a number of areas that would merit further research. The limitations of the PISA survey design (its cross-sectional nature, the lack of information from teachers, and the lack of detailed information about the nature of responses on the test) limit the nature and types of inferences that we can make.

Some of the key areas flagged for further research include:

- An examination of how students who enter second-level education with poor literacy skills are monitored.
- An evaluation of the extent to which the needs of those with poor literacy skills are being met by the established Junior Certificate Programme in the context of the English syllabus and the programme in general.

- The availability of the *Junior Certificate School Programme*, its contribution to the development of the literacy skills of at-risk students, and the profile of performance of JCSP students in the Junior Certificate examination. Indeed, evaluations of the JCSP by the NCCA and the Department of Education and Science are expected towards the end of 2003.
- An examination of the manner in, and extent to, which school resources are deployed to address literacy issues, including an examination of how teachers of English and of other subjects work with students who have significant literacy difficulties.
- The distribution of learning support resources, especially those for literacy development, across the second-level sector.
- The extent to which schools are implementing policies to improve literacy levels via cross-curricular and whole-school approaches, the identification of the aspects of those policies that are successful and the identification of local factors that contribute to their success.
- A more in-depth examination of gender differences in engagement in reading that would look at patterns of engagement and achievement at both primary and second levels. This is one area of research where a longitudinal survey design might be particularly useful.

READING LITERACY IN FUTURE PISA CYCLES

Although reading literacy is a minor domain in the PISA assessments of 2003 and 2006, these assessments will provide information on trends in reading literacy, making it possible to track changes in performance that may occur in Ireland and in other countries. The assessments will also offer an opportunity to address outstanding research issues arising from the PISA 2000 assessment. In Ireland, for example, it was found in PISA 2000 that students (and males in particular) did a comparatively low amount of leisure reading. However, no information was available on the volume of required reading that students engaged in as part of their school work. Therefore, in PISA 2003, both the frequency of leisure reading, and reading relating to study and homework, are examined through supplementary questions on the Irish Student questionnaire.

Bibliography

Reading for Change: Performance and Engagement Across Countries. Results from PISA 2000. (Kirsch, I., de Jong, J., Lafontaine, D., McQueen, J., Mendelovits, J., & Monseur, C. (2002, Paris: Organisation for Economic Co-operation and Development [OECD]).

Provides a detailed overview of the performance of students on the reading literacy component of PISA 2000. Engagement in reading and its association with reading performance is also examined in detail.

ISBN 92-64-09926-3

Full report and summary available online at <http://www.pisa.oecd.org>

Hardcopies can be ordered online at <http://www.SourceOECD.org>

Ready for Life? The Literacy Achievements of Irish 15-Year Olds with Comparative International Data. (Shiel, G., Cosgrove, J., Sofroniou N., & Kelly, A. (2001, Dublin: Educational Research Centre).

Provides a detailed interpretation of the performance of Irish students in the PISA assessment and considers how the outcomes might contribute to the development of educational policy in Ireland.

ISBN 0-9004400-9-0

Summary available online at <http://www.erc.ie/pisa>

Hardcopy of full report available from the Educational Research Centre, St Patrick's College, Dublin 9. [Online order form at: <http://www.erc.ie/pisa>]

Knowledge and Skills for Life: First Results of PISA 2000. (OECD, 2001, Paris: OECD).

The first international report produced by the OECD on PISA 2000. It presents a more broadly focused discussion of the international findings.

ISBN 92-64-19671-4

Full report and summary available online at <http://www.pisa.oecd.org>

Hardcopies can be ordered online at <http://www.SourceOECD.org>

Measuring Student Knowledge and Skills: The PISA 2000 Assessment of Reading, Mathematical and Scientific Literacy. (OECD, 2000, Paris: OECD).

Introduces the PISA approach to assessing reading, mathematical and scientific literacy and describes the PISA 2000 assessment instruments in terms of: the content that students need to acquire, the processes that need to be performed, and the contexts in which knowledge and skills are applied. Each of the assessment domains is illustrated with sample items.

ISBN 92-64-17646-2

Available online at <http://www.pisa.oecd.org>

Hardcopy can be ordered online at <http://www.SourceOECD.org>

Measuring Student Knowledge and Skills: A New Framework for Assessment. (OECD, 1999, Paris: OECD).

Describes the background to PISA with a particular focus on how Reading, Mathematics and Science are defined, measured and analysed.

ISBN 92-64-17053-7

Available online at <http://www.pisa.oecd.org>

Hardcopy can be ordered online at <http://www.SourceOECD.org>

Appendix 1

Sample Texts, Tasks and Item Statistics

INTERPRETING THE TABLES IN APPENDIX 1

Item difficulty is given (i) on the PISA scale with a mean of 500, and (ii) in terms of the PISA proficiency level (1-5).

The percent correct is the percentage of students who answered the item correctly out of all students. The percentage of students who did not attempt the question is given in as percent missing, and the percentage of students who *did* attempt the question but were unsuccessful is given as percent incorrect.

Readers can use this information to compute the percent correct out of *only* those students who did attempt the question should they so wish, using the sum of correct and incorrect as the denominator. For example, the percent correct for students who did attempt Question 1 of *The Gift* is 65% for students across the OECD ($55/[55+29]*100$) and 70% for Irish students ($65/[65+28]*100$).

In the tables, 'PC' refers to partial credit and 'FC' refers to full credit. These abbreviations are used with some tasks where students' responses are classified as either partially correct and merit some credit, or where their responses are more developed, and deserve full credit.

'THE GIFT': TEXT

Text Classification: Continuous, narrative.

5 How many days, she wondered, had she sat like this, watching the cold brown water inch up the dissolving bluff. She could just faintly remember the beginning of the rain, driving in across the swamp from the south and beating against the shell of her house. Then the river itself started rising, slowly at first until at last it paused to turn back. From hour to hour it slithered up creeks and ditches and poured over low places. In the night, while she slept, it claimed the road and surrounded her so that she sat alone, her boat gone, the house like a piece of drift lodged on its bluff. Now even against the tarred planks of the supports the waters touched. And still they rose.

10 As far as she could see, to the treetops where the opposite banks had been, the swamp was an empty sea, awash with sheets of rain, the river lost somewhere in its vastness. Her house with its boat bottom had been built to ride just such a flood, if one ever came, but now it was old. Maybe the boards underneath were partly rotted away. Maybe the cable mooring the house to the great live oak would snap loose and let her go turning downstream, the way her boat had gone.

15 No one could come now. She could cry out but it would be no use, no one would hear. Down the length and breadth of the swamp others were fighting to save what little they could, maybe even their lives. She had seen a whole house go floating by, so quiet she was reminded of sitting at a funeral. She thought when she saw it she knew whose house it was. It had been bad seeing it drift by, but the owners must have escaped to higher ground. Later, with the rain and darkness pressing in, she had heard a panther scream upriver.

20 Now the house seemed to shudder around her like something alive. She reached out to catch a lamp as it tilted off the table by her bed and put it between her feet to hold it steady. Then creaking and groaning with effort the house struggled up from the clay, floated free, bobbing like a cork and swung out slowly with the pull of the river. She gripped the edge of the bed. Swaying from side to side, the house moved to the length of its mooring. There was a jolt and a complaining of old timbers and then a pause. Slowly the current released it and let it swing back, rasping across its resting place. She caught her breath and sat for a long time feeling the slow pendulous sweeps. The dark sifted down through the incessant rain, and, head on
25 arm, she slept holding on to the bed.

Sometime in the night the cry awoke her, a sound so anguished she was on her feet before she was awake. In the dark she stumbled against the bed. It came from out there, from the river. She could hear something

30 moving, something large that made a dredging, sweeping sound. It could be another house. Then it hit, not head on but glancing and sliding down the length of her house. It was a tree. She listened as the branches and leaves cleared themselves and went on downstream, leaving only the rain and the lappings of the flood, sounds so constant now that they seemed a part of the silence. Huddled on the bed, she was almost asleep again when another cry sounded, this time so close it could have been in the room. Staring into the dark, she eased back on the bed until her hand caught the cold shape of the rifle. Then crouched on the pillow, she cradled the gun across her knees. "Who's there?" she called.

35 The answer was a repeated cry, but less shrill, tired sounding, then the empty silence closing in. She drew back against the bed. Whatever was there she could hear it moving about on the porch. Planks creaked and she could distinguish the sounds of objects being knocked over. There was a scratching on the wall as if it would tear its way in. She knew now what it was, a big cat, deposited by the uprooted tree that had passed her. It had come with the flood, a gift.

40 Unconsciously she pressed her hand against her face and along her tightened throat. The rifle rocked across her knees. She had never seen a panther in her life. She had heard about them from others and heard their cries, like suffering, in the distance. The cat was scratching on the wall again, rattling the window by the door. As long as she guarded the window and kept the cat hemmed in by the wall and water, caged, she would be all right. Outside, the animal paused to rake his claws across the rusted outer screen. Now and then, it whined and growled.

45 When the light filtered down through the rain at last, coming like another kind of dark, she was still sitting on the bed, stiff and cold. Her arms, used to rowing on the river, ached from the stillness of holding the rifle. She had hardly allowed herself to move for fear any sound might give strength to the cat. Rigid, she swayed with the movement of the house. The rain still fell as if it would never stop. Through the grey light, finally, she could see the rain-pitted flood and far away the cloudy shape of drowned treetops. The cat was not moving now. Maybe he had gone away. Laying the gun aside she slipped off the bed and moved without a sound to the window. It was still there, crouched at the edge of the porch, staring up at the live oak, the mooring of her house, as if gauging its chances of leaping to an overhanging branch. It did not seem so frightening now that she could see it, its coarse fur napped into twigs, its sides pinched and ribs showing. It would be easy to shoot it where it sat, its long tail whipping back and forth. She was moving back to get the gun when it turned around. With no warning, no crouch or tensing of muscles, it sprang at the window, shattering a pane of glass. She fell back, stifling a scream, and taking up the rifle, she fired through the window. She could not see the panther now, but she had missed. It began to pace again. She could glimpse its head and the arch of its back as it passed the window.

60 Shivering, she pulled back on the bed and lay down. The lulling constant sound of the river and the rain, the penetrating chill, drained away her purpose. She watched the window and kept the gun ready. After waiting a long while she moved again to look. The panther had fallen asleep, its head on its paws, like a housecat. For the first time since the rains began she wanted to cry, for herself, for all the people, for everything in the flood. Sliding down on the bed, she pulled the quilt around her shoulders. She should have got out when she could, while the roads were still open or before her boat was washed away. As she rocked back and forth with the sway of the house a deep ache in her stomach reminded her she hadn't eaten. She couldn't remember for how long. Like the cat, she was starving. Easing into the kitchen, she made a fire with the few remaining sticks of wood. If the flood lasted she would have to burn the chair, maybe even the table itself. Taking down the remains of a smoked ham from the ceiling, she cut thick slices of the brownish red meat and placed them in a skillet. The smell of the frying meat made her dizzy. There were stale biscuits from the last time she had cooked and she could make some coffee. There was plenty of water.

75 While she was cooking her food, she almost forgot about the cat until it whined. It was hungry too. "Let me eat," she called to it, "and then I'll see to *you*." And she laughed under her breath. As she hung the rest of the ham back on its nail the cat growled a deep throaty rumble that made her hand shake.

80 After she had eaten, she went to the bed again and took up the rifle. The house had risen so high now it no longer scraped across the bluff when it swung back from the river. The food had warmed her. She could get rid of the cat while light still hung in the rain. She crept slowly to the window. It was still there, mewling, beginning to move about the porch. She stared at it a long time, unafraid. Then without thinking what she was doing, she laid the gun aside and started around the edge of the bed to the kitchen. Behind her the cat was moving, fretting. She took down what was left of the ham and making her way back across the swaying floor to the window she shoved it through the broken pane. On the other side there was a hungry snarl and something like a shock passed from the animal to her. Stunned by what she had done, she drew back to the bed. She could hear the sounds of the panther tearing at the meat. The house rocked around her.

85 The next time she awoke she knew at once that everything had changed. The rain had stopped. She felt for the movement of the house but it no longer swayed on the flood. Drawing her door open, she saw through

the torn screen a different world. The house was resting on the bluff where it always had. A few feet down, the river still raced on in a torrent, but it no longer covered the few feet between the house and the live oak. And the cat was gone. Leading from the porch to the live oak and doubtless on into the swamp were tracks, indistinct and already disappearing into the soft mud. And there on the porch, gnawed to whiteness, was what was left of the ham.

THE GIFT QUESTION 1

Here is part of a conversation between two people who read "The Gift":

Speaker 1: I think the woman in the story is heartless and cruel.

Speaker 2: How can you say that? I think she's a very compassionate person.

Give evidence from the story to show how each of these speakers could justify their point of view.

PISA Difficulty	Item Statistics	% OECD	% Ireland
Scale score	Correct	55.0	65.4
537	Incorrect	29.3	28.3
Level	Missing	15.7	6.3
3	Total	100	100

Key: Gives evidence for both speakers.

Speaker 1: evidence from the story that supports the idea that the woman is heartless and cruel. **Speaker 2:** evidence from the story that supports the idea that the woman is compassionate.

Process: Reflect and evaluate. Connect own concepts of compassion and cruelty with behaviour of a character and use evidence identified in the text to justify opposing points of view.

THE GIFT QUESTION 2

What is the woman's situation at the beginning of the story?

- A She is too weak to leave the house after days without food.
- B She is defending herself against a wild animal.
- C Her house has been surrounded by flood waters.
- D A flooded river has swept her house away.

PISA Difficulty	Item Statistics	% OECD	% Ireland
Scale score	Correct	73.5	80.7
447	Incorrect	22.4	18.3
Level	Missing	4.1	1.0
2	Total	100	100

Key: C

Process: Interpretation of text. Understand the setting of a story from information given in a single paragraph.

THE GIFT QUESTION 3

Here are some of the early references to the panther in the story.

“the cry awoke her, a sound so anguished...” (line 27)

“The answer was a repeated cry, but less shrill, tired sounding...” (line 36)

“She had...heard their cries, like suffering, in the distance.” (lines 42-43)

Considering what happens in the rest of the story, why do you think the writer chooses to introduce the panther with these descriptions?

PISA Difficulty	Item Statistics	% OECD	% Ireland
<i>Scale score</i>	Correct	29.5 (PC); 28.1 (FC)	26.2 (PC); 38.0 (FC)
539 (PC); 645 (PC)	Incorrect	23.0	27.1
<i>Level</i>	Missing	19.4	8.7
3 (PC); 5 (FC)	Total	100	100

Key: *Partial Credit: Recognises that descriptions create mystery or suspense, or that the panther is presented from the woman’s point of view, or literal interpretation (e.g., the panther was hungry).*

Full Credit: Recognises that the quotations are intended to evoke pity.

Process: *Interpretation of text.* Detect nuances of language in short quotations from a story and relate them to the main theme. There are conflicting ideas in the immediate vicinity of the quotations.

THE GIFT QUESTION 4

“Then creaking and groaning with effort the house struggled up ...” (lines 20-21)

What happened to the house in this part of the story?

- A It fell apart.
- B It began to float.
- C It crashed into the oak tree.
- D It sank to the bottom of the river.

PISA Difficulty	Item Statistics	% OECD	% Ireland
<i>Scale score</i>	Correct	86.8	85.3
367	Incorrect	10.2	13.5
<i>Level</i>	Missing	3.0	1.2
1	Total	100	100

Key: B

Process: *Retrieval of information.* Locate an explicitly stated piece of information with little competing information.

THE GIFT QUESTION 5

What does the story suggest was the woman's reason for feeding the panther?

PISA Difficulty	Item Statistics	% OECD	% Ireland
Scale score	Correct	57.8	60.3
519	Incorrect	28.4	33.0
Level	Missing	13.8	6.7
3	Total	100	100

Key: Recognises that there is an implication that the woman is motivated by pity or empathy, that the story does not explicitly mention the woman's motivation, or that the panther has a physical need for food or help.

Process: Interpretation of text. Explain a character's motivation by linking a chain of events dispersed throughout a long narrative text.

THE GIFT QUESTION 6

When the woman says, "and then I'll see to you" (line 75) she means that she is

- A sure that the cat won't hurt her.
- B trying to frighten the cat.
- C intending to shoot the cat.
- D planning to feed the cat.

PISA Difficulty	Item Statistics	% OECD	% Ireland
Scale score	Correct	40.0	48.7
603	Incorrect	55.1	49.4
Level	Missing	4.9	1.9
4	Total	100	100

Key: C

Process: Interpretation of text. Construe meaning of a sentence in context by taking information in a large section of text into account. In isolation the sentence is ambiguous and there are alternative meanings (if context is not taken into account).

THE GIFT QUESTION 7

Do you think that the last sentence of "The Gift" is an appropriate ending?

Explain your answer, demonstrating your understanding of how the last sentence relates to the story's meaning.

PISA Difficulty	Item Statistics	% OECD	% Ireland
Scale score	Correct	28.0 (PC); 20.2 (FC)	28.8 (PC); 28.1 (FC)
567 (PC); 652 (FC)	Incorre	29.0	30.7
Level	Missing	22.8	12.4
4 (PC); 5 (FC)	Total	100	100

Key: Partial Credit: Responds at a literal level, in terms of narrative sequence.

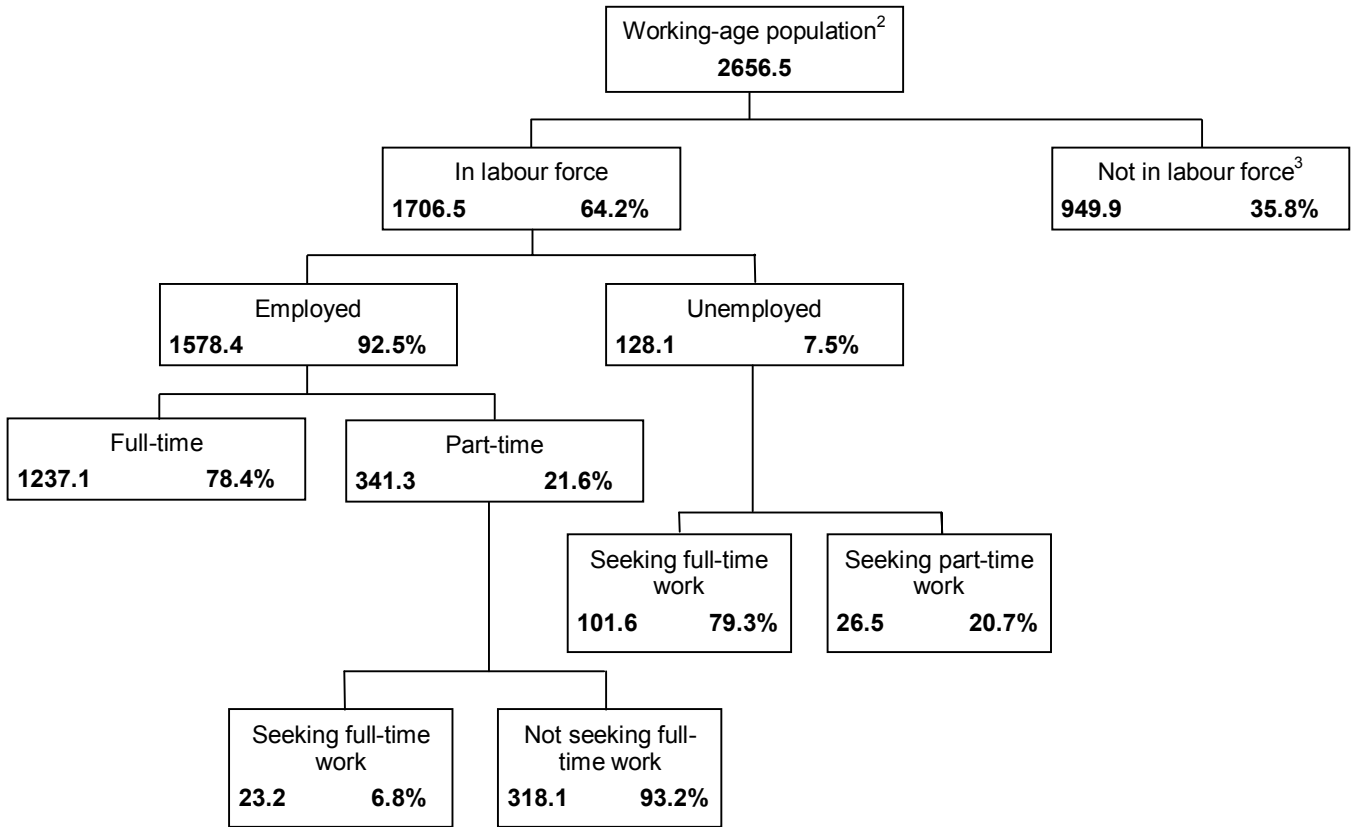
Full Credit: Evaluates the story by going beyond a literal interpretation, in terms of thematic completeness, or in terms of style or mood.

Process: Reflect and evaluate. Evaluate the appropriateness of a story ending by commenting on its consistency with the plot as a whole and/or by commenting on its connection with the general theme or mood of the text.

LABOUR FORCE: TEXT

The Labour Force Structure year ended 31 March 1995 (000s)¹

Text Classification: Non-continuous, schematic.



Notes

1. Numbers of people are given in thousands (000s).
2. The working-age population is defined as people between the ages of 15 and 65.
3. People "Not in labour force" are those not actively seeking work and/or not available for work.

LABOUR QUESTION 1

What are the two main groups into which the working-age population is divided?

- A Employed and unemployed.
- B Of working age and not of working age.
- C Full-time workers and part-time workers.
- D In the labour force and not in the labour force.

PISA Difficulty	Item Statistics	% OECD	% Ireland
Scale score	Correct	62.8	58.7
477	Incorrect	29.4	36.4
Level	Missing	7.8	4.9
2	Total	100	100

Key: D

Process: Interpretation of text. Understand the relationship between two categories of information presented.

LABOUR QUESTION 2

How many people of working age were not in the labour force? (Write the **number** of people, not the percentage.)

PISA Difficulty	Item Statistics	% OECD	% Ireland
Scale score	Correct	36.8 (PC); 27.6 (FC)	43.8 (PC); 28.5 (FC)
485 (PC); 631(FC)	Incorrect	21.8	20.3
Level	Missing	13.8	7.4
3 (PC); 5 (FC)	Total	100	100

Key: Partial Credit: 949.9 (or equivalent, allowing rounding)

Full Credit: 949.9 thousand (or equivalent, allowing rounding).

Process: Retrieval of information. Locate correct numerical information and, for full credit, combine it with conditional information given in a footnote.

LABOUR QUESTION 3

In which part of the tree diagram, if any, would each of the people listed in the table below be included? Show your answer by placing a cross in the correct box in the table. The first one has been done for you.

	“In labour force: employed”	“In labour force: unem- ployed”	“Not in labour force”	Not included in any category
A part-time waiter, aged 35	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A business woman, aged 43, who works a sixty-hour week	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A full-time student, aged 21	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
A man, aged 28, who recently sold his shop and is looking for work	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A woman, aged 55, who has never worked or wanted to work outside the home	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
A grandmother, aged 80, who still works a few hours a day at the family’s market stall	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

PISA Difficulty
Scale score 473 (PC); 727(FC)
Level 2 (PC); 5 (FC)

Item Statistics	% OECD	% Ireland
Correct	52.1 (PC); 13.2 (FC)	54.0 (PC); 14.5 (FC)
Incorrect	27.1	27.2
Missing	7.6	3.3
Total	100	100

Key: Marked in table. For partial credit, 1 or 2 errors are permitted.

Process: Interpretation of text. Analyse and match several cases to categories where some of the necessary information is in footnotes.

LABOUR QUESTION 4

Suppose that information about the labour force was presented in a tree diagram like this every year.

Listed below are four features of the tree diagram. Show whether or not you would expect these features to change from year to year, by circling either 'Change' or 'No change'. The first one has been done for you.

<i>Features of Tree Diagram</i>	<i>Answer</i>
The labels in each box (e.g. "In labour force")	Change / <u>No change</u>
The percentages (e.g. "64.2%")	<u>Change</u> / No change
The numbers (e.g. "2656.5")	<u>Change</u> / No change
The footnotes under the tree diagram	Change / <u>No change</u>

PISA Difficulty	Item Statistics	% OECD	% Ireland
<i>Scale score</i>	Correct	68.8	74.1
445	Incorrect	21.5	20.5
<i>Level</i>	Missing	9.7	5.4
2	Total	100	100

Key: Circled in table, all responses must be correct for credit.

Process: *Reflect and evaluate.* Draw on knowledge on the form and content of a tree diagram about the labour force to distinguish between variables and structural features.

LABOUR QUESTION 5

The information about the labour force structure is presented as a tree diagram, but it could have been presented in a number of other ways, such as a written description, a pie chart, a graph or a table.

The tree diagram was probably chosen because it is especially useful for showing

- A changes over time.
- B the size of the country's total population.
- C categories within each group.
- D the size of each group.

PISA Difficulty	Item Statistics	% OECD	% Ireland
<i>Scale score</i>	Correct	61.6	70.0
486	Incorrect	31.2	23.1
<i>Level</i>	Missing	7.2	6.9
3	Total	100	100

Key: C

Process: *Reflect and evaluate.* Evaluate structure of a tree diagram and recognise that its structure is appropriate for showing categories within each group.

TECHNOLOGY CREATES THE NEED FOR NEW RULES: TEXT

Text Classification: Continuous, expository, taken from International Adult Literacy Survey (IALS)

SCIENCE has a way of getting ahead of law and ethics. That happened dramatically in 1945 on the destructive side of life with the atomic bomb, and is now happening on life's creative side with techniques to overcome human infertility.

Most of us rejoiced with the Brown family in England when Louise, the first test-tube baby, was born. And we have marvelled at other firsts — most recently the births of healthy babies that had once been embryos frozen to await the proper moment of implantation in the mother-to-be.

It is about two such frozen embryos in Australia that a storm of legal and ethical questions has arisen. The embryos were destined to be implanted in Elsa Rios, wife of Mario Rios. A previous embryo implant had been unsuccessful, and the Rioses wanted to have another chance at becoming parents. But before they had a second chance to try, the Rioses perished in an airplane crash.

What was the Australian hospital to do with the frozen embryos? Could they be implanted in someone else? There were numerous volunteers. Were the embryos somehow entitled to the Rioses' substantial estate? Or should the embryos be destroyed? The Rioses, understandably, had made no provision for the embryos' future.

The Australians set up a commission to study the matter. Last week, the commission made its report. The embryos should be thawed, the panel said, because donation of embryos to someone else would require the consent of the "producers," and no such consent had been given. The panel also held that the embryos in their present state had no life or rights and thus could be destroyed.

The commission members were conscious of treading on slippery legal and ethical grounds. Therefore, they urged that three months be allowed for public opinion to respond to the commission recommendation. Should there be an overwhelming outcry against destroying the embryos, the commission would reconsider.

Couples now enrolling in Sydney's Queen Victoria hospital for in vitro fertilization programmes must specify what should be done with the embryos if something happens to them.

This assures that a situation similar to the Rioses won't recur. But what of other complex questions? In France, a woman recently had to go to court to be allowed to bear a child from her deceased husband's frozen sperm. How should such a request be handled? What should be done if a surrogate mother breaks her child-bearing contract and refuses to give up the infant she had promised to bear for someone else?

Our society has failed so far to come up with enforceable rules for curbing the destructive potential of atomic power. We are reaping the nightmarish harvest for that failure. The possibilities of misuse of scientists' ability to advance or retard procreation are manifold. Ethical and legal boundaries need to be set before we stray too far.

NEW RULES QUESTION 1

Underline the sentence that explains what the Australians did to help decide how to deal with the frozen embryos belonging to a couple killed in the plane crash.

PISA Difficulty
Scale score 558
Level 4

Item Statistics	% Correct OECD PISA age 15	% Correct Ireland PISA age 15	% Correct IALS Ireland age 16-65
Correct	47.9	58.2	58.2
Incorrect	36.0	35.6	{ 41.8*
Missing	16.1	6.2	
Total	100	100	100

*Breakdown of percent incorrect and percent missing not available for the IALS sample.

Key: Underlining of the text as shown above. There are two relevant parts of the text; if one or both of these is underlined, it receives credit.

Process: Interpretation of text. Follow a discussion in a dense and complex passage, where the correct response is surrounded by competing information.

NEW RULES QUESTION 2

List two examples from the editorial that illustrate how modern technology, such as that used for implanting frozen embryos, creates the need for new rules.

PISA Difficulty
Scale score 669
Level 5

Item Statistics	% Correct OECD PISA age 15	% Correct Ireland PISA age 15	% Correct IALS Ireland age 16-65
Correct	6.8	5.8	29.0
Incorrect	52.1	64.8	{ 71.0*
Missing	41.1	29.4	
Total	100	100	100

*Breakdown of percent incorrect and percent missing not available for the IALS sample.

Key: Mentions at least two of: (1) controversy over what was to be done with the embryos when the Rioses died; (2) a woman in France went to court to be allowed to use her deceased husband's sperm; (3) the need for rules for a surrogate mother who refused to give up the baby she gave birth to.

Process: Interpretation of text. Give two concrete examples of an abstract ethical concept from a dense and complex passage.

Appendix 2

Commentary on Sample Texts and Tasks

COMMENTARY ON 'THE GIFT'

The Gift is a relatively long narrative passage that describes the situation of a woman riding out a storm in her rickety wooden dwelling. The presence of a panther on the balcony outside represents further danger. All seven questions based on the text are categorised as 'continuous'. Each question is also categorised in terms of the main reading process that it is judged to evoke. Question 1, which asks the student to justify the points of view expressed by two speakers about the main protagonist, using evidence from the story, is categorised as a 'reflect and evaluate' question as students need to draw on their own concepts of compassion and cruelty in arriving at a response. The question is an open constructed-response item as there is no unique 'correct' answer. It is scored by a trained rater, who is aware of the range of expected responses, and makes a judgement on whether the supporting evidence provided by the student is valid. For full credit, the student has to provide evidence supporting both (conflicting) points of view. Among students in Ireland who attempted the question, 65% provided a response that was deemed to be correct. This is somewhat higher than the OECD average percent correct score of 55%. The question was of moderate difficulty. It is located at Level 3 on the OECD overall reading proficiency scale (see Chapter 3).

The second question asks about the protagonist's situation at the beginning of the story. It is a traditional multiple-choice question; just one of the four alternatives is correct. This question was particularly easy for Irish students, with 81% providing a correct response. The corresponding OECD percent correct score was 74%. The item, which was classified as 'interpret', is located at Level 2 on the overall reading proficiency scale.

The third question is an example of an open-constructed item for which the student may be awarded partial or full credit, based on the sophistication of the interpretation demonstrated. In this item, the student must 'interpret' the writer's use of language in a number of quotations drawn from the early part of the story, and, at the same time, set aside conflicting ideas that appear in adjacent text. Full credit is provided if the student infers and indicates that the statements evoke pity; partial credit is awarded for less sophisticated, though still correct, responses. For this item, two percentage correct scores are provided—one refers to full credit; the second to partial credit. Hence, in Ireland, 38% of students attempting the item received full credit, while a further 26% received partial credit. Across OECD countries, the corresponding scores were 28% and 30% respectively, suggesting that Irish students gave a fuller response than OECD students in general. This item is located at Level 5 on the proficiency scale, where full credit is the criterion, and at Level 3 where partial credit is the criterion.

The remaining questions based on *The Gift* provide further examples of traditional multiple-choice items (questions 4 and 6) and open constructed-response items (questions 5 and 7). Question 4 is an example of a 'retrieve' question; it requires the student to locate an explicitly stated piece of information in the text. The item is easy in that 85% of Irish students, and 87% of students in the OECD indicated the correct answer. Question 6 is a more difficult multiple-choice item, in that just 50% of Irish students, and 43% of students across OECD countries indicated the correct response. Question 7 provides a further example of an item on which either full or partial credit can be obtained. Students are invited to evaluate the appropriateness of the ending of the text by relating the last sentence to the story's meaning.

In Ireland, 29% of students received partial credit, as they responded to the item at a literal level, while 28% received full credit (the corresponding figures for the OECD are 28% and 20% respectively). Their responses were judged to reflect an evaluation of the story in terms of thematic completeness. Interestingly, 12% of Irish students and 23% of students in the OECD did not respond to this item, either because they did not reach it, or because they were unable to offer an answer.

COMMENTARY ON 'LABOUR FORCE'

Labour Force is a non-continuous text. Students are required to interpret a tree diagram with footnotes that provides statistics on the proportions of the working age population in a country that are in employment, are unemployed, or are outside the labour force. The first question asks students to indicate the two main groups into which the working-age population is divided, and is judged to require interpretation of text, in that the student needs to recognise the relationship between two groups. This traditional multiple-choice item was answered correctly by 59% of Irish students, while 63% of students in the OECD provided a correct response. The item is at Level 2 on the PISA reading proficiency scale.

Questions 3 and 4 are examples of 'complex' multiple-choice items. Question 3 allows students to receive full credit if they categorise each of five persons correctly in terms of their status with regard to the labour force; the item requires attention to the footnotes in the diagram. Just 13% of Irish and 15% of OECD students received full credit. In contrast, 52% of OECD and 54% of Irish students received partial credit (they made one or two errors). The more difficult, full-credit version of this item is located at Level 5 on the PISA reading proficiency scale, while the easier, partial credit version is located at Level 2.

Though also a 'complex' multiple-choice item, no partial credit is offered if the student makes one or more errors on Question 4. Even so, the item is relatively easy, with 74% of Irish students, and 69% of students across the OECD, providing correct responses. While the item assesses ability to 'reflect and evaluate' in that the student needs to draw on information outside the text to distinguish between variables and structural features in the tree diagram, it is located at Level 2 on the reading proficiency scale. Question 5, a traditional multiple-choice item which is also categorised as 'reflect and evaluate', is somewhat more difficult. It is located at Level 3 on the proficiency scale.

COMMENTARY ON 'TECHNOLOGY CREATES THE NEED FOR NEW RULES'

The Editorial, *Technology Creates the Need for New Rules* addresses ethical issues related to in vitro fertilization. It is one of the texts originating from the International Adult Literacy Survey (IALS). Question 1 asks readers to underline a sentence in the text that explains what Australians did to help decide how to deal with the frozen embryos belonging to a couple killed in a plane crash. This requires an interpretation of the text where the reader must deal with a considerable amount of competing information. Credit was given for underlying one (or both) of two sentences in the text. Across OECD countries in PISA, 48% of 15-year olds correctly answered the question. In Ireland, 58% did so, while in 1994/95, 58% of Irish adults that participated in IALS provided a correct answer. This item was located at Level 4 on the PISA literacy proficiency scale, indicating that it is relatively difficult. Question 2 asked readers to list two examples from the editorial that illustrate how modern technology creates the need for new rules. Here, the reader was required to provide an interpretation of the text by giving examples of abstract ethical concepts from a dense text. Across OECD countries in PISA, just 7% of students correctly identified two examples. In Ireland, 6% of 15-year olds did so. In 1994/95, 29% of Irish adults (aged 16-65 years) responded correctly. This complex item is located at Level 5 on the PISA literacy proficiency scale.

Glossary of Terms

The PISA survey uses specific terms to describe different aspects of assessment. Further, some technical and statistical terms are used in this report. These are explained in a little more detail here.

Categorical Variable. See Variable Types.

Composite Variable. See Variable Types.

Continuous Variable. See Variable Types.

Correlation. References are made to the correlation between achievement and other variables such as socioeconomic status, or performance on the Junior Certificate English examination. The correlation is a measure of linear association and should not be interpreted to mean that one variable is the cause of another. Rather, it suggests that they are associated, possibly by connection with other variables. Values of correlations can range from -1 to +1. When a correlation is negative, the increase in one variable is associated with a decrease in the other variable; when it is positive, an increase in one variable is associated with an increase in the other. A value of 0 indicates no association between two variables. In this report, the magnitudes of correlations are assigned qualitative labels to assist in interpretation (weak [$<\pm.1$], weak to moderate [$\pm .1$ to $.25$], moderate [$\pm .25$ to $.4$], moderate to strong [$\pm .4$ to $.55$], and strong [$\pm.55$ or greater]). The letter 'r' is used to denote a correlation.

Cross-sectional Survey. See Survey Types.

Explanatory Variable. See Variable Types.

Longitudinal Survey. See Survey Types.

Major Domain, Minor Domain. In PISA, the areas of assessment are referred to as domains. In PISA 2000, the main focus was on reading literacy, and it is referred to as the major domain. Mathematical and scientific literacy received less emphasis and are referred to as minor domains. Just over half of participating students attempted items from these minor domains, and there were fewer items compared to reading literacy.

Outcome Variable. See Variable Types.

Percentile. A percentile rank is the percentage of scores in a distribution that a specific score is greater than or equal to. For example, if an Irish student achieved a score of 641 on PISA reading literacy, this score is greater than or equal to the scores of 90% of the Irish students taking the test. Their percentile rank would be 90, they would be at the 90th percentile, and the score at the 90th percentile is 641.

Real-Life Literacy. The reference to real-life literacy reflects the philosophy underlying PISA. Since the focus of PISA is the assessment of outcomes of students who are near the end of compulsory schooling, it is of interest to find out how well these young adults are equipped for participation in work and wider society. Hence, the assessments are not linked to school curricula, but reflect the views of educators in participating countries of what young adults need to know to participate in society.

Rotated Booklet Design. See Test Booklets.

Standard Deviation. The standard deviation (sd) associated with a score in PISA is an indication of the spread of scores obtained by students in a region, country, or subgroup. It provides a useful way of interpreting the difference in mean scores between groups, since it corresponds to percentages of a Normally distributed population. For example, 68% of students in the population have an achievement score that is within one standard deviation

of the mean (± 1 sd), and 95% of the population has an achievement score that is within two standard deviations of the mean (± 2 sd). Across the OECD as a whole, 68% of pupils have an achievement score between 400 and 600 and 95% of pupils have an achievement score between 300 and 700. In the case of Ireland, which has a mean score of 527 and a standard deviation of 94 on combined reading literacy, 68% of students' scores fall within the interval 433 to 621, and 95% score between 339 and 715. Where international comparisons are made, the OECD value (100) is used; where comparisons are made between groups within Ireland, the Irish value (94) is used. Unless a minus sign appears the number is positive.

Statistical Significance. The achievement scores of students are not error-free. They include error due to sampling and measurement procedures. Therefore, statistical tests of association (*correlation*) and tests for differences between mean scores of groups incorporate this degree of uncertainty due to error. Throughout this report, correlations and differences between group means are statistically significant when there is a 19 in 20 chance that a difference between groups remains, even after allowing for error, unless otherwise stated. In this report, we refer to the outcomes of these statistical tests as either 'significant' or 'not significant'.

Survey Types. The more common type of survey is a *cross-sectional survey* (PISA is an example). In this type of design, information is gathered at one point in time. Cross-sectional surveys are more common because they are administratively less complex and less labour intensive. However, they only give information about participants' current circumstances. A second type is a *longitudinal survey*, which follows the same group of respondents (cohort) over time. Such a design allows for stronger inferences to be made about effects of background characteristics on outcomes. Relationships between current outcomes and background characteristics are more accurate in the latter design since the participants' history of outcomes can be incorporated into the analyses.

Test Booklets. PISA used a *rotated booklet design*. This means that each participating student was given one of nine possible test booklets at random. Each booklet contained four half-hour blocks of about 15 items (questions, tasks). All booklets contained some reading blocks, while five of the nine contained mathematics blocks and the same number contained science blocks. By linking items that are common across booklets, an equivalent achievement score for reading literacy is assigned to each student regardless of the particular booklet they attempted. A rotated design is used to obtain broad coverage of the assessment domains (it would not be reasonable to give every student the total number of PISA assessment items).

Variable Types. A variable is a quantity or attribute that may assume one of a range of values. *Outcome variables*, in this case student achievements, are related to a number of background or *explanatory variables*, i.e., characteristics of students, their home and school backgrounds, to highlight differences between subgroups of students based on different quantities of the explanatory variables. The interpretation of these differences helps to identify areas of inequity, and strengths and weaknesses of the education system, and thus to inform policy and pedagogical practice. Variables generally fall into one of two groups. *Continuous variables* are those measured on a scale with a wide range of values. For example, SES was measured on a continuous scale ranging from 0-90. Continuous variables are sometimes constructed by combining responses to several related agree-disagree statements, forming a combined or *composite variable*. *Categorical variables* are those which classify into discrete values or categories. For example, secondary, vocational, and community/comprehensive schools are categories of the variable school type (sector). Categorical variables can be ordered (such as high, medium and low SES) or unordered (such as school type).