

Reading Performance of Hong Kong's 15-Year-Old Students in PISA 2000

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This article presents the reading performance of Hong Kong's 15-year-old students taking part in the Programme for International Student Assessment (PISA) in 2002. The objectives, design, and assessment instruments of PISA are first delineated and the assessment results will then be presented. Contrary to the general impression that the language ability of Hong Kong students in general is declining, it was found that the reading performance of Hong Kong students in PISA was far better than those of other participating countries. Further details on students' literacy performance will also be reported when referring to the specific aspects of reading literacy like text types and reading tasks. Initial interpretations on the results will be provided with specific relevance to the existing language curriculum, so as to suggest how the curriculum could be improved in the future.

The ability to read and apply the information derived from written materials is fundamental to the development of individuals and the society they live in. In an era of information, knowledge and skills are acquired and developed largely through the medium of the written language, and academic success is largely measured through written tests. Even after schooling, reading continues to play a central role in an individual's participation in most areas of adult life.

In 2002, Hong Kong took part in the PISA (Programme for International Student Assessment) 2000. PISA, an initiative of the Organisation for Economic Co-operation and Development (OECD), aimed at establishing how well an education system had equipped students with the necessary skills and knowledge to meet the challenges of the future. Three domains of achievements were assessed, namely reading literacy, mathematical literacy, and scientific literacy.

In this article, the PISA assessment framework for reading literacy will first be described, followed by a delineation of how reading literacy is measured. Finally, the achievements in the domain of reading literacy of Hong Kong's 15-year-old students who participated in the assessment will be reported. Strengths and weaknesses as found will also be highlighted in the discussion. Wherever appropriate, the OECD averages¹ will be provided for comparison purposes. The discussion can therefore provide a picture about how Hong Kong students compare with their counterparts in the participating countries/regions. The implications that the results might have on the language curriculum will also be discussed.

The Hong Kong PISA 2000 Project

PISA was first conducted in 2000 with the participation of 32 OECD countries. Another 11 countries/regions, including Hong Kong, joined the project in 2002. The project specifically targets at 15-year-old students who are near the end of compulsory education. Their abilities therefore reflect the general results of the education system.

The Hong Kong PISA assessment is distinctive in two ways. First, among the countries/regions which took part in PISA 2000, the Hong Kong assessment is the first assessment administered in Chinese. The experiences obtained from the administration of the assessment and the findings about the reading performance of Hong Kong students may have implications for future assessment in communities which adopt Chinese as the medium of learning in school. Second, the linguistic environment of Hong Kong, together with the language in education policies, provides an interesting context for research on performance in reading literacy in first and second languages. Findings may provide more information about the development of first language reading literacy in a bilingual education system and how it compares with educational settings in a monolingual society.

The Construct of Reading Literacy

In PISA, reading literacy is defined as the ability of “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” (OECD, 1999, p. 20). This definition goes beyond the notion of reading as simple decoding of written words and literal comprehension. Reading literacy is seen as the ability not only to understand but also to use and reflect on written information for functional purposes. This definition has incorporated both the cognitive and social views of reading.

Cognitive models of reading emphasize the interactive and constructive nature of reading (Durkin, 1993; Kirby, 1988; Rumelhart, 1984; Smith, 1983; van Dijk & Kintsch, 1983). Reading is taken as a mental, or cognitive process which involves a reader in trying to follow and respond to a message from a writer who is distant in space and time (Davies, 1995; Widdowson, 1979). During the process, the reader plays an active role in reading comprehension and different levels of understanding can be reached by an interaction between the reader and the text. The text provides textual and situational cues which are often socially and culturally shared (OECD, 1999). The reader combines textual information with the information he brings to a text (Widdowson, 1979). The information includes how much he knows about the topic of the text, his knowledge of the world, and his knowledge about text (Carrell, 1984a, 1984b, 1985, 1987, 1994). This knowledge about text includes the rhetorical structures of different text types. The level of understanding therefore depends partially on how much information the reader brings to bear in the process of reading. If a reader is more familiar with the topic of the text or if he knows more about the text type of the text being read, he may be able to arrive at a higher level of understanding than someone who knows very little about the topic and the text type of the reading text. Though knowledge about text and knowledge about text topics are essential, there are other resources a reader can draw upon in case this knowledge is lacking (Stanovich, 1980). If a reader is weak in the text topic, but skilled at lower-level processing like word recognition, he will rely on bottom-up processes to achieve comprehension. On the contrary, a reader who is weak in decoding skills but has prior knowledge about the text topic may be better off relying on top-down processing strength in reading successfully.

The social models of reading, on the other hand, put emphasis on the functional nature of reading (Elwert, 2001; Freire & Macedo, 1987; Goodman, 1994; Harris & Hodges, 1995). These models focus on the reader's ability to use printed texts to achieve purposes that the reading is put to socially and culturally. Reading is, therefore, seen as a social event. Readers respond to a text in a variety of ways as they seek to understand and use what they are reading. Readers are conceptualized as "users of language" (Goodman, 1994). The ability to read enables an individual to fulfill purposes required by society or valued by individual, for example, to develop other knowledge and potential. Goodman has identified five types of purposes of reading, namely "environment reading" (to understand the environment), "occupational reading" (to complete tasks at work), "informational reading" (to get information), "recreational reading" (to enjoy leisure time), and "ritualistic reading" (to fulfill religious or cultural rites). The situational cues that are essential in reading comprehension are often socially and culturally shared.

The Measurement of Reading Literacy in PISA

The construct of reading literacy is operationalized along three dimensions in the PISA assessment framework. These three dimensions are:

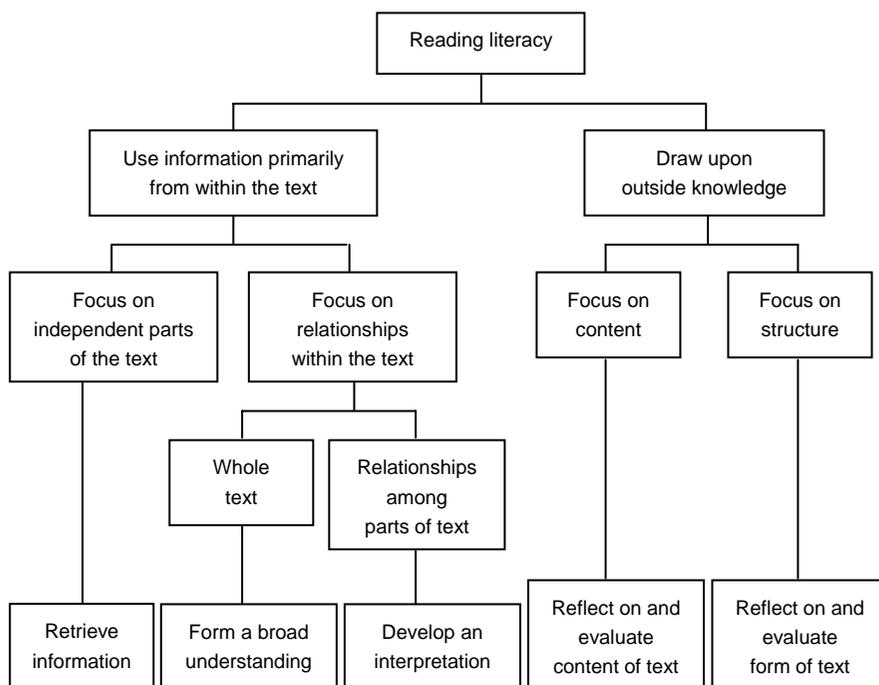
- *the process of reading* — aspects of reading
- *the content of reading* — types of text
- *the context of reading* — purposes of text

The Process of Reading — Aspects of Reading

To assess the extent of understanding, PISA measured students' reading ability on five different aspects which characterize the different levels of understanding. Five levels of understanding are identified. The most basic level is *forming a broad understanding* of the text. The text is taken as a whole. A reader usually obtains a general understanding before choosing to read in more detail. The next level is *retrieving information*. The reader is able to select specific information from the text to achieve certain purpose of reading. The third level of

understanding is *developing an interpretation* which requires the reader to extend his broad understanding of the text to reach a complete understanding of what is read. The next two levels, *reflecting on the content of the text* and *reflecting on the form of the text* require the reader to go beyond the textual information and draw upon information from other sources to evaluate claims made in the text or the quality and appropriateness of the text respectively. It is expected that all readers, irrespective of their overall proficiency, will be able to demonstrate some level of competency in each aspect (Langer, 1995). The five aspects and their relationships are depicted in Figure 1.

Figure 1. The Five Aspects of Reading Comprehension



Source: OECD (2002), p. 31.

For each of the five aspects, reading tasks are designed for assessment purposes. When attempting the reading tasks, students demonstrate their proficiency in retrieving relevant information from the

text, forming a broad understanding of what they read, interpreting what writers convey, reflecting on text content and evaluating the form of the text. The distribution of reading tasks by aspects of reading literacy is shown in Table 1.

Table 1. Distribution of Reading Tasks Across the Five Aspects of Reading

Aspect	Percentage of reading tasks
Retrieving information	20%
Broad understanding	20%
Developing an interpretation	30%
Reflecting on content	15%
Reflecting on form	15%

For reporting purposes, three aspects, instead of five aspects, are used:

- retrieving information
- interpreting (combining *developing an interpretation* and *forming a broad understanding*)
- reflecting and evaluating content and form

The Content of Reading — Text Format and Text Type

In addition to measuring proficiency level attained in different aspects of reading, PISA also measures how good students are understanding different types of written materials. The assessment framework employs a wide range of written materials which are likely to be encountered in real life. These written materials fall into two broad categories which are defined in terms of text format. The two categories are *continuous* and *non-continuous* texts. Continuous texts are typically composed of sentences that are in turn organized into paragraphs. There are five continuous text types, namely description, narration, exposition, argumentation, and injunctive. These text types are defined in terms of content and author's purpose. Non-continuous texts are made up of six text types. They are: charts and graphs, tables, diagrams, maps, forms, and advertisements. The distinctive features of these different text types are presented in Appendix 1. Table 2 lists the distribution of reading tasks by the eleven text types.

Table 2. Distribution of Reading Tasks Across Text Types

Text Type	Percentage of text	Percentage of reading tasks
Continuous text		
Description	20%	13%
Narration	20%	13%
Exposition	33%	22%
Argumentation	20%	13%
Injunctive	7%	5%
Non-continuous text		
Charts and graphs	33%	11%
Tables	33%	11%
Diagrams	10%	3%
Maps	10%	3%
Forms	8%	3%
Advertisements	6%	2%

The Context of Use — Purposes of Text

The context of use refers to the uses for which the text is constructed. The PISA assessment framework categorizes context of use into four, namely *personal*, *public*, *occupational*, and *educational*. These four contexts are included to reflect the scope of situations in which reading literacy plays a role for young adults. Table 3 lists the distribution of the reading tasks across the four contexts of use.

Table 3. Distribution of Reading Tasks Across Contexts of Use

Context	Percentage of reading tasks
Personal	28%
Public	28%
Occupational	16%
Educational	28%

Formats of Responses

Five response formats are used in PISA for capturing responses to the reading tasks. These include *multiple-choice questions*, *complex multiple-choice items* (mostly requiring a series of True/False or Yes/No answers), *closed-constructed responses* (requiring a clear-cut short

answer), *short responses* (requiring a short answer that is not as clear-cut as the answers for closed-constructed responses), and *open-ended responses* (requiring test takers to construct their answers which are usually extended). Table 4 summarizes the distribution of response types across the aspects of reading, text formats, text types, and contexts of use.

Table 4. Distribution of Response Types Across Aspects of Reading, Text Formats, Text Types, and Contexts of Use

	Response types					Total
	Multiple-choice items	Complex multiple-choice item	Closed-constructed responses	Open-constructed responses	Short responses	
A. Distribution of reading tasks by text format						
Continuous	42	3	3	34	7	89
Non-continuous	14	4	12	9	13	52
<i>Total</i>	<i>56</i>	<i>7</i>	<i>15</i>	<i>43</i>	<i>20</i>	<i>141</i>
B. Distribution of reading tasks by aspect of reading						
Interpreting	43	3	5	14	5	70
Reflecting	3	2	—	23	1	29
Retrieving information	10	2	10	6	14	42
<i>Total</i>	<i>56</i>	<i>7</i>	<i>15</i>	<i>43</i>	<i>20</i>	<i>141</i>
C. Distribution of reading tasks by text type						
Description	7	1	—	4	1	13
Narration	8	—	—	8	2	18
Exposition	17	1	—	9	4	31
Argumentation	7	1	2	8	—	18
Injunctive	3	—	1	5	—	9
Charts and graphs	8	—	2	3	3	16
Tables	2	1	6	3	3	15
Diagrams	2	2	—	—	1	5
Maps	1	—	—	1	2	4
Forms	1	1	4	1	1	8
Advertisements	—	—	—	1	3	4
<i>Total</i>	<i>56</i>	<i>7</i>	<i>15</i>	<i>43</i>	<i>20</i>	<i>141</i>
D. Distribution of reading tasks by context of use						
Personal	10	—	3	10	3	26
Public	20	2	7	20	5	54
Occupational	4	1	4	9	4	22
Educational	22	4	1	4	8	39
<i>Total</i>	<i>56</i>	<i>7</i>	<i>15</i>	<i>43</i>	<i>20</i>	<i>141</i>

Note: Nine items were deleted and four items were combined into one item from subsequent analysis.

Item of Responses

In PISA 2000, reading literacy was assessed using a series of texts, with a number of reading tasks for each text. A text and the associated tasks are described as a *unit*. More than one piece of text could be used in a unit. Altogether, the PISA 2000 made use of 37 stimulus texts. These texts, together with 141 reading tasks, or test items, were put into nine sets. Each student attempted only one set. For each set, it covers a comparable range of difficulties as well as the dimensions mentioned previously. The texts and tasks have been translated into Chinese and verified by the PISA Consortium.

Every item used in PISA is classified according to the three dimensions of the assessment. The classification specifies situation, text format, aspect of process, and level of proficiency. An additional feature is that each reading task has been assigned a PISA scale score which can be mapped against the proficiency levels that the task is designed to capture. The value is arrived at taking into consideration the difficulty level and the skill that the reading task is designed to assess. That is to say, it is possible to place the 141 reading tasks along a continuum of difficulty and of the reading skill it will assess. This background information of each testing item could be very useful for further analysis. The following is a sample item taken from a stimulus text called "Graffiti." A complete sample unit of it is attached in Appendix 2 for reference.

Question 1: GRAFFITI

The purpose of each of these letters is to:

- A explain what graffiti is.
- B present an opinion about graffiti.
- C demonstrate the popularity of graffiti.
- D tell people how much is spent removing graffiti.

Answer: B

Aspect: Interpreting texts

Text format: Continuous

Context of use: Public

Level: 2

PISA scale score: 421

Reporting Performance in Reading Literacy

An important feature of the PISA assessment is the way reading literacy performance is described and reported. A *five-level proficiency scale* was constructed to represent students' performance in reading literacy, with Level 5 being the highest. A sixth level, below Level 1, is used to describe students whose performance in reading literacy does not reach Level 1. Students at this level should not be assumed to have no reading literacy skills at all, but it is possible that they show serious deficiency in their capacity for life-long learning and functioning in other areas of society beyond the school.

The characteristics of each proficiency level are established by combining subject expert judgment and statistical analysis of reading tasks. Statistically, task difficulty was computed and used for determining the cut-offs at each proficiency level. Cut-off scores on the scale were set so that the change in item difficulty was approximately equal between each level. And, all students within each proficiency level could be expected to answer half of the items at that level correctly.² It should be noted that at each proficiency level, reading tasks of each aspect of reading are included. This is to ensure that the reading tasks can reflect precisely different literacy levels of each aspect.

A good match between task difficulty and student proficiency level provides an efficient estimation of reading literacy levels. Students at a particular level of proficiency are typically able to demonstrate the knowledge and skills associated with that level. A higher level of proficiency assumes the mastery of knowledge and skills at a lower level of proficiency.

Performance in reading literacy is recorded as *reading literacy scores*. These scores are transformed in order to produce a numerical reading literacy scale. Altogether there are three proficiency sub-scales and one combined scale used in PISA to describe reading performance. The three sub-scales correspond to the three aspects of reading processes as discussed. They are:

- the *retrieving information scale* which reports on the ability to locate one or more pieces of information in a text;
- the *interpreting text scale* which reports on the ability to construct meaning and drawing inferences from one or more parts of a text;
- and

- the *reflecting on and evaluating text scale* which reports on the ability to relate a text to one's experience, knowledge, and ideas.

The *combined reading literacy scale* summarizes the results from these three sub-scales. The use of such a proficiency scale provides an objective way of describing and comparing reading performance across countries/regions. Table 5 shows how reading scores map on to the five-level proficiency scale.

Table 5. Reading Literacy Score Range of the Reading Proficiency Levels

	Reading literacy scores
Proficiency level 5	More than 625
Proficiency level 4	553–625
Proficiency level 3	481–552
Proficiency level 2	408–480
Proficiency level 1	335–407
Proficiency level below 1	Below 335

In addition to the statistical presentation of reading performance, a criterion-referenced interpretation of reading proficiency was also provided to describe what students are capable of doing at each level. A description of the knowledge and skills required of students at each proficiency level of the three reading proficiency scales is given in Appendix 3. The appendix specifies the subtle differences in task difficulty across each level. The tasks are more demanding at the higher levels. Hence, when the students' performance level is known, their strengths and weaknesses in reading can be identified.

The ways reading proficiency reported in PISA can achieve two purposes. First, they make it possible to rank student performance. Second, they make it possible to describe what students at a particular level of proficiency can do. This information is extremely important from a pedagogical point of view.

Results of Study

A total of 4,405 Hong Kong's 15-year-olds drawn from 140 secondary schools took part in the assessment. These schools were chosen from a total of 440 secondary schools in Hong Kong using a stratified sampling design and they represented schools by mode of subsidy (government or

aided) and intake quality (high ability, medium ability, or low ability). As age was taken as the sampling criterion, the 4,405 students came from six different grade levels. The distribution of the students across the grade levels is presented in Table 6.

Table 6. Distribution of Students Across Grade Levels

Grade level	Number of students	Proportion (%)
Secondary 1	135	3.1
Secondary 2	280	6.4
Secondary 3	524	11.9
Secondary 4	2,695	61.2
Secondary 5	767	17.4
Secondary 6	4	0.1
<i>Total</i>	<i>4,405</i>	<i>100.0</i>

These students were tested on three domains — reading, mathematics, and science. The language of the test was Chinese.

In the following sections, the reading literacy performance of Hong Kong students will be presented and discussed. The overall performance will first be discussed, followed by a discussion of the performances on the three dimensions of aspects of reading, content of reading, and contexts of use.

Overall Reading Performance

This section reports on the overall performance of Hong Kong students in terms of reading scores. This will give a picture of how Hong Kong students compare with their counterparts in participating countries on their overall performance in reading literacy.

Table 7 presents the mean scores and standard errors for the 41 participating countries/regions on the combined reading literacy scale. It compares the performances across countries/regions and indicates whether the performance of one country/region is significantly higher than, lower than, or not different from the performance of other countries/regions. The mean scores of all participating countries/regions on the combined reading literacy scale range from 327 (Peru) to 546 (Finland). This range is equivalent to nearly three levels on the five-level proficiency scale (i.e., Below Level 1 in the case of Peru to the upper end of Level 3 in the case of Finland).

Table 7. Mean Scores in Reading Literacy of Participating Countries/Regions

	Mean	SE	
Finland	546	(2.6)	#
Canada	534	(1.6)	@
New Zealand	529	(2.8)	@
Australia	528	(3.5)	@
Ireland	527	(3.2)	@
Hong Kong, China	525	(2.9)	—
Korea	525	(2.4)	@
United Kingdom	523	(2.6)	@
Japan	522	(5.2)	@
Sweden	516	(2.2)	@
Austria	507	(2.4)	#
Belgium	507	(3.6)	#
Iceland	507	(1.5)	#
Norway	505	(2.8)	#
France	505	(2.7)	#
United States	504	(7.1)	@
Denmark	497	(2.4)	#
Switzerland	494	(4.3)	#
Spain	493	(2.7)	#
Czech Republic	492	(2.4)	#
Italy	487	(2.9)	#
Germany	484	(2.5)	#
Liechtenstein	483	(4.1)	#
Hungary	480	(4.0)	#
Poland	479	(4.5)	#
Greece	474	(5.0)	#
Portugal	470	(4.5)	#
Russian Federation	462	(4.2)	#
Latvia	458	(5.3)	#
Israel	452	(8.5)	#
Luxembourg	441	(1.6)	#
Thailand	431	(3.2)	#
Bulgaria	430	(4.9)	#
Mexico	422	(3.3)	#
Argentina	418	(9.9)	#
Chile	410	(3.6)	#
Brazil	396	(3.1)	#
Macedonia	373	(1.9)	#
Indonesia	371	(4.0)	#
Albania	349	(3.3)	#
Peru	327	(4.4)	#

Notes: @ denotes score that is not significantly different from that of Hong Kong.
denotes score that is significantly different from that of Hong Kong.

The mean score on the combined reading literacy achieved by Hong Kong students is 525, which is at Proficiency Level 3. That is to say, an average Hong Kong 15-year-old student performs at Level 3. With a mean score of 525, Hong Kong ranks 6th among the 41 participating countries/regions, after Finland, Canada, New Zealand, Australia, and Ireland. Among the five Asian countries/regions (i.e., Hong Kong, Indonesia, Japan, Korea, Thailand) which participated in the PISA assessment, Hong Kong is top in terms of mean scores. Statistically speaking, Hong Kong is not significantly different from those countries which ranked from 2nd to 10th, including Korea (7th), and Japan (9th), but Hong Kong students scored significantly lower than their counterparts in Finland.

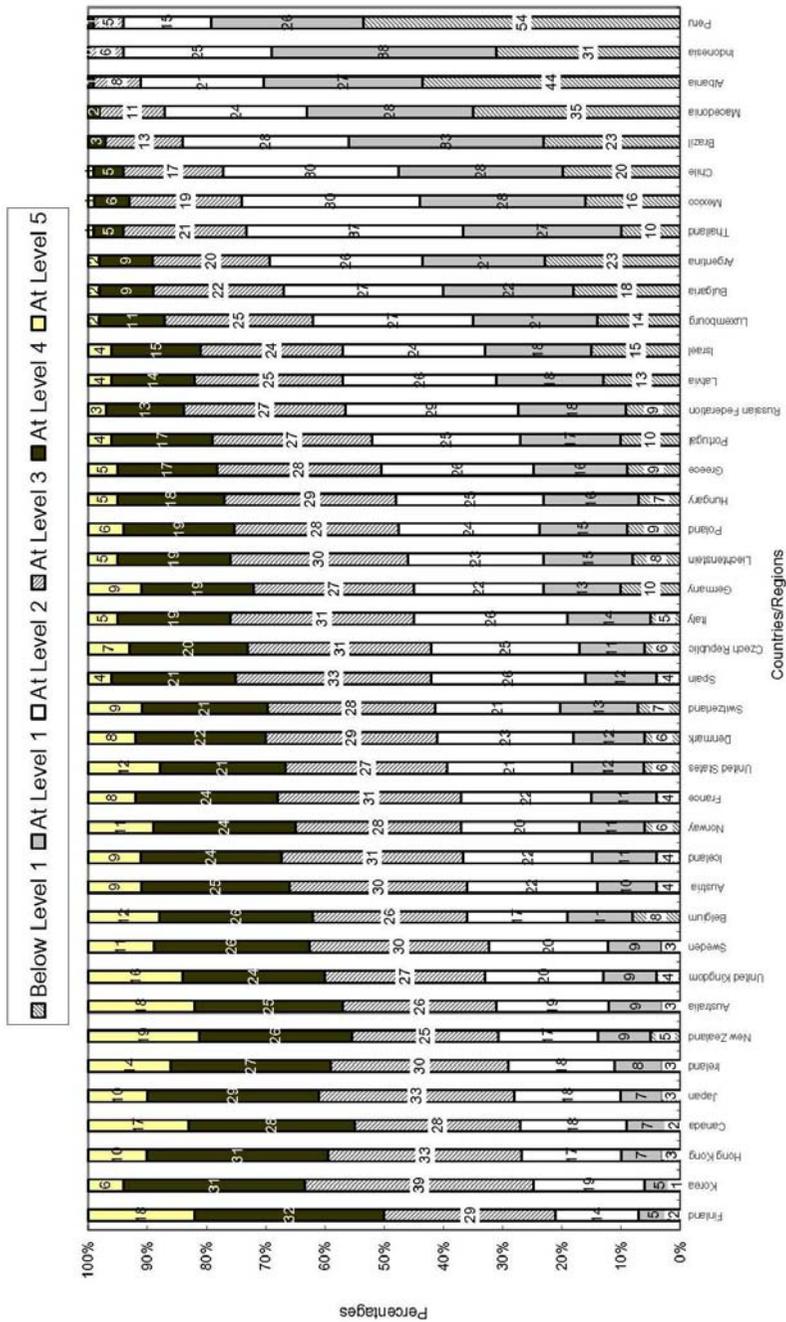
Distribution Across Reading Proficiency Levels

Figure 2 shows the percentage of students at each proficiency level on the combined reading literacy scale. Countries/regions are ordered according to their total percentage of students at Level 3 or above. Using that as the criterion, Hong Kong came third among all participating countries/regions, with a total of 74% of students at Level 3 or above, only after Finland (79%) and Korea (76%).

Hong Kong has about 10% of students achieving Level 5, the highest level of performance (reading scores over 625), and this figure is similar to the overall OECD average of Level 5 students, which is also 10%. Students proficient at Level 5 on the combined reading scale are “capable of completing sophisticated reading tasks, such as managing information that is difficult to find in unfamiliar texts; showing detailed understanding of such texts and inferring which information in the text is relevant to the task; and being able to evaluate critically and build hypotheses, draw on specialized knowledge, and accommodate concepts that may be contrary to expectations” (OECD & UNESCO, 2003, p. 70).

If the percentage of Level 5 students is taken as the ranking criterion, Hong Kong came 11th, after New Zealand (19%), Australia (18%), Finland (18%), Canada (17%), United Kingdom (16%) and five other countries. This indicates that though generally Hong Kong students perform quite well in reading, we lag behind in the number of very proficient readers.

Figure 2. Percentage of Students Performing at Each of the Proficiency Levels on the Combined Reading Literacy Scale



Among the top five high performing countries/regions, three are Asian countries/regions. They are Korea (2nd), Hong Kong (3rd), and Japan (5th). It is interesting to note that the percentages of Level 5 students of all these three countries/regions are low compared with other high performing Western counterparts such as Australia, Canada, Finland, and New Zealand. Korea has only 6% and Japan has only 10% of students at Level 5. It suggests that Asian countries fall behind their Western counterparts at Level 5 though the overall reading scores are similar among these high performing countries.

At the bottom end (i.e., Level 1 and below, reading scores ranging from below 335 to 407), the Hong Kong percentage is 10, which is the 4th lowest among all 41 countries/regions. The OECD average percentage of students below Level 1 is 6.0 %. Students at Level 1 are described as “capable of completing only the least complex reading tasks developed for PISA, such as locating a single piece of information, identifying the main theme of a text or making a simple connection with everyday knowledge” (OECD & UNESCO, 2003, p. 72). Students performing below Level 1 are “not capable of the most basic type of reading that PISA seeks to measure.... Such students have serious difficulties in using reading literacy as an effective tool to advance and extend their knowledge and skills in other areas” (OECD & UNESCO, 2003, p. 72).

These statistics suggest that the high rank of Hong Kong (6th overall) is largely due to the large percentage of students achieving Level 3 (33%) and Level 4 (31%). Students proficient at Level 4 are those who are “capable of difficult reading tasks, such as locating embedded information, construing meaning from nuances of language and critically evaluating a text” (OECD & UNESCO, 2003, pp. 70–71) while students proficient at Level 3 are capable of “locating multiple pieces of information, making links between different parts of a text and relating it to familiar everyday knowledge” (OECD & UNESCO, 2003, p. 71).

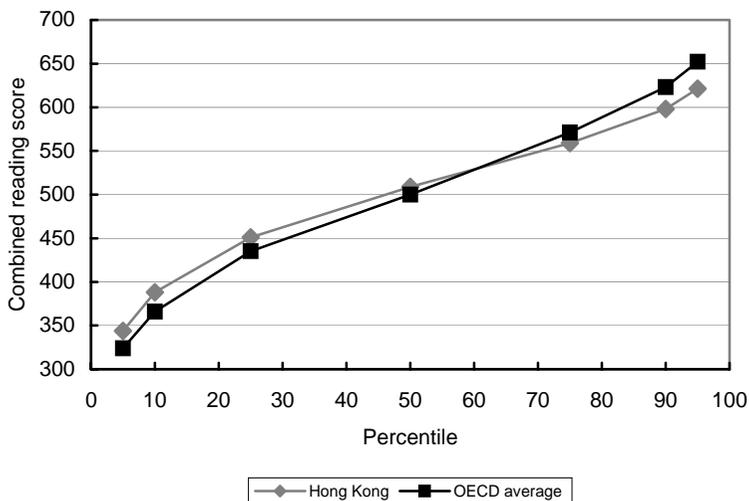
These findings show that although Hong Kong students generally perform better in overall reading literacy than many countries, we do not have a comparable number of high achieving students compared with other countries which may not have performed as well overall. Despite this, Hong Kong has succeeded in achieving a low disparity in literacy skills at a relatively high level as more than three quarters of Hong Kong

students are proficient at least at Level 3 and only 10% of them are at or below Level 1.

As Hong Kong is targeting to maintain its status as an international city, it is necessary to ensure that there will be a good quality of human resources in the coming future. As far as the top-achieving group (Level 5) is concerned, Hong Kong's Level 5 readers do not do significantly better than the OECD averages. In particular, the percentage is only 8% on the interpreting sub-scale, which is lower than the OECD average of 10%. On the retrieving information sub-scale, the percentage of students achieving Level 5 is the same as that of the OECD average.

Percentile points provide us with another way to examine how well Hong Kong students are performing when compared with other OECD countries. Figure 3 compares the combined reading scores of Hong Kong with those of the OECD countries at several percentile points. It indicates that Hong Kong's performance lead diminishes at higher percentile points. Beyond the 60th percentile, which is equivalent to 530 of the combined reading score, Hong Kong 15-year-olds lag behind those from the OECD countries on the combined reading literacy scale. In short, the high overall performance of Hong Kong 15-year-olds on the reading literacy scale is largely due to the high proportion of students at Levels 3 and 4.

Figure 3. A Comparison of Student Performance on the Combined Reading Literacy Scale



Performance on the Reading Sub-scales

Table 8 presents information about the performance of Hong Kong students at each level of the three reading subscales of *retrieving information*, *interpreting*, and *reflecting and evaluating* in comparison with the OECD averages.

Table 8. Proportion of Students at Each Proficiency Level of the Reading Sub-scales

Proficiency level	Retrieving information			Interpreting			Reflecting and evaluation		
	HK	OECD	Difference	HK	OECD	Difference	HK	OECD	Difference
Below Level 1	4%	8%	-4%	2%	6%	-4%	3%	7%	-4%
Level 1	8%	12%	-4%	7%	12%	-5%	6%	11%	-5%
Level 2	19%	21%	-2%	18%	22%	-4%	15%	21%	-6%
<i>Sub-total (Level 2 and below)</i>	<i>31%</i>	<i>41%</i>	<i>-10%</i>	<i>27%</i>	<i>40%</i>	<i>-13%</i>	<i>24%</i>	<i>39%</i>	<i>-15%</i>
Level 3	30%	26%	+4%	34%	28%	+6%	29%	28%	+1%
Level 4	28%	21%	+7%	30%	22%	+8%	32%	23%	+9%
Level 5	12%	12%	0%	8%	10%	-2%	15%	11%	+4%
<i>Sub-total (Level 3 and above)</i>	<i>70%</i>	<i>59%</i>	<i>+11%</i>	<i>72%</i>	<i>60%</i>	<i>+12%</i>	<i>76%</i>	<i>62%</i>	<i>+14%</i>

Note: There may be rounding errors.

On the retrieving information sub-scale which measures the ability to locate one or more pieces of information in a text correctly, about 12% of Hong Kong students are at Level 5; that is, they are able to identify multiple pieces of embedded or implicit text information and infer task-related information. More importantly, they can deal with highly plausible and extensive competing information whereas the rest of the Hong Kong students cannot. This percentage is similar to the OECD average. While on the lower end (i.e., below Level 1), there are still 4% of Hong Kong students who failed to identify one or more pieces of explicitly stated information in what they read.

The interpreting sub-scale reports on the ability to construct meaning and drawing inferences from one or more parts of a text. Analysis of the interpreting sub-scale yields a number of findings. First, the percentage of Level 5 students on this sub-scale is 8%, the lowest among the three sub-scales for Level 5. More importantly, the percentage is 2% below the OECD average of 10%. The high-achieving

students in Hong Kong are not as good in making inferences and constructing meaning from text as high-achieving students in other countries. Despite this, the percentages of students at Level 4 and Level 3 on this sub-scale are 30% and 34% respectively, both higher than the OECD averages. Moreover, there are only 2% of students at the level below Level 1, the lowest among the three sub-scales.

The third reading literacy sub-scale is the reflecting and evaluating text sub-scale. It reports on the ability of readers to relate a text to one's experience and ideas. Results show that the percentage of Level 5 students is 15%, the highest among the three sub-scales and it is 4% above the OECD average. Over three quarters of the students can attain Level 3 or above on this reading sub-scale.

It is also encouraging to note that on the ability to reflect on and evaluate texts, which are considered some high-order reading skills, Hong Kong students can still maintain their prominent performance over OECD. Comparing the percentages of performances by Hong Kong students and OECD's, the difference on reflecting and evaluation is the greatest among the three processes of reading. Moreover, as retrieving, interpreting, and reflecting are considered reading skills of increasing difficulty, one would expect the performance on the lower-order reading skills should be better than those on the higher ones. However, this assumption only matches with the result pattern for the low-achieving group (i.e., 31%, 27%, 24%), but is exactly the reversed case for the high achievers (70%, 72%, 76%). The OECD students also exhibit a similar pattern of performance.

Focusing on the performances across the reading sub-scales by the different levels of Hong Kong students, it is noticed that at the lower end of the proficiency levels (i.e., Level 2 and below), the percentages of Hong Kong students are smaller than the OECD averages on all three sub-scales. The Hong Kong percentages at these levels are 31%, 27%, and 24% for the retrieving information, interpreting, and reflecting scales respectively. The corresponding OECD averages are 41%, 40%, and 39%.³ This suggests that Hong Kong's low-achieving students generally do better on all three sub-scales than low achievers in other countries. However, as compared with the OECD averages, the greater disparity across the sub-scales as shown by Hong Kong's low-achieving students indicates that they lack effective reading strategies beyond information retrieval. Higher-order thinking abilities involved in reading

such as interpreting and reflecting are progressively declining for this group of students.

At the upper end of the proficiency scale (i.e., Level 3 and above), the Hong Kong percentages are larger than the OECD averages. The total percentages of students at Level 3 or above are 70%, 72%, and 76% for the retrieving information, interpreting, and reflecting scales respectively. The corresponding OECD averages are 59%, 60%, and 62%. It shows that skillful readers in Hong Kong performed generally better than skillful readers in OECD countries.

Performance Across Text Formats and Text Types

The PISA assessment framework includes two different text formats. Table 9 lists the Hong Kong students' performance in handling the two text formats.

Table 9. Mean Percentage Scores Across Different Text Formats

Text format	No. of items	Mean percentage score	
		Hong Kong	OECD
Continuous text	85	66	61
Non-continuous text	42	64	61

Note: Two items were deleted from the Hong Kong data set for subsequent analysis; this OECD average is calculated based on 127 corresponding items.

It can be seen that students' ability to comprehend continuous texts is slightly better than that on non-continuous texts (66% as compared to 64%) while no difference in students' performances on these two text formats can be found in OECD countries.

One feature of PISA is the inclusion of a variety of text types in its assessment. These text types differ in the format they are presented and also in the function of the texts. An analysis was made to identify how Hong Kong students perform in the reading tasks related to the 11 text types included in the assessment and the results are presented in Table 10.

As far as the continuous texts are concerned, Hong Kong students outperformed OECD countries on all types of texts. But Hong Kong has

Table 10. Mean Percentage Scores Across Different Text Types

Text type	No. of tasks	Mean percentage score	
		Hong Kong	OECD
Continuous text			
Description	11	63	60
Narration	17	64	61
Exposition	31	68	63
Argumentation	17	69	60
Injunctive	9	62	58
Non-continuous text			
Charts and graphs	15	69	68
Tables	12	57	51
Diagrams	5	62	56
Maps	4	75	75
Forms	5	69	62
Advertisements	1	20	29

a 7% (from 69% to 62%) variation across different types of the continuous text format, while there is only a 5% difference (from 63% to 58%) as found in OECD countries. Among the five continuous text types, Hong Kong students could handle *argumentative* and *expository* texts better than *narrative* and *descriptive* texts. When the performances of these different text types are ranked, the order of performance for Hong Kong is: Argumentation, Exposition, Narration, Description, and Injunctive; while the order for OECD countries is Exposition, Narration, Description, Argumentation, and Injunctive. It is apparent that the order of performances is more or less the same except for the case of argumentative text. The difference on argumentative texts between Hong Kong students and their OECD counterparts (69% as compared to 60%) is relatively large.

It is also interesting to note that the order of performance of Hong Kong students on various text types is not comparable to the curriculum order of teaching of those texts. According to the *Guidelines for the Chinese Language Curriculum* (《中國語文教育學習領域課程指引》), narration is a recommended text type for teaching at Form One, while argumentative text is the focus of teaching at Form Three. Apparently, text types like narration which has been emphasized and taught in the early stage of secondary education did not score better than those text types learned at a latter stage.

In the case of non-continuous texts, Hong Kong students have similar performance on maps, charts/graphs when compared with students of the OECD countries and they do better than OECD counterparts in forms, diagrams, and tables. As comprehending advertisements is concerned, Hong Kong students do not handle this text type as effectively as the OECD students do.

Performance Across Context of Use

The 37 stimulus texts used are grouped into four contexts of use, namely educational, occupational, personal, and public. The performance of Hong Kong students in these four contexts of use as expressed in mean percentage scores is shown in Table 11. The mean percentage scores for the four different contexts of use are higher than or equal to the OECD averages. Hong Kong students are better at texts written for educational (68%) and occupational (69%) purposes than for personal (65%) and public (63%) uses. In the case of texts written for occupational purposes, Hong Kong students perform much better than their counterparts in OECD countries (69% as compared to the OECD average of 58%). Results suggest that Hong Kong students can handle texts written for different purposes and they do better in educational and occupational texts.

Table 11. Mean Percentage Scores Across Different Contexts of Use

Context	No. of items	Mean percentage score	
		Hong Kong	OECD
Educational	36	68	64
Occupational	19	69	58
Personal	25	65	60
Public	47	63	61

Discussion and Conclusions

This article summarizes the PISA assessment framework and the performance of Hong Kong's 15-year-old students in reading literacy. The findings have given us a clear picture of Hong Kong students in terms of their reading achievement in Chinese, and how well they have performed when compared to other countries. In particular, the

following strengths of Hong Kong 15-year-old students can be identified:

1. As a group assessed for their reading literacy in their first language, Hong Kong students perform well in the reading tasks and rank high among students from many countries.
2. Hong Kong has a relatively low disparity in reading proficiency levels.
3. Hong Kong students are good at retrieving information and reflecting on and evaluating text content and format. This may indicate that Hong Kong students are capable of critical and other higher-level thinking.

These findings seem contradictory to the general view on Hong Kong students' language abilities. In recent years, there are claims and reports stating that the language abilities of Hong Kong students are declining as compared to previous generations. The PISA results, however, indicate that Hong Kong students' performance on reading literacy is much better than it has been reported locally, at least when they are compared with other Asian and Western countries. These contradictory results may be due to a couple of reasons. First, PISA only assessed the reading literacy with its emphases on cognitive and social functions. Other aspects of language proficiency like literary appreciation were not included. The public's unfavorable impression on Hong Kong students' language proficiency may be referring to a reading construct different from that measured in PISA. Second, PISA adopts a "0" and "1" dichotomy scoring system to indicate the successful reading performance of students on each reading task. A full mark of "1" will be given to a correct answer regardless of the quality of its written presentation. The scores as reported in PISA therefore only represent the receptive rather than the productive abilities in reading. With this regard, Hong Kong students' high performance in PISA would reveal the fact that they are cognitively better than students from other countries in reading tasks, and what is more, the Hong Kong education as a whole is successful in producing a great number of students with a reading standard well-above international average.

Despite these strengths, a number of weaknesses can be identified.

1. Having a generally high performance, Hong Kong does not have many students who attain Level 5 in the reading proficiency scale in the school population.

2. There are still a remarkable percentage of students who are at Level 2 or below on the proficiency scale.

As revealed in the results, the relatively high position of Hong Kong students' attainment on PISA reading literacy is mainly due to the great proportion of student cluster at Levels 3 and 4. Hong Kong is therefore particularly successful in providing a good-quality language education for the norm of the student population. Besides, with concerns on the two extremes, the results also reveal the fact that Hong Kong lags behind other Western countries on the percentage of Level 5 students, and is still having a noticeable percentage of poor readers. In particular, the limited number of high achievers seems to worry the business sector in Hong Kong that its international status would be threatened in the near future. To improve the situations at both ends means that Hong Kong should not only be satisfied with having a majority of good-performing readers, but also need a high percentage of excellent readers and a small proportion of low achievers. To achieve this aim, it would largely depend on an overall improvement of our language education, as well as financial and professional input of resources for those students at the two extremes. The recent policy "to help the good ones to excel, and to help the bottom ones to improve" is undoubtedly a policy geared toward this aim.

On the functional dimension of literacy, namely the text types and purpose of reading, the following strengths and weaknesses have also been identified:

1. Hong Kong students performed slightly better on continuous texts than on non-continuous texts.
2. They do not handle narrative and descriptive texts which involve more language processing as effectively as they do argumentative and expository texts.
3. Hong Kong students are better at texts written for educational and occupational than for personal and public uses.

The minor advantage of performance on continuous texts over non-continuous texts by Hong Kong students could be explained in two ways. First, it may be argued that non-continuous texts pose more difficulties in reading. Though the processing of a smaller amount of linguistic data usually found in graphic forms may be easier, the demand on comprehension is higher as the information relationship is not stated explicitly using words. Readers have to understand the information

relationship depicted by the graphic method first before they can work out the ideas presented. Second, continuous texts are extremely dominant in our language curriculum. The reading strategies to tackle these texts are taught explicitly throughout the years of education. As a matter of fact, non-continuous texts are not rare in our school curriculum, but they were only treated as some supplementary information for students' own reference or interpretation. As a result, students could become more familiar and successful in reading continuous texts.

There could be a number of possible reasons to account for the advantage of Hong Kong students' performance on argumentative text. First, the argumentative text type is included and commonly found in the Chinese language curriculum. Second, the organization structure of ideas in argumentative texts is straightforward and made explicit by writers rendering it easy to comprehend. On the other hand, descriptive and narrative texts do not follow a fixed information structure, thus making it more difficult to comprehend and to extract the main ideas. Moreover, the language used in narrative texts is usually more opaque with connotations. These factors may explain why Hong Kong students do not perform as well in narrative as in argumentative texts. It has also been noted that some text types like narration which have been introduced early in the curriculum do not guarantee a better reading performance than those which are taught later. More emphasis on narrative reading and an explicit teaching of reading strategies handling narration would be helpful to improve the reading literacy in this area.

The discussion above provides useful information regarding how well the Hong Kong education has prepared students to meet the challenges of today's knowledge society. This increased understanding of Hong Kong students will better inform different sectors in society when they formulate and implement policies and strategies to promote and enhance the reading literacy of the school population.

Notes

1. "OECD averages" refer to averages obtained by the 28 OECD countries which took part in the PISA assessment. There are other non-OECD countries/regions taking part in the assessment, among them Hong Kong being one.

2. Technically, the two criteria defining the proficiency levels are: (a) A student with a reading score at the bottom of a level has an average probability of 0.50 of correctly responding to all items at that level, and (b) proficiency levels should be of fixed width (i.e., 0.80 logits).
3. There are rounding errors when percentages are converted to the nearest unit digit. The total percentage may be 99% or 101% in some cases.

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Appendix 1: The Distinctive Features of Different Text Types

1. *Narration* is the type of text in which the information refers to properties of objects *in time*. Narrative texts typically provide answers to *when*, or *in what sequence*, questions.
2. *Exposition* is the type of text in which the information is presented as composite concepts or mental constructs, or those elements into which concepts or mental constructs can be analyzed. The text provides an explanation of how the component elements interrelate in a meaningful whole and often answers *how* questions.
3. *Description* is the type of text in which the information refers to properties of objects *in space*. Descriptive texts typically provide an answer to *what* questions.
4. *Argumentation* is the type of text that presents propositions as to the relationship between concepts, or other propositions. Argumentative texts often answer *why* questions. Another important sub-classification of argumentative texts is persuasive texts.
5. *Injunctive* (sometimes called *instruction*) is the type of text that provides directions on what to do and includes procedures, rules, regulations, and statutes specifying certain behaviors.
6. *Charts and graphs* are iconic representations of data. They are used for the purposes of scientific argumentation, and also in journals and newspapers to display numerical and tabular public information in a visual format.
7. *Tables* are row and column matrices. Typically, all the entries in each column and each row share properties, and thus the column and row labels are part of the information structure of the text. Common tables include schedules, spreadsheets, order forms, and indexes.
8. *Diagrams* often accompany technical descriptions (e.g., demonstrating parts of a household appliance), expository texts, and instructive texts (e.g., illustrating how to assemble a household appliance). It is often useful to distinguish procedural (how to) from process (how something works) diagrams.
9. *Maps* are non-continuous texts that indicate the geographical relationships between places. There is a variety of types of maps. Road maps mark the distances and routes between identified places.

Thematic maps indicate the relationships between locations and social or physical features.

10. *Forms* are structured and formatted texts which request the reader to respond to specific questions in specified ways. Forms are used by many organizations to collect data. They often contain structured or pre-coded answer formats. Typical examples are tax forms, immigration forms, visa forms, application forms, statistical questionnaires, etc.
11. *Calls and advertisements* are documents designed to invite the reader to do something; for example, to buy goods or services, attend gatherings or meetings, elect a person to a public office, etc. The purpose of these documents is to persuade the reader. They offer something and request both attention and action. Advertisements, invitations, summonses, warnings and notices are examples of this document format. (For details, see OECD, 1999, pp. 25–28)

Appendix 2: A Sample Unit of PISA “Graffiti”

GRAFFITI

I'm simmering with anger as the school wall is cleaned and repainted for the fourth time to get rid of graffiti. Creativity is admirable but people should find ways to express themselves that do not inflict extra costs upon society.

Why do you spoil the reputation of young people by painting graffiti where it's forbidden? Professional artists do not hang their paintings in the streets, do they? Instead they seek funding and gain fame through legal exhibitions.

In my opinion buildings, fences and park benches are works of art in themselves. It's really pathetic to spoil this architecture with graffiti and what's more, the method destroys the ozone layer. Really, I can't understand why these criminal artists bother as their “artistic works” are just removed from sight over and over again.

Helga

There is no accounting for taste. Society is full of communication and advertising. Company logos, shop names. Large intrusive posters on the streets. Are they acceptable? Yes, mostly. Is graffiti acceptable? Some people say yes, some no.

Who pays the price for graffiti? Who is ultimately paying the price for advertisements? Correct. The consumer. Have the people who put up billboards asked your permission? No. Should graffiti painters do so then? Isn't it all just a question of communication — your own name, the names of gangs and large works of art in the street?

Think about the striped and chequered clothes that appeared in the stores a few years ago. And ski wear. The patterns and colours were stolen directly from the flowery concrete walls. It's quite amusing that these patterns and colours are accepted and admired but that graffiti in the same style is considered dreadful.

Times are hard for art.

Sophia

These two letters come from the Internet and are about graffiti. Graffiti is illegal painting and writing on walls and elsewhere. Refer to the letters to answer the questions.

Question 1: GRAFFITI

The purpose of each of these letters is to:

- A explain what graffiti is.
- B present an opinion about graffiti.
- C demonstrate the popularity of graffiti.
- D tell people how much is spent removing graffiti.

Score 1:

- B present an opinion about graffiti.

Aspect of reading — interpreting texts

Response format — multiple-choice

This reading task requires students to identify the purpose the two short texts have in common by comparing the main ideas in each of them.

Question 2: GRAFFITI

Why does Sophia refer to advertising?

Score 1:

Answers which recognize that a comparison is being drawn between graffiti and advertising, and are consistent with the idea that advertising is a legal form of graffiti.

Or

Answers which recognize that referring to advertising is a strategy to defend graffiti.

Aspect of reading — interpreting texts

Response format — open-constructed response

This task requires students to infer an analogical relationship between two phenomena in the text.

Question 3: GRAFFITI

Which of the two letter writers do you agree with? Explain your answer by using **your own words** to refer to what is said in one or both of the letters.

Score 1:

Answers which explain the student's point of view by **referring to the content of one or both letters**. They may refer to the writer's general position (i.e., for or against) or to a detail of her argument. The interpretation of the writer's argument must be **plausible**. The explanation may take the form of paraphrase of part of the text, but must not be wholly or largely copied without alteration or addition.

Aspect of reading — reflecting and evaluating texts

Response format — open-constructed response

The task requires students to compare claims made in two short texts with own views and attitudes. Students are also required to demonstrate broad understanding of at least one of the two letters.

Question 4: GRAFFITI

We can talk about **what** a letter says (its content).

We can talk about **the way** a letter is written (its style).

Regardless of which letter you agree with, in your opinion, which do you think is the better letter?

Explain your answer by referring to **the way** one or both letters are written.

Score 1:

Answers which explain opinion **with reference to the style or form** of one or both letters. They should refer to criteria such as style of writing, structure of argument, cogency of argument, tone, register used, or strategies for persuading readers. Terms like "better arguments" must be substantiated.

Aspect of reading — reflecting and evaluating texts

Response format — open-constructed response

The task requires students to evaluate the writer's craft by comparing two short letters on the topic of graffiti. Students need to draw on their understanding of what constitutes good style in writing.

Appendix 3: Descriptors of Skills Demonstrated at Each Level of the Three Reading Proficiency Sub-scales

Proficiency level	Retrieving information	Interpreting	Reflecting
Level 5	Locate and possibly sequence or combine multiple pieces of deeply embedded information, some of which may be outside the main body of the text. Infer which information in the text is relevant to the task. Deal with highly plausible and/or extensive competing information.	Either construe the meaning of nuanced language or demonstrate a full and detailed understanding of a text.	Critically evaluate or hypothesize, drawing on specialized knowledge. Deal with concepts that are contrary to expectations and draw on a deep understanding of long or complex texts.
<p>Continuous texts: Negotiate texts whose discourse structure is not obvious or clearly marked, in order to discern the relationship of specific parts of the text to its implicit theme or intention.</p> <p>Non-continuous texts: Identify patterns among many pieces of information presented in a display which may be long and detailed, sometimes by referring to information external to the display. The reader may need to realize independently that a full understanding of the section of text requires reference to a separate part of the same document, such as a footnote.</p>			
Level 4	Locate and possibly sequence or combine multiple pieces of embedded information, each of which may need to meet multiple criteria, in a text with familiar context or form. Infer which information in the text is relevant to the task.	Use a high level of text-based inference to understand and apply categories in an unfamiliar context, and to construe the meaning of a section of text by taking into account the text as a whole. Deal with ambiguities, ideas that are contrary to expectation and ideas that are negatively worded.	Use formal or public knowledge to hypothesize about or critically evaluate a text. Show accurate understanding of long or complex texts.
<p>Continuous texts: Follow linguistic or thematic links over several paragraphs, often in the absence of clear discourse markers, in order to locate, interpret or evaluate embedded information or to infer psychological or metaphysical meaning.</p> <p>Non-continuous texts: Scan a long, detailed text in order to find relevant information, often with little or no assistance from organizers such as labels or special formatting, to locate several pieces of information to be compared or combined.</p>			

Proficiency level	Retrieving information	Interpreting	Reflecting
Level 3	Locate, and in some cases recognize the relationship between pieces of information, each of which may need to meet multiple criteria. Deal with prominent competing information.	Integrate several parts of a text in order to identify a main idea, understand a relationship, or construe the meaning of a word or phrase. Compare, contrast or categorize taking many criteria into account. Deal with competing information.	Make connections or comparisons, give explanations, or evaluate a feature of text. Demonstrate a detailed understanding of the text in relation to familiar, everyday knowledge, or draw on less common knowledge.
<p>Continuous texts: Use conventions of text organization, where present, and follow implicit or explicit logical links such as cause and effect relationships across sentences or paragraphs in order to locate, interpret or evaluate information.</p>			
<p>Non-continuous texts: Consider one display in the light of a second, separate document or display, possibly in a different format, or combine several pieces of spatial, verbal and numeric information in a graph or map to draw conclusions about the information represented.</p>			
Level 2	Locate one or more pieces of information, each of which may be required to meet multiple criteria. Deal with competing information.	Identify the main idea in a text, understand relationships, form or apply simple categories, or construe meaning within a limited part of the text when the information is not prominent and low-level inferences are required.	Make a comparison or connections between the text and outside knowledge, or explain a feature of the text by drawing on personal experience and attitudes.
<p>Continuous texts: Follow logical and linguistic connections within a paragraph in order to locate or interpret information; or synthesize information across texts or parts of a text in order to infer the author's purpose.</p>			
<p>Non-continuous texts: Demonstrate a grasp of the underlying structure of a visual display such as a simple tree diagram or table, or combine two pieces of information from a graph or table.</p>			
Level 1	Locate one or more independent pieces of explicitly stated information, typically meeting a single criterion, with little or no competing information in the text.	Recognize the main theme or author's purpose in a text about a familiar topic, when the required information in the text is not prominent.	Make a simple connection between information in the text and common, everyday knowledge.
<p>Continuous texts: Use redundancy, paragraph headings or common print conventions to form an impression of the main idea of the text, or to locate information stated explicitly within a short section of text.</p>			
<p>Non-continuous texts: Focus on discrete pieces of information, usually within a single display such as a simple map, a line graph or a bar graph that presents only a small amount of information in a straightforward way, and in which most of the verbal text is limited to a small number of words or phrases.</p>			