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INTERNATIONAL OPTION FOR THE READING OF ELECTRONIC TEXTS

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INTERNATIONAL OPTION FOR THE READING OF ELECTRONIC TEXTS

Introduction

1. This document reports on the outcomes of the first (development) stage of the PISA 2009 international option for the reading of electronic texts, including results of the School Capability Survey, and presents a budgeted proposal for the second stage of the option, i.e. the field trial of the assessment. Appendix 1 gives a rationale for participation in this option, explaining why the reading of electronic texts is assessed in PISA 2009. **Countries will need to declare their intention to participate in the next stage of this option, leading to the field trial, at the meeting of the PGB in Edinburgh at the latest**.

2. The first stage of the work required the Consortium to:

- Develop reading items within the reading framework developed for the PISA 2009 main study.
- Develop a delivery platform.
- Administer a school capability survey (the School Computer Resources Survey) to participating countries through their national project managers.
- Submit a report on the outcome of this developmental phase to the PISA Governing Board (PGB).

3. This included the following deliverables:

- Demonstration of sample items to National Program Managers.
- Administration of the school capability survey.
- Release of the items in two sets for review, and receipt of feedback.
- Demonstration of Online Translation and Test Delivery systems to National Project Managers.
- Submission of the Report of the Developmental Phase to the PGB.

4. In addition to these deliverables, which have been achieved, work has been undertaken in preparation for the field trial and main study stages, should they go ahead. In particular:

- All field trial arrangements have been determined and operational details have been documented and discussed with National Project Managers.
- The main study sample and test designs have been determined in conjunction with the Technical Advisory Group.

5. A decision on whether the field trial stage is to proceed is required urgently. Some countries have scheduled their field trial to commence at the beginning of March. The PISA Consortium can only meet this deadline if preparations continue uninterrupted, but this requires a guarantee of further funding, as considerable investment is necessary to implement the web interface for managing translation of test material and for the development of an Online Coding system.

6. Furthermore, Denmark and Iceland have requested that their participation fees in ERA be reduced because of their involvement in the PISA 2006 computer-based assessment of sciencde, which paved the way for the development of ERA.

7. In preparation for the meeting of the PGB in Edinburgh, delegates of the PGB will need to finalise their decision whether or not to participate in the field trial. At the meeting in Edinburgh, the PGB will need to:

- **REVIEW PROGRESS** with the development of the instruments for the international option for assessing electronic texts.
- **DECIDE** whether to continue with the development of this option and **FINALISE** the ERA budget for the field trial.
- **DECIDE** whether the participation fee for Denmark and Iceland should be reduced to compensate for the investment of these countries in the PISA 2006 computer-based assessment of science.

Consultation and communication

8. Plans for implementing the option were discussed in detail at the National Project Managers' (NPMs) meeting held in Mexico City at the beginning of March. Sample units were demonstrated at the meeting.

9. Arrangements for the field trial, and recent developments, were discussed at a meeting of interested NPMs in Dubrovnik on 23 September. The translation procedure for ERA (Electronic Reading Assessment) units and a sample ERA test were demonstrated.

10. Interested NPMs were kept informed of progress between meetings by newsletters dispatched at the end of March and June, and through the establishment of an ERA website directly accessible from the MyPISA home page.

11. Plans for implementing the option were discussed at the Reading Forum and Reading Expert Group (REG) meetings held in Liège in February and progress concerning this option has been monitored by the REG at its subsequent meetings in Princeton at the end of June and in Dubrovnik in September. Time has been set aside at each REG meeting for reviewing items as they were developed.

12. An advisory group, comprising experts in the field from within and outside the REG, was established and the group met in Hong Kong on 14–15 April to further develop those parts of the reading framework concerningelectronic reading. The group also provided valuable advice for ongoing test development and for item template and test interface design.

13. The proposed main study sample and test designs were discussed and endorsed by the Technical Advisory Group (TAG) at its meeting held in Melbourne in early March. The TAG also provided advice on desirable response rates and sample sizes, and recommended strategies to be followed in countries

where there is an imbalance of appropriate computer resources across schools. This advice is included later in this report.

Framework development

14. A third draft of the PISA 2009 Reading Literacy Framework was submitted to the PGB at the end of July for review. Discussion of electronic reading is fully incorporated into the framework alongside print reading.

15. The relationship between electronic text processing and navigation skills is explored in depth (paragraphs 186–203). A method of constructing and analysing electronic reading tasks that takes both text processing, and navigation skills into account is proposed.

16. Proposals for reporting the results of the Electronic Reading Assessment separately and combined with the print assessment results, if empirically supported, are elaborated (paragraphs 250–255).

Computer requirements

17. The basic requirement for administering ERA is that there must be a suitable computer (PC or Macintosh) available for each student. To be suitable, a computer must satisfy the following four criteria:

- be manufactured in 2001 or later;
- have a keyboard and a pointing device (e.g. a mouse);
- have a 15 inch or larger colour display; and
- have at least one accessible USB port.

School computer resources survey

18. The School Computer Resources Survey (SCRS) was revised following feedback from the REG, NPM and TAG meetings held in February/March and went online on 20 April. Two versions were available (see Appendix 2). The longer version included an additional two questions to determine whether a school's willingness to participate in the PISA print assessment would be affected by needing to participate in ERA as well.

19. The survey was available online in three languages: English, French and German. An Italian version will be available soon. If translation into other languages was necessary, the survey was administered through the national centre either by phone or email.

20. Fifteen countries have participated, or are currently participating in the SCRS: Australia, Belgium (Flemish), Canada, Chile, Colombia, Germany, Hungary, Ireland, Italy, Iceland, Korea, Norway, Scotland, Sweden and the UK (excluding Scotland). Three other countries advised that they would not administer the survey because they already had sufficient knowledge about the computer resources in their schools.

21. Data has been processed for 799 schools from 14 countries. The number of responses, per country, ranged from 19 to 130, with a mean of 57 and a median of 50. Countries that conducted the survey were provided with their raw data and summary reports.

22. Across countries, 85% of schools indicated that at least 11 suitable computers were available for ERA in one room. Five percent of schools indicated they were unable to provide any suitable computer facilities.

23. The vast majority of schools (97%) who had computers, indicated that their computers were connected on a local area network. Ninety-nine percent of schools indicated that at least one of the computers that could be used for ERA had a stable Internet connection (with 85% being a high-speed connection). This is encouraging as it suggests that data transfer from schools will be more easily facilitated than was originally envisaged.

24. Eight of the countries included the additional questions about the impact of ERA on the school's willingness to participate in PISA. Interestingly, 31% of the 414 schools indicated that they would be *more* likely to participate, with only 7% indicating that they would be less likely to participate.

Item development

25. An item template, incorporating a simulated browser, was conceptualised and designed by the Contractor to provide the environment for ERA stimulus material. Five units were developed as stand-alone files in time for presentation at the Mexico NPM meeting.

26. Implementation of further units was not possible until a suitable authoring tool was available. The procedure used to program the original five demonstration units did not produce code that would enable the items to be delivered by the TAO platform[1]. The only feasible solution to the coding problem was to await the availability of a stimulus authoring system, designed to produce TAO-compatible code, which had been commissioned by DIPF for use in another project.[2]

27. The authoring tool has now been developed sufficiently to implement units with greater functionality than even the original demonstration units. In all, 16 units have been developed and at the time of writing, 15 had been fully implemented. This includes the re-engineering of revised versions of the original five units. Units are undergoing cognitive laboratory testing as they become available.

28. Ten of the sixteen units originated at ACER, four at DIPF (Germany), one at aSPe (Belgium) and one from a national submission. They comprise a total of 125 tasks (items). About 70 items are required for the field trial.

Item review

29. A first *bundle* of items, comprising the original five demonstration units, was released on 30 April for online review. The online review system was developed at ACER and was favourably received by NPMs.

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1 TAO is the acronym for the French "Testing Assisté par Ordinateur. The TAO computer-based assessment platform is being used to deliver the ERA assessment at no cost to the project. It is a modular and versatile platform for collaborative and distributed computer-based assessment delivery and management that is being developed by the *Centre de Recherche Public (CRP): Henri Tudor* and the *Univeristé du Luxembourg*. TAO will be eventually distributed as "open-source" software.

2 The DIPF research and development work is funded by the German Federal Ministry of Education and Research to support national and international initiatives in developing innovative technology-based assessment methods.

30. The further release of units for review was delayed by the complexities of integrating the ERA web browser stimulus into the TAO environment. The interactivity of ERA stimulus material, and the interaction required between the stimulus and task areas, pushed the boundaries of possibility and required enhancement of the TAO environment by its developers.

31. Eight units implemented within the TAO environment were released for review at the start of September and a final eight units are due for release in mid-October. The item review system has been further developed since its first use and now allows for multiple online reviews within a country to be combined by the NPM into a single review for submission.

32. Eleven countries provided feedback on the first bundle of items: Austria, Canada, France, Hungary, Iceland, Ireland, Japan, Macao-China, Mexico, Norway and Sweden. Comments were generally favourable. The following table summarises quantitative responses on a scale from 1 (lowest) to 5 (highest), for all items:

	Relevance to school	Relevance to life beyond school	Interest level	Priority for inclusion
Mean	4.0	4.2	3.7	3.7
Standard deviation	1.0	1.0	1.0	1.1

Sample design

33. Students participating in ERA must be a sub-sample (size 10 on average) of the students participating in the print PISA assessment. Students must undertake the print PISA assessment before the ERA. Students who are absent for, or refuse to participate in the print assessment, will be considered ineligible for the ERA.

34. This model ensures that **all** PISA students in schools that administer ERA will receive scale and subscale scores from ERA. Put another way, the ERA test design is such that ERA acts similarly to a minor domain in PISA. For example, while not all students will be given mathematics items in PISA 2009, all students will receive a set of mathematics scores. The fact that it is possible to assign scale and subscale scores from ERA for all students will, in turn, allow statistical inferences about ERA scales and subscales to be made about the entire PISA population.

Field Trial sample size

35. To achieve sufficient responses per item, and assuming a student response rate of about 80%, about 350 students will need to be sampled for ERA for the majority language in each country. Assuming that an average of 10 students per school are sampled for ERA, about 35 schools will need to participate in the field trial.

36. In recognition of the extra costs involved and the fact that it is not certain that the ERA main study will go ahead, it will not be necessary for countries with minority languages, involving less than 15% of the population, to field trial ERA in those languages.

Main Study sample size

37. For the main study, a minimum of 150 schools and 1200 students should participate in ERA in each country (i.e., in each *adjudicated entity*[3]).

38. More specifically, the number of schools required to participate in the ERA main study is the same as for print PISA (i.e., a minimum of 150). Therefore, all schools participating in PISA within a country should participate in ERA. Unless a country has chosen to participate in ERA as a pilot study with a non-representative sample[4], any deviations from this model, for example, sub-sampling of schools, will carry additional costs to offset the expense of additional sampling and weighting work.

39. In countries where there is an imbalance of computer resources across schools, a uniform within school sample size for ERA may be difficult to implement. The most appropriate strategy in such a situation is to sub-sample as many students as there are suitable computers (up to a maximum cluster of 14 per Test Administrator), so that an average of at least 10 students per school is achieved.

40. The minimum within school sample size for ERA is four students. However, where there are fewer than four computers available in a school, the ERA test session will either have to be conducted sequentially (e.g., two sessions of three students) *or* NPMs could arrange for laptops to be carried into the school by the Test Administrator.

41. An alternative, but less preferred approach to achieving the school and student sample requirements when there are very few or no computer resources in a school, is to use a replacement school for the ERA assessment. In such a situation the full print PISA assessment would take place in the originally sampled school (usually 35 students) and a sample of students could be drawn to participate in ERA (e.g., 10 students) from the replacement school. Note that in this situation the ERA students (only) in the replacement school would also need to undertake the print PISA assessments and questionnaires. The TAG stressed that the use of carry-in laptops in the originally sampled school was preferable to using a replacement school.

42. Whichever strategy is used, the requirement of 1200 participating students from at least 150 schools (or all schools participating in PISA) will apply.

Student response rate

43. The TAG considers an acceptable response rate for ERA to be at least **80% of sub-sampled students who also participate in the print PISA assessment**. Note that this differs from the response rate standard for print PISA, which is a minimum of 80% of sampled students overall.

The test

Test duration

44. It was originally planned that the duration of the test would be 30 minutes. However, it was clear from cognitive laboratory studies undertaken with the demonstration units, that students took more time than anticipated to navigate around the stimulus websites and, consequently, to respond to items.

[3] See the PISA Technical Standards for definitions of *adjudicated entities*, *PISA participants* and *additional adjudicated entities.*

[4] Participation in this manner would have implications for international reporting as the sample would not be adjudicated.

Accordingly, since it is critical that enough items are administered in the test to develop and describe a scale for the reading of electronic texts, a proposal was put to NPMs to increase the duration of the test to 40 minutes.

45. Only one objection to the proposal has been received and so the duration of the ERA test for the field trial will be 40 minutes. This means that the total amount of time to administer the test, including tracking student participation, and having students logon to the delivery system, and complete an introductory tutorial, has increased to about one hour. If the extension of time presents difficulties to any country, it may be possible for the country to **trial** a shorter version of the test, although without a concomitant increase in sample size, the statistical information about the performance of items will be compromised.

46. Timing information will be automatically captured during the field trial and will be analysed to determine whether a shorter test would still enable robust reporting scales to be developed.

47. On the advice of the ERA advisory group, it was decided that both units and items within units will be delivered in a fixed order, or *lockstep* fashion. The lockstep procedure means that the student will not be able to return to an item or unit once they have moved to the next item/unit. Each time a student clicks the *Next* button in the test navigation bar, a dialog box will display a warning that the student is about to move on to the next item and that it will not be possible to return to the previous item. At this point, students will either confirm that they want to move on, or cancel the action and return to the item that they had been viewing.

48. The lockstep approach will enable test developers to specify the starting page for each item. This means that all students begin in the same place within the stimulus and, if they have navigated through a series of less relevant pages, do not have to find their way back to begin the item task. As well as reducing the average amount of time spent on questions, this procedure reduces item dependence within a unit.

Test design

49. For the field trial, five 20-minute clusters of items/units will be paired in five 40-minute electronic forms so that each cluster appears first in one cluster and second in another cluster (AB, BC, CD, DE, EA).

50. For the main study, three 20-minute clusters will be rotated across six electronic forms (AB, BA, AC, CA, BC, CB).

Adaptation, translation and verification

51. The adaptation process for ERA units will be similar to that for print PISA – that is, adaptations will be recorded, reviewed and commented upon in an adaptation spreadsheet. The translation process will be considerably different, however, because of the special electronic format of the instruments. Translation files will be managed through an online interface, and translation will be implemented using translation editing software. The verification of the ERA materials is the responsibility of the national centre, as a central verification service for the field trial will not be provided. Central verification will be available for the main study if sufficient countries participate.

52. The online interface has been designed and a *mock up* was prepared to enable the translation process to be demonstrated at the Dubrovnik NPM meeting. The implementation of the interface is *not* part of the first stage Contract, though routines have already been programmed to download and upload stimulus files, and this functionality will form a key part of the translation system.

Translation Load

53. As specified in the consortium's proposal, there will only be one source version of the ERA – in English. All countries testing in languages other then English will need to translate the materials. A maximum of 14 units will need to be translated for the field trial. Counting blanks, we estimate that there will be an average of 11 000 characters per unit (8 500 in the unit stimulus and tasks, plus a total of 2 500 for the coding guides for the open-response items).

Test delivery method

54. As specified in the contractor's proposal, the test will be delivered by booting each student's computer from either a CD or a USB memory stick. This minimises risks to the international comparability of results given the requirement, specified in the PISA 2009 Terms of Reference, that any computer-delivered assessment be implemented using the existing school infrastructure.

55. The test will be bundled together on CD and USB memory stick with a Linux-based operating system, a beta release of the TAO assessment platform and a Mozilla Firefox web browser for viewing the TAO interface. A licensed version of Flash media player also will be included to enable the viewing of the stimulus material.

56. Because all students will use the same operating system and the same browser, they will receive a similar test experience, no matter which operating system and browser is installed on their school's computers. Using a bootable medium prevents students from accessing other resources resident on their computers or accessible over the Internet, and ensures the security of the test materials by preventing their copying or transmission elsewhere.

57. The use of a bootable CD/USB memory stick requires that the test computers are configured to boot directly from one of these devices. This is the default configuration of most computers upon manufacture. However, some schools configure their computers so that booting directly from the CD drive or a USB port is disabled. In such cases, the test computers will need to be reconfigured to boot from either the CD drive or a USB port. This is usually a simple procedure that can be performed either by appropriate school staff (preferably), or a trained ERA Test Administrator. Reconfiguring the computer takes about two minutes per machine, does not affect the computer hardware or software, and can be reversed in two minutes at the end of the test session, leaving the computer in its original state.

58. Overall, 14% of the schools that completed the School Computer Resources Survey indicated that they would not allow their computers to be configured to boot directly from a CD or USB drive. In half of the 14 countries for which survey data is available, less than 10% of schools responded in this manner. However, between 17% and 29% of schools indicated that direct booting would not be permitted in the other seven countries.

59. NPMs in the most affected countries were asked to investigate why schools indicated that they would not allow their computers to be reconfigured to boot directly from CD or USB memory stick. The most common findings were that the people completing the survey either did not accept that the reconfiguration procedure is simple and benign, or did not properly understand what was being asked in this part of the survey. One country reported that school's IT maintenance was often handled externally, by a contractor or administrative body, and that it would be difficult to arrange reconfiguration (at least without cost).

60. It is apparent that the practicalities of delivering the test by direct booting from either CD or USB stick will need to be explained fully to schools when they are first approached to participate in PISA 2009. To assist in this task, a guide to detecting and altering the boot order sequence of a range of computers has

been drafted. This guide emphasises that the reconfiguration procedure is straightforward, not harmful to the computer, and is temporary in nature.

61. Schools that refuse to allow reconfiguration should be regarded as having insufficient computer resources and one of the two approaches identified above should be employed to help achieve school and student sample requirements. That is,

- laptops preloaded with the ERA delivery system could be taken to the school by the Test Administrator; or
- the school could be replaced.

62. Of course it may not be possible to make alternative arrangements in all cases where schools are identified as having insufficient computer resources. However, the level of risk to comparability that may come from a high rate of student exclusions for this reason can be monitored by using the pencil and paper results of the excluded students to estimate any likely bias. Further, imputing scores for these excluded students is being considered. This will be possible because the students sampled for the electronic reading option are a sub-sample of the PISA sample.

Data dollection

63. Student responses will be collected on a USB memory stick during the assessment and transferred to ACER via the Internet following the assessment. This procedure will be detailed in the ERA Test Administrator's Manual. Other data collection options involving local area networks are possible. As country situations differ, these options will be discussed bilaterally between the national centre and ACER.

Test administrator skills

64. The PISA model specifies that an external Test Administrator should be used, although some countries opt to have the test administered by a member of the school's staff. Either way, PISA Standard 6.2 requires that Test Administrators are trained in person.[5]

65. In selecting persons for the role of Test Administrators, their capacity to perform fundamental IT tasks and solve basic IT problems must be considered. All of the knowledge necessary to successfully administer the ERA can be imparted to a Test Administrator with a basic aptitude for IT in a few hours of additional training.

Coding of student responses

66. Some of the items in the test will be open-ended, requiring the student to copy-and-paste or type a response into a text box. These items will require coding by trained experts, conversant in the test language. An online system will be developed to facilitate this coding but its design and implementation is not part of the first stage Contract.

Online coding system

67. The online coding system will collate open-ended responses and manage their allocation to coders. An online coding system offers many advantages, including:

[5] The relevant PISA standards for conduct of the normal print assessment will apply except for a modified acceptable student response rate (see paragraph 0).

- responses that can be collated item by item, preventing coders from being influenced by students' other responses;
- multiple marking, enabling the facilitation of calculation of inter-rater reliabilities ;
- sets of coding that can be queried, for example, all coding before a given day, or all coding by a particular individual of a particular item;
- immediate data entry – meaning the coding is not double-handled;
- automatic data collection ;
- coding that can take place in a wide variety of locations via the Internet – it need not be centralised.

68. The online coding system will be demonstrated at the international coder training meeting to be held at the end of February 2008.

Coding load

69. The proportion of open-ended items requiring expert coding will be less for ERA than for the print-based PISA tests. About one-third of the items will require expert coding.

70. An advantage of a computer-delivered assessment such as ERA is that behavioural data can be collected and subsequently analysed. Coding schemes for ERA items will therefore be able to take students' navigation strategies into account where appropriate.

Budget for the second stage

71. As agreed in 2006, countries participating in the option of reading of electronic texts through all stages will contribute EUR 24,000 per year for a period of three years, starting in 2007. For countries that declared their participation in the option before January 2007, this amount is reduced to EUR 20,000 per year. Countries participating in the second stage of the option will contribute EUR 24,000 (or EUR 20,000) if they have participated in the first stage already, and EUR 48,000 otherwise.

72. The budget for the year 2008 foresees EUR 444,000 in country contributions for the international option on the reading of electronic texts [doc.ref. **EDU/PISA/GB(2007)37**]. Of this amount, EUR 402,000 (91%) is budgeted for the external contractor developing and implementing the option, EUR 11,700 (3%) is foreseen for OECD staff costs and EUR 23,000 (5%) for OECD overheads. EUR 5,300 (1% of the total amount) will be carried forward to 2009.

73. Assuming that all countries taken into account in 2008 will continue their engagement in the option to the Main Study, country contributions in 2009 will again amount to EUR 444,000. Of this amount, EUR 369,000 (83%) will go towards the external contractor implementing the option, EUR 12,000 (3%) is foreseen for OECD staff costs and EUR 23,500 (5%) for overhead costs. Total costs are thus estimated at EUR 404,500, leaving a surplus of EUR 39,500, or 9% of country contributions in 2009.

74. The carry-forwards from 2008 and 2009 will amount to EUR 44,800, which will contribute to finance the analysis and reporting of results in the years 2010 and 2011. EUR 14,400 (32%) are tentatively foreseen to go towards external experts, EUR 17,400 (39%) will account for OECD staff costs and EUR 13,000 (29%) for costs relating to the production of the publication (layout and printing).

75. The contractor points to the fact that the contractor's cost for the second stage of the option, the field trial, which is covering the period, 1 October 2007 to 30 September 2008, is EUR 518,000, and thus relatively high compared to the costs for the main study.

76. The contractor costs are presented in the following table in the context of the whole-of-project budget as specified in the contractor's proposal (doc.ref. EDU/PISA/GB(2006)31).

All figures in Euro	**Original whole-of-project Budget**	**Original 2007 Budget**	**2007 Contract base amount**	**Budget (2008-2010)**			***TOTALS***
				2008	**2009**	**2010**	
Instrument development	240,000	180,000	155000	85000	0	0	*240,000*
Software development	210,000	120,000	105000	105000	0	0	*210,000*
Administration	204,000	21,000	19000	83000	81000	21000	*204,000*
Meetings and experts	36,000	12,000	10000	14000	12000	0	*36,000*
Data management, scaling & analysis	132,000	0	0	44000	44000	44000	*132,000*
Translation and verification	258,000	0	0	156000	51000	0	*207,000*
Pilot activities	60,000	36,000	29000	31000	0	0	*60,000*
TOTAL	**1,140,000**	**369,000**	**318,000**	**518,000**	**188,000**	**65,000**	***1,089,000***

77. The relatively high cost of the second stage compared with the first stage reflects the large amount of work still needing to be done to implement the field trial and the need for the contractor to recover the shortfall in funding of the first phase. The main activities to be performed by the contractor in the second stage include the following:

- Engineer the test delivery system to boot from CD and USB memory stick.
- Supply software for the sub-sampling of ERA participants.
- Prepare and distribute full documentation of field trial procedures.
- Implement a secure online interface to manage the translation process.
- Conduct field operations and coder training.
- Compile translated materials into nationally specific test forms.
- Design and implement an online coding system.
- Perform data cleaning and analysis of FT data.
- Review the psychometric characteristics of the ERA scales.
- Examine the relationship between ERA and print reading scales.

78. Note that, due to the cost structures of the Contractor, expenditure in 2008 would exceed the income foreseen for this year, while the reverse would be the case in 2009.

79. If countries commit to their participation for both years, and with the agreement of the PGB, the Secretariat could smooth the costs over the two years by drawing on the PISA reserve.

APPENDIX 1: RATIONALE FOR INTRODUCING AN ELECTRONIC READING ASSESSMENT IN PISA 2009

1. There are several compelling reasons for including an assessment of electronic reading in PISA 2009. These include:

   - ensuring that the construct of reading is not under-represented;
   - measuring young people's preparation for, and transition to, the workplace; and
   - collecting critically important baseline data for public policy makers, during a time when the nature of reading is changing.

2. Each of these reasons is discussed below.

Ensuring that the construct of reading is not under-represented

3. Perhaps the most compelling argument in favour of including electronic reading within PISA 2009 is to ensure that the construct of reading is not under-represented.

4. It is increasingly common for people around the world to read in the electronic medium. The growth in access to and the use of the Internet worldwide has been described in the introduction to the current draft of the PISA 2009 Reading Literacy Framework (paragraphs 8–10). Moreover, since PISA surveys 15-year-olds, the danger of under-representing reading is even greater because 15-year olds around the world read online at a rate much higher than the older population. For example, in the UK, 74% of children and young people aged nine to nineteen have access to the Internet at home, and most of these (84% in all) are daily or weekly Internet users (Livingstone & Bober, 2005). In the US, 87%of all students between the ages of 12 and 17 report using the Internet; nearly 11 million students do so daily (Pew Internet & American Life Project, 2005). While such OECD countries are the primary focus of PISA, mass Internet use by young people is not confined to the developed world. In Accra, Ghana, for example, 66% of 15–18 year olds attending school, and 54% of 15–18 year olds not attending school, report having gone online (Borzekowski et al., 2006). In short, the Internet is quickly becoming this generation's defining technology for reading literacy and thus the neglect of assessing reading in this medium would seriously limit any claim to a comprehensive understanding of reading proficiency for the age group.

5. We also see these changes in schools around the world where the past decade has seen the rapid integration of the Internet into school settings. For example, schools in the European Union report 96% Internet access in 2006, with broadband access the new standard. They average nearly 70% school classroom penetration, with highs of over 90% broadband Internet access in the Nordic countries, the Netherlands, Estonia and Malta, and lows of 13–33% in Greece, Poland and Lithuania (Korte & Hüsing, 2006). In 2005, 99% of public K-12 schools in the US had an Internet connection and 93% of all K-12 classrooms in the US had Internet access (Parsad et al., 2005).The rates are likely to be higher in secondary schools.

6. The previous PISA surveys of ICT Familiarity indicate that in excess of 95% of 15-year-old students in OECD countries have used a computer and in excess of 85% of 15-year-old students in OECD countries use a computer at home to access the Internet.

7. A second danger of under-representing the construct of reading by not testing electronic reading, is that reading a paragraph, a story or a document in print is not the same, in many respects, as reading an electronic text. For example, in authored environments in the electronic medium, one must access information from search results, a task requiring skills to infer which of several search results will take a reader to the most useful information (Henry, 2006). One must navigate a web page, make an inference about the information behind a link, and continually drill down or across to locate the answer to a problem or a question (Coiro & Dobler, 2007). Once readers locate a useful site, they must critically evaluate the accuracy of the information within a context where anyone may publish anything (Leu & Castek, 2006). They must think critically about the credibility and authority of the information, to a greater extent than in the print context where texts are typically edited and filtered by many layers of the print publication process. In message-based environments, to take another example, readers often must read short, seemingly cryptic, blogs or e-mail messages during their online reading experiences to gather new information resources or to evaluate the ones they have acquired (Lewis & Fabos, 2005).

Measuring young people's preparation for, and transition to, the workplace

8. The PISA Reading Framework refers to the centrality of electronic reading to modern economies (paragraph 8), commenting that while Internet use correlates highly with socio-economic status and education (Sweets & Meates, 2004), the requirement to use computers crosses a wide range of occupations including administration and sales as well as careers in the knowledge professions (OECD and STATCAN, 2005). According to the European Commission, "Information and communication technologies (ICT) are a powerful driver for economy-wide productivity, growth and jobs." (European Commission, 2005). Since one of the primary uses of PISA data is to assist in determining the capacity of each nation's educational system to prepare young people for their future, it is important to evaluate students' preparation for the new types of reading demands entailed by electronic texts, both in the workplace and in post-secondary education (European Commission, 2005; Kirsch *et al.*, 2002).

Collecting critically important baseline data for public policy makers, during a time when the nature of reading is changing

9. The third argument for including an assessment of electronic reading in PISA 2009 is one that points to the future. If PISA 2009 includes an assessment of electronic reading, it will be the first international assessment of this important aspect of reading. This will allow PISA 2009 to provide baseline data against which to measure progress, in each nation as well as internationally, as the nature of reading changes in the 21st century. Data collected in 2009 will be used for many years. It would be unfortunate to miss the special opportunity that PISA 2009 presents to gather the first international set of data about electronic reading, representing what will become an increasingly important aspect of reading in the future. If we wait until reading is again the major PISA assessment domain – in 2018 – to include electronic reading, it will be too late to capture the initial changes that are taking place as electronic texts transform elements of the way we read.

10. The extent to which the assessment of electronic reading is perceived as an important addition to what PISA offers is reinforced by the results of the School Computer Resources Survey, referred to in the main body of this report. Of the schools surveyed in the eight countries that responded to the question asking whether the ERA would affect their school's willingness to participate in PISA, 63% said that the inclusion of ERA would not affect their willingness; 7% said they would be less inclined to participate; and 31% responded that their school would be more likely to participate in PISA 2009 if ERA were included. Given the additional disruption that an extra testing session for ERA will inevitably cause to school routines, this set of responses is both surprising and extremely encouraging. The question was designed to ascertain whether including the ERA was likely to put the main study response rate at risk; however, on the contrary, the result implies that the ERA will assist countries in

reaching their school sample targets. It may be inferred, moreover, that a substantial proportion of those, most closely engaged in the education of the target population – school administrators and teachers – recognises the value of such an addition to PISA. This inference is supported by anecdotal evidence collected in discussing the prospect of an assessment of electronic reading ability with school teachers in various countries. An issue often raised in these discussions is whether the gender difference generally observed in favour of girls in print reading will persist in the electronic medium.

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APPENDIX 2: SCHOOL COMPUTER RESOURCES SURVEY

[Statements in square brackets and blue font do not appear in the survey as seen by respondents]

Electronic Reading Assessment
School Computer Resources Survey

The purpose of this survey is to ascertain the level of resources available in schools to implement an assessment of the reading of electronic texts in PISA 2009. PISA is an international assessment of 15-year-olds conducted in all OECD countries and numerous partner countries every three years.

This is **not** a request for your school to participate in the assessment.

As part of PISA 2009, a small sample (about 10) of 15-year-olds in some schools will be asked to undertake a computer-delivered test of reading. The test will be supervised by an external test administrator, but a member of staff should be available beforehand to help set-up the computers.

This survey is being administered to a sample of schools in each participating country to ascertain the level of resources available in schools to implement the assessment. Sharing your knowledge of the computer facilities available to students at your school, and the technical staff available for support, will be a great help in designing an assessment that will run easily in many school environments.

You are asked to answer a maximum of 10 questions. The whole survey will take only five to ten minutes.

[The maximum number of questions will be 12 for those countries who opt to ask about the effect of ERA on participation in PISA]

The basic requirement for administering the test is that there must be a suitable computer (PC or Macintosh) available for each student. To be suitable, a computer must satisfy the following four criteria:

* Be manufactured in 2001 or later
* Have a keyboard and a pointing device (e.g., a mouse)
* Have a 15 inch or larger colour display
* Have at least one accessible USB port (e.g. at the front of the machine)

In addition, the computers must be located so that the test can be supervised by a single test administrator, and in such a manner that students cannot easily observe each others' screens. No other students should be present in the room.

Note that while the test will take only 30 minutes, it is likely the Test Administrator would need to occupy the test room (e.g. computer lab) for up to an hour and a half.

Q01: Approximately how many 15 year olds attend your school?

- ☐ Fewer than 20
- ☐ 20 to 50
- ☐ More than 50

Q02: Does your school provide computers for student use?

- ☐ No
- ☐ No, but students must have their own laptops
- ☐ Yes

Q03: How many suitable computers does your school have in a single room that can be used under test conditions?

To be suitable, a computer must be manufactured in 2001 or later, have a keyboard and pointing device, have a 15 inch or larger colour display, and have at least one accessible USB port.

- ☐ 0
- ☐ 1-3
- ☐ 4-6
- ☐ 7-10
- ☐ 11-14
- ☐ more than 14 (please enter approximate number in comments box)

[Note that a 'zero' response to Q03 will lead directly to the submission page of the online survey]

If your answer to the previous question was more than 14, answer all the following questions for <u>your best 14 computers</u>.

Q04: What operating system do these computers normally run?

<u>Please choose **all** that apply:</u>

- ☐ MS Windows
- ☐ Mac OS
- ☐ Linux

Q05: How many of these computers also have a CD or DVD drive?

- ☐ 0
- ☐ 1-3
- ☐ 4-6
- ☐ 7-10
- ☐ 11-14

Q06: How many of these computers have <u>two</u> or more accessible USB ports?

Note that each computer must have at least one accesible USB port to be suitable for the Electronic Reading Assessment

- ☐ 0
- ☐ 1-3
- ☐ 4-6
- ☐ 7-10
- ☐ 11-14

Q07: Are these computers connected via a local area network (LAN)?

- ☐ No
- ☐ Yes

Q08: Does at least one of these computers have stable internet access?

- ☐ No
- ☐ Yes, but with less than 256 kilobits per second upload speed
- ☐ Yes, with at least 256 kilobits per second upload speed

Q09: If there is a CD/DVD loaded when these computers are turned on, will each computer try and boot directly from it?

Note that booting directly from CD/DVD is the default configuration for most computers on delivery.

- ☐ No - the computers don't have a CD or DVD drive
- ☐ No
- ☐ Yes

[Note that a 'yes' response to Q09 will mean that Q10 will no longer appear in the online version]

Q10: Would you allow the automatic boot-up feature (from CD/DVD or USB) to be enabled for the duration of the assessment?

This is a software procedure and would take about 3 minutes per computer to perform before and after the test. Note that computers would be returned to their original configuration after the test and the procedure would have no effect on the subsequent use of the computers.

- ☐ No
- ☐ Yes - there is a member of staff who could do this
- ☐ Yes - but it would have to be done by the external test administrator

[Note that countries can choose whether or not they include the following two questions in their survey]

Q11 : The PISA project normally involves randomly selecting 35 fifteen-year-olds in every school to undertake a two hour assessment in reading, mathematics and science, plus a 30-minute questionnaire. Would your school normally be willing to participate in the PISA study?

This is NOT a request for participation.

- ☐ No
- ☐ Yes

Q12 : The Electronic Reading Assessment would require that 10 of the students selected for PISA also underatake a 30-minute computer based test. If your school were to be asked to participate in this innovative Electronic Reading Assessment, in addition to the main PISA assessment, would this affect your school's willingness to participate?

This is NOT a request for participation.

- ☐ No
- ☐ Yes, we would be MORE likely to participate
- ☐ Yes, we would be LESS likely to participate

Submit Your Survey.
Thank you for completing this survey.