




1

Context of the PISA Digital Reading Assessment

Computer use has grown exponentially since the invention of the microcomputer three decades ago; as of mid-2010, almost one-third of the world's population uses the Internet. Digital technologies have changed the ways texts are produced and displayed; and those changes have had an impact on how students read. This chapter focuses on how new kinds of texts have transformed reading.



Since the invention of the microcomputer some 30 years ago, the number of computers in use worldwide has been growing at an exponential rate. By mid-2010, it was estimated that almost two billion people, or 29% of the world population, were using the Internet, with percentages ranging from 77% in North America to about 11% in Africa (Miniwatts Marketing Group, 2010). On average in OECD countries in June 2010, around 25% of the population had a subscription for fixed-line broadband (OECD Broadband Portal : www.oecd.org/sti/ict/broadband). The past decade has also seen the explosion of mobile technologies, with laptops, digital pads, smart phones and other portable digital devices being sold in increasingly large numbers. Only around 8% of the global population is connected to fixed-line broadband, but mobile broadband connection is estimated at 14%, pointing to the growing importance of mobile Internet access in non-OECD countries (ITU Statistics: www.itu.int/ict/statistics).

Information and communication devices based on digital technologies are used in a wide range of contexts and for many different purposes. Their most important common characteristic is that they all permit the display and perusal of text. Indeed, most applications of computer technologies, including videogames, involve some type of textual information. As a result, whatever their purposes, tasks or goals, users of computers and networked digital technologies are compelled to read digital texts.

Moreover, digital technologies deeply affect the shape, content and life-cycle of texts and, consequently, the very nature of reading. It is important for governments and societies to understand these changes as they have begun to affect, in turn, almost every aspect of life in society, including government, education, work, commerce and civic life. To cite just a few examples: more and more taxpayers fill in online forms; students search the web for information; jobseekers look up ads on employment websites; consumers order goods in online stores; and people build and maintain social communities on line. All these activities, and many others, require the production, dissemination, and reading of some type of text.

This chapter begins with a review of the impact of digital technologies on the production and display of text. The potential consequences of these changes for defining reading skills and reading literacy are then discussed, stressing a number of features and processes that are characteristic of digital reading, and listing a number of important questions that are addressed in the PISA 2009 digital reading assessment. This chapter is not concerned with an analysis of how digital texts may affect instruction, such as lesson-based teaching and learning strategies, or social networking. The focus is on the act of reading and how reading is transformed by new forms of texts and textual devices. For more extended discussions of this and related topics, see Coiro, *et al.*, 2008; Dillon, 2004; Mayer, 2005; and Rouet, 2006.

NEW TECHNOLOGIES FOR TEXT, NEW WAYS OF READING

From the invention of the cathode ray tube to the latest mobile communication devices, the advent of digital technologies has had a profound impact on the design, production, dissemination and uses of text. From a linguistic standpoint, a text is usually defined as a passage forming a “unified whole” (Halliday and Hasan, 1976). Linguists agree that textual “unity” is not conferred through strict criteria of length or grammatical rules, but rather through the communication act that the text fulfils. Texts originate from a source and are intended for an audience. They are meant to perform a specific communicative act, for instance, to tell, describe, explain, persuade, and so forth. The extent to which sets of linguistic utterances can indeed perform those acts depends on their compliance with a set of principles or “standards of textuality” (de Beaugrande and Dressler, 1981). For instance, texts can only communicate effectively to the extent that they are coherent, cohesive, informative, relevant and acceptable.

The general principles that define textuality are arguably similar across media. However, printed and digital technologies each possess some unique features that result in important differences in the way texts are produced, displayed, organised and connected to other texts. Furthermore, whereas printed texts have a relative permanence, digital texts are potentially dynamic and can be constantly completed, edited and updated. These differences have consequences for the access, comprehension and uses of text in a wide variety of situations, ranging from education to work to personal and civic purposes. It is therefore crucial to understand and assess the new forms of reading literacy that come with the practice of reading on digital displays (Coiro, 2009).

Although digital text is often associated with microcomputing, information societies are replete with devices that display digital texts, without the reader having to manipulate a computer. Examples include videoprojected slides used during conferences, electronic advertisements or public communication signs, information booths in railway



stations, shopping centres and airports, but also displays of iPods, mobile phones, digital pads and many more. Throughout the past decade, the list of these new devices has been continually expanded and updated.

The growing practice of displaying text digitally is having a deep impact on the shape and contents of the texts themselves. Digital texts differ from printed texts in readability and usability, and also in the social and economic processes that drive the creation, dissemination and multi-dimensional uses of text.

Differences in the readability and usability of text

Superficially, texts displayed digitally may seem very similar to those that are printed on paper. They use the same basic sign systems (for example, the Roman alphabet or Japanese Kanji, punctuation marks), the same syntax and, to some extent, the same rules for composing passages and signalling structure (margins, paragraphs, headings and so forth). However, a closer examination reveals important differences. One prominent difference is the physical size of the display area or “page”. A 15-inch computer screen is about the physical size of an A4 or US letter page, which is smaller than printed newspapers, catalogues or supermarket flyers. And in recent years electronic gadgets with much smaller displays, such as digital pads and smartphones, have become increasingly popular.

In addition, the combination of smaller size and poorer quality of digital information means that the reader of digital text must generally cope with reduced readability and piecemeal presentation of information. A simple illustration is provided in Figure VI.1.1, which shows the amount of text featured on a printed and a digital page of a newspaper. The excerpt of the printed page roughly corresponds to the display size of the web page.

■ Figure VI.1.1 ■

Comparison of print and digital texts

Print

THE AGE
Friday, May 20, 2011

Taking the road to greatness

The world's most successful streets have more humanity and fewer cars, writes Megan Backhouse.

BUSTLING with people but enough room to linger, safe, attractive and with a jumble of uses — we all know what makes great streets, but that doesn't mean we always get them.

When Melbourne City Council recently unveiled its plans for an overhaul of Swanston Street, lord mayor Robert Doyle said he hoped to make the stretch of road “one of the great boulevards of the world”.

He is not the first to have such a vision. Mayors everywhere regularly announce their intention to make a particular street “great”. Some succeed and some don't. But given that architects and urban designers believe that great streets can be designed, why has it proven so tricky?

American urban designer Allan Jacobs wrote a whole book attempting to pinpoint the physical, designable characteristics that make a street — say the Rambles in Barcelona or Boulevard Saint-Michel in Paris —

turned Copenhagen's Strøget into a success story since it was closed to traffic in 1962, has said that designers have addressed buildings, transport and the ecology of a street, but not the people.

Alexander too has written that positive urban spaces (of which streets are a key component) need to “provide for people, for their feelings, for their needs and their emotional life”.

Gehl, a regular visitor to Australia who has advised many Australian councils, including the City of Melbourne, seeks to make better streets by improving conditions for pedestrians and bicyclists.

He says cities must be “integrated” if it is not human character that Melbourne Elliott says this nation and the post-“pedestrian” transport by He says Swans originally in th and partially c has slowly got Elliott says that continue t Swanston Stre other parts of “Melbourn boulevards, lik St Kilda Road.

She wrote in the early '60s about how vital streets — like the one she lived on at the time in New York's Greenwich Village — had density, diversity and a sense of neighbourhood. But it is precisely this human scale that architects such as Denmark's Jan Gehl and Britain's Christopher Alexander lament has been ignored for 50 years.

Gehl, credited with having

Photo: Wide Laube

Press clipping of “Taking the road to greatness”, by Megan Backhouse/Fairfax Media publication

Digital

11:30AM Friday May 20, 2011 2,277 online now See today's paper The Age Domain Drive MyCareer

theage.com.au
THE AGE

Entertainment

Movies Music TV & Radio TV Guide Art & Design Stage Restaurants & Bars Books

You are here: Home > Entertainment > Art and Design > Article Search here... Search

Taking the road to greatness

Megan Backhouse
May 13, 2011

Join the conversation
You're the only person reading this now. Tell your friends

Get 1 month free. Ends June 30.
Find out more

Top Entertainment articles

1. Tears in the green sauce see Andrew Irie for another day
2. Instagram
3. 'I won the lotto': Kutcher makes his debut as a Man man
4. Cannes bans von Trier over Hitler remarks
5. How Melbourne made its own best

• More Entertainment articles

Story Tools

Email this story

Strøget, Copenhagen's three kilometre pedestrianised street. Photo: Wide Laube

The world's most successful streets have more humanity and fewer cars.

BUSTLING with people but enough room to linger, safe, attractive and with a jumble of uses — we all know what makes great streets, but that doesn't mean we always get them.

Screen grab from www.theage.com.au of story “Taking the road to greatness”, by Megan Backhouse/Fairfax Media publication

However, digital texts should not be regarded as mere impoverished versions of printed texts. Digital technologies are constantly being improved and may eventually be comparable to high-quality printing technologies. In addition, designers of digital documents have created new publishing standards to cope with the limitations inherent in the digital medium (consider, for instance, the increasingly popular web-based applications tailored to small screens). Digital technologies have also introduced new ways to represent and organise information, some of which result in clear benefits for the reader compared to printed texts.

New features of digital texts

From static pages to dynamic windows and frames

Digital texts provide new ways for the reader to move within and across pages of text. Some of these have to do with the limitations of digital displays reviewed above; others are original inventions that have brought readers new ways of accessing and navigating through texts. In order to fully appreciate the impact of these new devices on digital reading literacy, one must keep in mind a few essential differences between printed and digital text in terms of page composition and arrangement into volumes.

In printed texts, the content is intrinsically connected to the physical artefact. A passage of text exists both as a verbal message and as a concrete artefact: the page, the chapter, or the volume. Printed texts can and must be stored and indexed, like any collections of material objects – hence, since the 16th century at least, the use of numbering systems to order books in libraries and page numbers in books (Platteaux, 2008). In both cases, the number always represents the serial position of the item in the respective set. As a consequence, tables of contents and indexes have emerged as universal cataloguing techniques for printed artefacts.

In digital texts, however, the physical storage of the information is independent of its organisation as it appears to the reader. Pages of digital texts are also independent from the particular display that is used to visualise them. For example, one can view a particular web page using a 21-inch desktop monitor, a 15-inch laptop or a smartphone. Most often, the pages are larger than the actual display screen or window. This is a major difference from printed text in which the text frame is most often equal to the physical page, and sometimes smaller, such as in newspaper pages.

Because of the virtual nature of page contents and formats, designers have had to replace page composing and numbering with other indexing and retrieval techniques. These techniques have been continually revised over the past two decades, and navigation devices are continuously updated in new versions of web browsers. To cite just one example, the “new tab” function appeared after 2000, even though these devices did not require any advanced technology. The reason why older versions of browsers did not include this and other useful features is unclear, but it may be that the excitement raised by multiple-window operating systems in the early 1990s overshadowed for a while the serious usability issues that came along with reading on line.

Digital texts come with devices that let the reader navigate within and across pages of digital texts. In the past decade, common devices used to navigate digital pages were the vertical and horizontal scroll bars, index tabs and expandable menu frames. None of these devices has ever had any meaning in the world of printed text. Their mastery and use is a component of the so-called “new literacies” (Coiro, *et al.*, 2008) typical of the electronic age.

From linear arrangement to networking and hyperlinking

Even more dramatic differences between printed and digital displays can be found at the level of multitext compounds, such as electronic books or websites. Designers of digital documents have created various techniques to represent the contents of those compounds and to let the reader move from page to page.

One of the earliest indexing techniques used in digital documents is the menu, or list of page headings, from which the reader is invited to make a choice. The digital menu resembles a table of contents except that there are usually no page numbers. Instead, the reader selects an option by clicking directly on the item or a symbol that represents it, which results in the display of the selected page instead of or on top of the menu page (that is, in a new window or tab).

Since there are no page numbers, however, once the page is displayed, the reader has no direct clue about its position among the set that makes up the electronic book. Such clues have to be provided indirectly through analogical symbols (for example, a micropage within a series of micropages at the bottom of the screen) or through path-type expressions, such as “Habitats – Marine – Open waters – Mediterranean open waters – Common skate” (example adapted from Nilsson and Mayer, 2002).

Menus can be made hierarchical, which means that selecting a menu item causes another, more specific, menu to be displayed. Alternatively they may be presented as separate pages, or as part of multitext pages. In the context of web pages, menus are more and more frequently presented in a frame at the top or to the left of the display window. The rest of the window can be updated with the menu remaining constant, which can help the reader to keep a sense of his or her location in the document set.



The issue of designing effective menu systems for digital information systems has been revived lately with the advent of mobile devices that can display vast amounts of multimedia information (see, for example, St Amant, *et al.*, 2007). Other active areas of research and development are the design of “hands-free” menu systems guided by eye movements or speech.

One of the most distinctive features of digital texts is the hypertext link, a technique that appeared in the 1980s as a means of connecting pages of information in large electronic documents (Koved and Shneiderman, 1986). The hypertext link or hyperlink is a piece of information (usually a word or a phrase) that is logically connected to another piece of information (usually a page). Clicking a hyperlink results in the display of a new page instead of or on top of the page previously displayed.

Hyperlinks may be presented in separate lists (also called menus) or embedded within content pages. When embedded, hyperlinks are generally marked using a specific colour or typography.

The use of hyperlinks allows for the creation of multipage documents with a networked structure. Unlike lists or hierarchies, the arrangement of pages in a networked structure is not systematic. Rather, it follows the semantic relationships across pages. It is up to the author of a multipage digital document to link a page with another page by inserting a hyperlink.

The hyperlink has contributed to the popularisation of digital documents (hypertexts) whose overall organisation is unlike that of traditional documents. In some early studies, hypertexts were praised as a means to “free” the reader from the supposedly cumbersome constraints of linear texts. But scientific studies of hypertext reading have found that network-like document organisation frequently results in disorientation and cognitive overload (Conklin, 1987; Rouet and Levonen, 1996). Navigation and orientation within nonlinear structures seems to rely on the reader’s ability to mentally represent the top-level structure of the hypertext. Global organisers that accurately represent the overall structure of the information space made up by the hypertext document, such as structured menus and content maps, are usually of some help, provided that such organisers use symbols and metaphors that are already familiar to the reader (Rouet and Potelle, 2005).

In summary, skilled reading, navigation and information search in digital texts requires the reader to be familiar with explicit and embedded hyperlinks, nonlinear page structures, and global content representation devices and tools. Empirical evidence so far indicates that navigating digital texts is far from trivial, and may pose some challenges to certain categories of users, such as the elderly (Lin, 2004).

From illustrated text to multimedia and augmented reality

Digital technologies have also introduced new ways of integrating verbal texts with other forms of representation. Online pictures and graphics can be clicked on to reveal descriptions and comments. Text can also be integrated with animated pictures, graphics and even video materials. Augmented reality allows one to integrate an actual environment (say, a Renaissance castle) with explanations and comments presented on a digital device. At the time of writing (January 2011), the use of multimedia presentations on fixed and mobile digital devices was booming, and was assisting individuals in moving around city streets, visiting museums and exhibitions, and learning professional skills in domains ranging from mechanics to surgery.

These innovations were still too marginal to be incorporated in the 2009 edition of the PISA digital reading assessment, but they will progressively be integrated in future PISA assessments.

From authored texts to online discussion and social networks

Another prominent feature of digital texts is the shift from so-called authored texts to message-based discussion forums, social networks and Web 2.0. The spread of the Internet, combined with the interactivity of electronic displays, have made it possible to create new forms of communication that lie between traditional written texts and spoken conversations. Receiving and sending e-mail or short text messages, participating in discussion groups or engaging in social relationships through the web is becoming more and more common (Pew Research Center, 2010a). These activities require a mastery of reading comprehension and written skills, even though the genres and forms of texts that are involved appear relatively new. Research on the impacts of these new forms of textual communication on skill acquisition is warranted. (For a recent review of the state of the art, see Kemp, 2011; Light, 2011 and, in particular, Coe and Oakhill, 2011.)

IMPACT OF DIGITAL TEXTS ON READING LITERACY

This section outlines the new literacy demands and opportunities that are associated with digital texts. (For more extended reviews, see Britt and Gabrys, 2000; Coiro, *et al.*, 2008; Kemp, 2011; Reinking, 1994; Rouet, 2006; Warschauer, 1999.)

Some types of reading are still mostly done using printed materials, while others are specific to the electronic medium. For instance, even experienced computer users read novels and extended informational texts on paper (see study of medical school students printing, Martin and Platt, 2001). On the other hand, the activity of reading search engine lists is almost exclusive to reading on line, as is reading a personal blog (a genre that seems to have been born with the new millennium: Blood, 2000) or the comprehension of an online job-application form. Thus, digital reading cannot always be strictly compared to print reading. This is, in fact, the best evidence in support of the design of a new framework and new assessment procedures for digital reading.

However, a wide range of reading activities can be performed using both types of texts. Popular examples include reading news, informational texts, texts with a practical purpose such as buying goods or getting directions. However, because the digital versions of these texts differ – sometimes dramatically – from their printed counterparts, it is useful to consider how they affect reading skills and reading literacy. A powerful illustration of this is found in the area of literacy-assessment research itself, where so-called test-mode effects have been found with computerised versions of tests, resulting in better or worse performance than when printed versions are used (Clariana and Wallace, 2002).

Which aspects of reading are affected by digital text?

Independent of the particular reading situation or purpose, there is a need to identify those components of reading literacy that are relatively preserved and those that are the most affected by digital texts.

Low-level processes such as word identification or syntactic parsing are presumably very similar in printed and digital reading, aside from the general surface readability issues discussed in the previous section. The processes involved in building a mental representation of the text, such as identifying referents of anaphoric expressions or maintaining coherence locally and globally, would also appear to be relatively unaffected. These processes may simply be hindered in the case of lengthy texts displayed on line, because the reader will have more trouble referring to a previously read section (for a discussion see Foltz, 1996).

Differences between print and digital reading are more apparent when considering macro-aspects of reading, such as accessing texts of interest, integrating information across texts, or evaluating texts for quality and credibility.

Access to text

Printed texts require the reader to locate a material artefact, and use the categorisation and organisers to locate information of interest within that artefact. Digital texts require the reader to search phrases, scan heterogeneous links, and use navigation devices. The latter procedures call upon the reader's ability to generate vocabulary, assess the relevance of verbal expressions (and disregard distractors), and understand the hierarchical structuring of information in menu trees.

The skilled reader of digital texts must be familiar with the use of navigation devices and tools. He or she must also be able to mentally represent the movement of the window over the text page, so as to be able to move in the correct direction. This includes an ability to overcome apparent discrepancies, for example the fact that the arrow oriented downwards on the scrollbar actually moves the text upwards. As early as 1989, Foss noted that some users tended to get lost in the maze of windows that ended up covering each other on their computer screen; early human-factors experiments often concluded that just two side-by-side windows seemed to be a good compromise for most readers (Wiley, 2001; Wright, 1993). The opening, layout and closing of multiple windows is arguably a skill in itself. There is indeed some evidence that reading complex digital texts relies on visuo-spatial abilities as much as on language-processing abilities (Pazzaglia, *et al.*, 2008; see also Naumann, *et al.*, 2008).

Integration across texts

Integration, defined as comparing and relating different pieces of texts, calls upon similar processes, whatever the medium. However, because digital texts do not follow any stable categorisation scheme, and because the digital medium makes it so easy to cross-reference texts, readers are much more likely to find themselves jumping across



different texts within a single reading episode. Furthermore, the web offers readers the possibility of compiling a large number of different sources on any given topic. Therefore, the accumulation of information across multiple passages is becoming typical of the sustained reading of digital texts. Integration across text requires sophisticated reading skills and strategies, which are not spontaneously mastered by young readers (Britt and Rouet, forthcoming). Even though these skills are not specific to digital reading, they may explain a significant portion of readers' digital reading proficiency.

Evaluation of text

Readers of web-based documents are faced with a wide array of materials, given the open, unregulated nature of web publishing. Current retrieval systems are mostly based on the semantic match between the query and the contents, regardless of any indication of genre, accuracy, authority or trustworthiness. It is up to the reader to find out not just what the text is about, but also who wrote it, who published it, when, for what purpose and with what potential biases. In the printed world, a range of perceptual and contextual cues (what the text looks like and where it is found), as well as the presence of human mediators (for example, the librarian, the bookseller, the critic) often facilitate these attributions. On the web, however, most of these cues and mediations are missing and the reader has to resort to deeper levels of reasoning to evaluate the quality of the text (Britt and Gabrys, 2000). There is mounting evidence that evaluating web information is indeed a difficult aspect of digital reading for most teenagers, even though they rely more and more on the web to acquire new information about subjects of interest (Dinet, *et al.*, 2003; Darroch, *et al.*, 2005; Kuiper, *et al.*, 2005).

SOME ISSUES FOR ASSESSING DIGITAL READING

The PISA digital reading assessment addresses a number of important issues that arise from the differences between print and digital reading outlined above.

First, it considers whether print and digital reading belong to the same construct. The PISA 2009 reading framework (OECD, 2009b) points out that, while many of the skills required for print and digital reading are similar, digital reading demands some new emphases and strategies to be added to the reader's repertoire. "Gathering information on the Internet requires skimming and scanning through large amounts of material and immediately evaluating its credibility. Critical thinking, therefore, has become more important than ever in reading literacy" (Halpern, 1989; Shetzer and Warschauer, 2000; Warschauer, 1999). It is important to find out which specific dimensions of tasks and students' characteristics explain students' proficiency in digital reading, accounting for print reading proficiency.

Data from the digital reading assessment will allow for investigating whether the specific features of digital text, such as nonlinearity, navigation, intertextuality, and uncertainty regarding the quality of information, explain a specific share of the variance in student performance. Some of these issues are beyond the scope of this report, but the characteristics of the tasks and students' navigation behaviour are the subjects of Chapters 2 and 3, respectively, of this volume.

The results of the digital reading assessment also make it possible to explore the extent to which a student's social, cultural and economic background is associated with proficiency in digital reading. These associations are explored in Chapter 4, as is the relationship of digital reading proficiency with malleable characteristics, such as students' engagement in print and digital reading activities and their awareness of reading strategies.

Over the past ten years, there has been a discussion as to whether the people who have been exposed to information technology from a young age, so-called "digital natives", might readily possess the skills and abilities required to make use of digital devices, compared to older people, the so-called "digital immigrants" (Prensky, 2001). There is mounting evidence that mere exposure to technology is not sufficient for becoming a skilled user. As time elapses, the gap in technology use between generations is progressively decreasing. The Pew Research Center (2010b) has found that even though "millennials" (people who were between 5 and 20 years old at the turn of the 21st century) are more likely than older generations to use mobile digital devices and social networks, they are no longer dominant in other types of digital activities, such as looking up government websites or financial information. Of particular interest is an investigation of prior exposure to and familiarity with digital technologies, and the extent to which they explain students' proficiency in digital reading tasks. Results of the information and communication technologies (ICT) familiarity survey, an international option in PISA 2009 implemented in 45 countries, are provided in Chapter 5 of this report. Chapter 6 presents an analysis of the relationship between digital reading proficiency and ICT familiarity and mainly use for the 17 countries that participated in both options in PISA 2009.

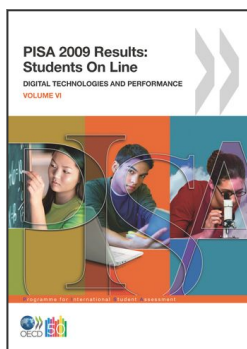


Chapter 7 expands this theme by presenting an analysis of the combined influence on digital reading proficiency of a range of variables, including print reading proficiency, gender, online and print reading engagement, reading strategies and selected socio-cultural variables, as well as ICT experience.

Access to technology is necessary but certainly not sufficient in itself to acquire digital reading literacy. As noted by Warschauer (1999), overcoming the “digital divide” is not only a matter of developing access to online technology, but also of enhancing people’s abilities to access and make use of information through electronic devices. Indeed, recent studies show a wide range of proficiency levels among groups of “digital natives” (Kennedy, *et al.*, 2008). A growing number of experts call for “a more nuanced understanding of students’ technology experiences”, to use the words of Bennett and Maton (2010).

CONCLUSIONS

The advent of information and communication technologies has sparked a revolution in the design and dissemination of texts. Online reading is becoming increasingly important in information societies. Even though the core principles of textuality and the core processes of reading and understanding text are similar across media, there are good reasons to believe that the specific features of digital texts call for specific text-processing skills. The PISA 2009 digital reading assessment was designed to investigate students’ proficiency at tasks that require the access, comprehension, evaluation and integration of digital texts across a wide range of reading contexts and tasks. The rest of this report presents the results of this first attempt to obtain a large-scale picture of digital reading skills among today’s 15-year-olds.



From:
PISA 2009 Results: Students On Line
Digital Technologies and Performance (Volume VI)

Access the complete publication at:
<https://doi.org/10.1787/9789264112995-en>

Please cite this chapter as:

OECD (2011), "Context of the PISA Digital Reading Assessment", in *PISA 2009 Results: Students On Line: Digital Technologies and Performance (Volume VI)*, OECD Publishing, Paris.

DOI: <https://doi.org/10.1787/9789264112995-5-en>

This work is published under the responsibility of the Secretary-General of the OECD. The opinions expressed and arguments employed herein do not necessarily reflect the official views of OECD member countries.

This document, as well as any data and map included herein, are without prejudice to the status of or sovereignty over any territory, to the delimitation of international frontiers and boundaries and to the name of any territory, city or area. Extracts from publications may be subject to additional disclaimers, which are set out in the complete version of the publication, available at the link provided.

The use of this work, whether digital or print, is governed by the Terms and Conditions to be found at <http://www.oecd.org/termsandconditions>.