

# Situated Responses to the Digital Literacies of Electronic Communication in Marginal School Settings

*Mastin Prinsloo & Marion Walton*

In this chapter we examine examples of young children's encounters with computers and the Internet in poorly resourced schools in an African setting. We argue that computerized and networked media resources operate in these settings in specific ways that are sometimes ignored in the discussion of 'digital divides' and the call for the expansion of physical access to computers and the Internet. These local ways of using the digital resources of the media do not always fit with common assumptions about the value of such technology for enhancing learning in otherwise deprived or poorly resourced educational settings.

## Globalisation, technology and marginalisation

The information-technological revolution has made possible the new forms of production and organization that have resulted in a global economy. Capital markets are interconnected world-wide and multinational corporations, in manufacturing, services, and finance make up the core of the world economy (Castells 2000). While the electronic media are not the cause of these changes, none of what is commonly referred to as globalisation would be possible without them. It makes sense, then, to think about how these media work in African settings, and with what sort of potential.

Unfortunately, the changes associated with globalization have not improved things for most people in Africa, where many often don't have access to clean water, let alone communications technology. More than ten years ago, Castells (1996: 135) wrote that that the new global economy did not have much of a role for the majority of the African population. Emphasising the relentless logic of the global system he suggested that structural irrelevance was a more threatening condition than dependency might have been for African societies in preceding

decades. A sign of Africa's marginal status was the underdeveloped nature of the electronic media there. He suggested that Africa (together with other marginal regions in the world) was being left in a technological apartheid. Blommaert (2002) similarly suggested that we were witnessing the widening of the gap between prestige resources and practices at the core (the wealthy parts of the world) and those at the periphery (large parts of Africa, South America and Asia). He pointed out that this was not only something that was happening on a world scale but also happened within most contemporary societies. The electronic media, it can be said, almost certainly exaggerate and extend this gap between the marginalized and included sectors of society because of their technological load relative to print media.

## Digital divides

The response to such concerns has been to call for strategies to close the gap between Africa (and other poor regions of the world) and the developed world, and between included and excluded sectors within societies, as far as access to and application of electronic media resources is concerned. One view, which commonly refers to the 'digital divide', has stressed the worth of putting computers and Internet access into poor African settings as quickly and as widely as possible, with the hope that the huge potential of the technology will rapidly connect people to the vast resources of the 'Knowledge Economy', catapulting them towards paths of progress and development. Numerous projects aim to bring information and communication technologies to poor parts of Africa because of the belief in their transformative potential. These include the construction of 'telecentres' and Internet cafés in African villages and urban centres, with Internet-linked computers providing multi-function resources, an initiative supported by the World Bank and UNESCO, reportedly with uneven results (Etta and Parvyn-Wamahiu 2003). A more recent case in point is the aggressively-marketed *One Laptop Per Child* (2007) programme as well as rival programmes that seek to persuade impoverished governments to buy \$200 computers for millions of children in countries in Africa, Latin America, and Asia.

In the USA as elsewhere, 'digital divide' rhetoric is similarly invoked when strategies for disseminating 'new literacies' skills are made. The No Child Left Behind Act, passed by the Bush administration in 2002 and now under attack by members of the Democratic Party for its failures, enacted a wide range of initiatives, many of which were supposed to improve reading outcomes in schools, and to address inequalities in educational outcomes. The Act has a section devoted to technology (Title II, Section D), with the stated goal, "To assist every student in crossing the digital divide by ensuring that every student is technologically literate by the time the student finishes the eighth grade, regardless of the student's race, ethnicity, gender, family income, geographic location, or disability." (discussed in Leu et al. 2004: 9).

At the same time, a more cautious response has been to warn that these new media are no silver bullet, and not instantly able to solve the problems of poverty and skewed development (Warschauer, forthcoming; 2003; Snyder and Prinsloo 2007). Warschauer (2003) developed a model of what kinds of resources are required to help promote meaningful access to and use of technology. These, he said, included physical resources (e.g., computers and Internet access), digital resources (e.g., online content and tools in multiple languages and appropriate to the needs of diverse users); human resources (e.g., knowledge and skills developed through instruction emphasizing critical inquiry and situated practice); and social resources (e.g., enhanced social capital developed through in-person, online, and institutional support).

This expanded model suggests, however, the idea of a divide to be bridged that does not explicitly take account of the social resources, norms, practices and technologies that marginal individuals, groups of people, nation states and regions already hold. As we will argue here, drawing on empirical research, Information Communication Technologies (ICTs), electronic media and digital literacies<sup>1</sup>, when they are injected from the outside to bring about certain results, encounter situated social practices that do not simply result in these resources being used in ways that might be expected, and do not necessarily or automatically promote social inclusion or development.

## Research in well-resourced contexts

Much of digital literacy research to date has been carried out among those who are either relatively privileged or who are shown to be successful with new digital media. Researchers writing from middle-class contexts around the globe have argued that children's literacy activities involving computers prior to and outside of school are typically more frequent, richer, and more meaningful than those they encounter in school (Gee 2003; Reinking et al. 1998). Clearly, this contrast between in-school and out-of-school experiences with the new literacies only works when such digitally rich, out-of-school encounters with computers are available to children, which is seldom the case in the contexts we are concerned with here. Such research has assumed that one can generalise from middle-class American or European contexts to elsewhere. For example, Reinking writes that:

By the time many young children begin formal schooling, they are likely to have had countless experiences involving digital forms of communication, for example sitting in the lap of an adult who is corresponding with a relative via email or who is making an on-line purchase over the Internet. Or, they may participate in engaging interactive multimedia stories and games on a home computer... (Reinking 2003: 338).

Reinking contrasts the experiences that children have with computers outside of school with those they have in school, to make the point that schools are not doing enough with the resources of the new digital literacies:

for many youngsters literacy activities involving computers prior to and outside of school are typically more frequent, richer, and more meaningful than are such activities they encounter when they enter elementary school. (Reinking 2003: 338)

Clearly this contrast between in-school and out-of-school experiences with digital literacies only works when children's out-of-school experiences are 'digitally-rich' in the way Reinking describes. African children in the sub-elite schools and social settings where the majority of people are located, on the other hand, generally only encounter computer-based digital literacies in school settings, if at all, and are probably more likely to access the Internet from a mobile phone than from a computer.

We examine these concerns and this debate here from the perspective of studies of children encountering electronic media across schools in the Western Cape, South Africa, where a well-funded programme has been rolled out to put computers and connectivity into otherwise poor and under-resourced schools across the region. We argue that computerized and networked media resources operate in these settings in localized ways that are particular to peripheral or marginal settings. These ways do not fit with common assumptions about the value of such technology for enhancing learning in otherwise deprived or poorly resourced educational settings. We develop a theoretical perspective to make sense of these anomalies between the promises in the research literature and our observations of the local situation. We conclude that whether electronic resources offer opportunities for particular users is something that has to be established by situated research, not assumed, in contrast with research models that start from concerns around digital divides and offer solutions along the lines of technology transfer.

## **Computers in context:**

### **Research examples from the Western Cape, South Africa**

Until very recently, a large majority of South African children had no access to computers at school. Since the country's first democratic elections in 1994, schools have been under pressure to provide more equitable access to computers and other ICTs. The Western Cape province has embarked on a process of rapid deployment of computers to all state schools (Dugmore 2004). Literacy and numeracy development have been targeted as priority areas for these new computer facilities in Western Cape primary schools. Imported and adapted software is installed in the labs and provides many hours of self-contained 'drill-and-practice' literacy lessons. These lessons, it must be noted, emphasise

grammatical and orthographic ‘correctness’ rather than the sense of the writing. This approach reinforces the prevailing notions of literacy teaching in township schools in the Western Cape, where literacy teaching is most often a drill-and-practice activity (Prinsloo 2005: 7) that focuses on the surface features of text. Commonly, the schools still have little or no library facilities, sports fields, or school hall, and, state schools receive very limited budgets. Consequently, the computers and computer lab are prized acquisitions, and, unfortunately, theft of the computers is a major problem.

We present and discuss three cameos from the wider research in this chapter. Starting at the lowest school level, the first is from a pre-school class at a school in the Khayelitsha township, Cape Town.<sup>2</sup> The dialogue in the fieldnote transcribed below was translated from Xhosa into English.

### Example A

The children wait outside the computer room in a line until they are shepherded in by the teacher. There are 20 computers in the lab. The children are told to put their hands under the table. The teacher selects a ‘pre-reading’ programme and calls it up on all the computers. There are 8 balloons, numbered and in a bunch on the screen, and below that a key consisting of numbers in squares from one to ten and below each number the name of a colour. The children can change the colour of the balloons by clicking on the number-colour key.

The teacher asks the children to click on the 1/Red button at the bottom of the screen. One child (Sesethu) holds the mouse and moves the cursor to number one. She places it there but does not click. The children seem confused. The teacher revises the names and places of colours in the sequence again, in case the children do not know the colours by name. He then tells them to click on number 1/Red again. Sesethu says she has clicked, but hasn’t. The teacher asks them to find balloon number one and click on it. The teacher comes to Sesethu and her friend and shows them where the click button is. The teacher first asks them to identify the two number ones in the balloons. They identify them and click on them. The balloons become red. The teacher says there isn’t a number 2 on the balloons. He asks: “What number comes after number 2?” The children say “Three”. Teacher asks, “What colour is number 3?” The learners say “Blue”. The teacher asks them to click on number 3. Sesethu identifies number 3 and clicks on it. It turns blue. Teacher says “Good!”, and asks for the children’s attention. The teacher asks the class to look on the board. He says, “Our four looks like this (4) and their four looks like 4. It is the same thing. Now first click on the yellow and then find the 4 in the balloons”. Sesethu clicks on four but it turns blue. The teacher comes over and says she must click on the four first. He helps her to click on number 4 (yellow) and then balloon number 4. The teacher says, “Excellent!” The teacher explained in an aside to the researcher that this was a difficult exercise but a very good one. He said that it taught children fine-motor skills and eye-hand co-ordination. He said that the following term he planned

to teach the children how to get in and out of a programme, but now they were started with pre-reading exercises.

The extract shows clearly that the school was using what have been called 'first generation' skill-and-drill computer software, donated along with the computers. The teachers enthusiastically supported the use of this software because it was consistent with their own ideas about how reading as a basic skill should be introduced: as a drill and practice activity (Prinsloo and Bloch 1999). Children encounter literacy in the context of the authority relations and pedagogical practices that characterize schooling in this setting. The enforced passivity of the children (for example, where they sat with their hands under the table while the teacher set up the lesson, and then followed limited procedures in mechanical fashion) is consistent with the way they were expected to behave in school, but contrasts sharply with the often declared potential of ICTs for children's experimentation, self-instruction and individual choices and creativity (Snyder 1997; Gee 2003).

#### **Example B: Cheating literacy**

In a related example in a higher school Grade, we see children using 'drill-and-practice' literacy software at a primary school, again in the Western Cape, near Cape Town.

The package the class was using was structured around the United Kingdom's National Curriculum, involving standardised literacy practice and testing, and was adapted or 'localised' for use in South Africa. The software was adapted under license to the UK company that developed it for UK schools, by a South African firm, which translated the English content into Afrikaans, Xhosa, and Zulu, and mapped the word and sentence-based activities onto their equivalents in the local primary school curriculum. In the localisation process, details of content and language were customised, but the coded structure of the package (together with its educational assumptions) remains essentially unchanged. Such educational software typically simulates one prevalent classroom genre of teacher-pupil dialogue, where the teacher questions children, they respond and she evaluates their response against the criteria she holds. The genre has been labelled 'Initiation, Response, Evaluation' (IRE) (Sinclair and Coulthard 1975). Such IRE dialogic interaction in the class has been described as locking children into an activity around learning which can best be summarised as: "Guess what the teacher is thinking". The 'closed' questioning style works to shut down dialogic interchange (Wells 1999), and does not encourage children to provide justification and further information but works well as an attention-focusing strategy for teachers who have limited subject knowledge, pedagogic training and who are dealing with large classes and with syllabus content to cover. The coded structures of educational software often provide an extreme version of this pattern of closed discourse. The software largely comprises sets of exercises that test 'basic skills'. Such educational software creates a representation of the

learners and their learning by evaluating answers and summarising them in a score or grade.

In one illustrative example,<sup>3</sup> a child was observed while working alone on an exercise, with headphones on so that he could listen to audio instructions and feedback from the digital tutor as he worked on the exercises: The screen displayed “Grade 7: Punctuation revision”. The rest of the text instructed the child to insert commas into the sentences of a paragraph. He read the text on the screen carefully, moving his lips as he read and moving the cursor as he read, word by word. He then added six full-stops to the paragraph and pressed the “Is it right?” button. The programme responded:

Oops, you haven't found everything yet. [A pop-up displays “You have 0 out of 6 points in this activity”.]

The student tried again and again got the same response. He turned to the researcher and then to another student for help. Having been shown that he had inserted full-stops rather than commas, he changed them, but the same response about 0 out of 6 was given again. The other student suggested that he start the exercise again from the beginning. This time he got the response: “Correct. You got it right the very first time.”

The software's limited capacity to respond to user actions meant that the negative feedback and low score it first gave the student were based on a simple count of the number of commas inserted, rather than any awareness of what he had been doing. He had found all the places where commas should be inserted in the paragraph but he had inadvertently hit the wrong key on the keyboard. The software was unable to interpret the student's input as a human teacher or fellow student might have. In this case, “drill and practice” meant that the student had to “drill and practice” something he had already mastered. In total he repeated the rather unexciting comma exercise three times over.

In another example, in the same lesson a student showed the researcher how she had figured out how to cheat the programme, successfully bypassing the simulated discourse of an exercise and getting full marks.

Brenda tugged my sleeve as I was walking around the classroom. When she had my attention, she pointed out that she had full marks for one exercise (46 out of 46). I congratulated her and she shook with laughter. The two girls working next to her quickly explained to me that she had found a way of “cheating” and getting the “high score” for that exercise. I asked Brenda to show me her trick, and she explained her method: “I click all of them, Miss, and then I just go there – Is it right? – and click, and it come all right, Miss.”

The exercise in question presented a series of sentences and required the learner to ‘click on’ the “main idea” in each sentence. Ideas are hard things to ‘click on’ at the best of times, and the exercise in question in fact required learners to demonstrate their knowledge of sentence structure by clicking on all the words

of the main clause of such sentences as ‘The girl talks with the man with the red beard’; ‘She read the book from beginning to end’. When asked to try the exercise without the “cheat” the student clicked on several of the words in the sentences but did not identify the main clause at all. She apparently attempted to click on words which provided a telegraphic summary of the sentence and she had not identified clauses at all (e.g., she highlighted words as follows: ‘**She read the book from beginning to end**’; rather than ‘**She read the book** from beginning to end’.) She certainly was not focusing on sentence structure in the very specifically intentioned but vaguely outlined way that the software programme wanted.

The poor design of the electronic exercise meant that, firstly, it could be “hacked” by a creative student who ignored the sense of the activity and focused directly on its scoring mechanisms and procedures. Secondly, the stated purpose of the exercise (“find the main idea”) was a bad surrogate for what it really wanted, which was a grammar-recognition activity – “find the main clause”.

As described above, the drill-and-practice exercises of the educational software simulate the interaction patterns of classroom discourse. It does this through rule-governed sequencing of images, text, audio and sometimes video and animation. Notwithstanding the obvious limitations of the software that is used in education programmes, children’s enjoyment of the media is notable, but particularly where they can use it to pursue their own interests. The children made their own situated meanings out of the rules of the software programmes, troubleshooting and cheating with pleasure, as they focused on the software’s economy of scores and marks, and made these into subversive games of their own (Walton 2007).

The research starts to suggest that computers and software are not simply ‘delivering’ information to children. Instead, the software is always interpreted in a specific local context. The children are engaged in an active process of sign-making, and their interests often diverge from those of their educators and the creators of the software. The ‘drill-and-practice’ software makes few concessions to the children’s context and does without the reciprocal negotiation of meaning which is fundamental to interpersonal communication. Nonetheless, this study suggests that children use the rule-governed logic of the software as a representational resource and that this is associated with distinctive literacy practices. A similar dynamic is observed with regard to digital literacy practices to do with the Internet as we now discuss below.

### Example C: Googling with a difference

Leu, Kinzer, Coiro and Cammack (2004: 15) identify the core skills involved in reading and writing in relation to Internet use as “using a search engine effectively to locate information” and secondly, as “evaluating the accuracy and utility of information that is located on a webpage in relation to one’s purpose”. These authors take the design of the search engine for granted, and assume that

search engine use is a skill that is readily taught through well-designed exercises of a general nature. It seems important, though, to look more closely at what is involved when children in socially marginal settings make use of resources designed at the centre, with different users in mind. The lessons that used the Web usually amounted to “Googling sessions” where the teacher provided a topic and the students were left to use Google to find (and transcribe) relevant results, often working almost entirely independently for most of the lesson. While students saved digital media for their own personal use, the products of the Google lessons were always a hand-written paragraph on a piece of paper – the students seldom had more than thirty minutes per week in the computer lab.

In the following example<sup>4</sup> the teacher initiated the activity by providing the topic for research [apartheid], and suggested Google as a place to find the answer. The transcript from fieldnotes shows two students working together:

The students in this class transcribed the word ‘apartheid’ into the search engine as their query. The Google interface offered them a small set of high-ranking results (only three displayed above the fold).

They wait a few seconds for the results to appear, and then click on the first link, which takes them to a page entitled “The History of Apartheid in South Africa”. They spend the next ten minutes reading the article. When they are done, they carefully copy down the first two paragraphs of the article on pieces of paper that they brought into the lab with them.

The students selected the top result and treated it as they would treat other authoritative texts, by transcribing it faithfully and returning this answer to the teacher for assessment. The page that the two girls transcribed with such care was written by five second year Computer Science students from Stanford University in 1995. It is a second year student project which exposes the complicity of computer technology and IBM in particular in facilitating the administration of racial classification under apartheid. The irony that these students working in South Africa should be offered, as first choice by Google, on the topic of apartheid, a ten-year old student site from Stanford University, USA, is immense, even more so in that Stanford is the alma mater of the designers of Google. It is also ironic in that South Africa’s National Curriculum (Department of Education 2002a: 6) proposes new approaches to history and social science which aims to ‘give space to the silent voices of history and to marginalised communities’. The girls’ query has powerful local resonances in the face of which Google’s localization features are entirely inadequate.<sup>5</sup> The provenance of the information found by the girls suggests that Google is introducing a very different set of values into the South African curriculum.

An early paper written by Google’s founders when they were still PhD students at Stanford presents the values which govern its search algorithm. The paper, which introduced the Google PageRank algorithm to the academic community began with the caveat that ‘(t)he importance of a Web page is an inherently

subjective matter, which depends on the readers [*sic*] interests, knowledge and attitudes' (Page *et al.* 1998: 1). The paper has the subtitle 'Bringing order to the Web', and goes on to introduce the Google algorithm as an 'objective' way of deciding the 'relative importance' of a web page and thus ranking search results. This shift to an automated editorial judgement claims to remove the potential for overt political bias, commercial interests, and the immense labour costs associated with human editorial judgements. (These were the difficulties on which most human-edited web directories such as Yahoo! founded.)

Current research suggests that search engines are 'gatekeepers' which, contrary to their claims of being impartial and fair arbiters of value, have developed rules or algorithms which accord disproportionate 'visibility' to certain categories of sites. Past research has highlighted search engine bias in favour of commercial sites, popular sites which are heavily linked, and (the category most relevant to the 1995 student site about apartheid), sites from the U.S., particularly those which have enjoyed the cumulative advantages of having been established for longer, and of gaining traffic and better visibility through the benefits of a high Google ranking (Cho and Roy 2004; Vaughan and Thelwall 2004; and Thelwall and Vaughan 2004, Baeza-Yates *et al.* 2002). Such ranking and indexing decisions are hidden behind a veil of secrecy, and are not subject to public scrutiny or any public service mandate (Introna and Nissenbaum 2000; Van Couvering 2004).

The objective counts which underlie the PageRank algorithm thus 'measure' social interests, in a global context of growing inequities in access to social power and resources. The Google ranking algorithm reflects a set of decisions, which without deliberate intention, make it unlikely that schoolchildren in poorer countries will access the local knowledge of the people around them. Google rewards established pages (Baeza-Yates *et al.* 2002), and these are very seldom African-based. Google is a conversation broker which favours popular sites and sites which get a lot of attention from the other popular sites. African countries struggle to get any attention in the media and elsewhere, except around issues of war and famine. The search engine industry favours those who have the money to buy attention via public relations, search engine optimization and spam (Machill, Neuberger and Schindler 2003). And Google favours topics which interest many web users. There are simply fewer people online in South Africa or elsewhere in Africa than in the U.S.A. By piggybacking on the human intelligence of the creators of the Web, Google was able to shift away from the spam-cluttered nonsense of the early search engines. At the same time, however, Google also piggybacks on the social prejudices and preferences of these early web authors.

The Google interface has been slotted into the existing patterns of classroom discourse, and lab and classroom drill and practice activities in the classrooms studied, so that it comes to function as a kind of "multiple choice" machine. In this way, both teachers and children treat Google like the educational software discussed earlier, although Google (and other search engines) in comparison to the educational software allowed the children a certain amount of space to explore alternative ways in which they could be used.

In a second example of classroom Googling that we examine here, students carried out their teacher's instruction to use the search engine to investigate two topics, electrical safety, and sound energy. The teacher walked around the classroom to check that everyone was on task, and reminded them what she wanted them to do: "Sound energy first. After that you write down safety rules for electricity. See what they say about sound energy and then go to safety rules." Two students working together typed in "Energy. What are the safety measures". The result to the query generated a set of results that bore very little relation to the topic (see Fig.1 below). Rather than trying another query which better matched their intentions, they scrolled down the list of results, looking for the bolded words by which Google cues a match with their query. They scrolled all they way down the list, up again, and selected the closest match to their keywords, a press release for Massey Energy, entitled "New safety measures for Massey Energy". (Massey Energy is a large-scale coal producer in Virginia, U.S.A.) Both children wrote down the first paragraph of the press release, which they reproduced verbatim: "Massey Energy has announced new safety initiatives designed to help prevent underground mine fires and to improve mine fire response efforts. Massey Energy is headquartered in Richmond, Virginia, USA with operations in West Virginia, Kentucky and Virginia."

**Figure 1.** Screenshot of Google search results for the students' query 'energy what are the safety measures'

The screenshot shows a Google search interface. At the top, the Google logo is on the left, and navigation links for 'Web', 'Images', 'Groups', 'News', 'Scholar', and 'more »' are on the right. Below the logo is a search bar containing the text 'energy what are the safety measures' and a 'Search' button. To the right of the search bar are links for 'Advanced Search' and 'Preferences'. Below the search bar, there are radio buttons for 'the web' (selected) and 'pages from South Africa', and a link for 'New! View and manage your web history'. The main results section is titled 'Web Results 1 - 10 of about 5,460,000 for energy what are the safety measures. (0.20 seconds)'. The first result is 'Book results for energy what are the safety measures', listing three books: 'Dictionary & Thesaurus of Environment, Health ... - by Smoley, ...', 'Canada Enters the Nuclear Age - by Atomic Energy of Canada Limited - 434 pages', and 'A History of Japanese Trade and Industry Policy - by Mikio Sumiya - 662 pages'. The second result is 'VietNamNet - Bill on atomic energy introduced, stipulating safety ...', with a sub-link 'Bill on atomic energy introduced, stipulating safety measures. 10:15' 08/06/2007 (GMT+7)'. The third result is 'VietNamNet Bridge - A new draft law on the use of atomic energy ...', with a sub-link 'english.vietnamnet.vn/tech/2007/06/703940/ - 11k - Cached - Similar pages'. The fourth result is 'New safety measures for Massey Energy', with a sub-link 'New safety measures for Massey Energy - 20th September '06: Featured News. Massey Energy has announced new safety initiatives designed to help prevent ... www.im-mining.com/Articles/NewsafetymeasuresforMasseyEnergy.asp - 7k - Cached - Similar pages'. The fifth result is 'Safety measures at Engen - SA Instrumentation & Control', with a sub-link 'Safety measures at Engen .... South Africa has no option but to follow the green energy (which includes nuclear) route ... instrumentation.co.za/article.aspx?pkArticleId=3272&pkCategoryId=65 - 34k -

The formal register of the query is partially to blame for the children's lack of success. The phrase "safety measures" (rather than their teacher's suggested phrase "safety rules") and the use of the superordinate category "energy" took them off track. Because they relied primarily on Google's first set of results, and didn't adjust the language of their initial query (beyond correcting the spelling error in "measures"), the two students didn't find any of the sources their teacher had imagined they could use to complete their first task, and they continued to their next search with only a paragraph from a Mining company's press release, copied *verbatim*. Two neighbouring children had copied the query, received the same results and had also copied the Massey paragraph and so four children in total left the lab with a press release transcribed from a distant American energy company.

The South African National Curriculum for the natural sciences proposes to develop an understanding of science and technology in relation to the local social and natural environment (Department of Education 2002b). It is worth pointing out that in South Africa, and in other parts of Africa, the most prominent dangers of electricity are caused because large numbers of people cannot afford to pay for it. Children are shocked and burnt by wires lying on the ground from illegal connections created to siphon power off the main lines, and by the live ends of wires which have been cut in order to remove their copper. Frequent 'load shedding', or power cuts are problems that have to be dealt with. Finally, the greatest dangers posed to children by electrical power may well be the future environmental costs of climate change. These children's Google search did not take them anywhere near relevant information relating to such issues, underscoring the point again about the bias towards issues affecting well-off countries on the Internet.

The children were considerably more successful at finding materials for "Sound Energy". The first source they came across was written by children and clearly illustrated. It had been created for the ThinkQuest competition. The children read the discussion of sound energy and musical instruments with great attention, and then returned to once again transcribe the first paragraph for their answer. Interestingly, and unlike their previous searches, they continued reading through the Google results even after they had finished their transcription. Although most of the sources they explored were written at a level which was far too complex for them, one student appeared to be trying to make a connection between kinetic energy and sound energy, and continued to try an additional query [kinectic energy].

Overall, though, in the half hour they had in the lab, the students were hardly able to develop their understanding of the set topic in directions imagined by the national curriculum.

## Making sense of digital literacy practices in sub-elite school settings

A key insight from the study of literacy as situated practice (also known as the New Literacy Studies: See Street 1983; 2001; Gee 1996; 2003; Prinsloo and Breier 1996; Blommaert et al. 2006) is that literacy is a form of human activity that has to be interpreted contextually, not as an issue of measurement or of skills. The relationship between the practices and norms that shape reading and writing in particular contexts is complex: what counts as effective performance in a setting can be shaped by multiple influences from within and beyond the local setting. The goings-on in sub-elite school settings, such as in the township schools on the fringes of Cape Town that we examined here, have a local distinctiveness in comparison to what happens in well resourced or middle-class schools; yet such settings are often seen only *in relation* to the wider system as ‘peripheries’ or ‘backward areas’ and the literacy activities (including digital literacies) are understood as deviant, lacking or deficient. National testing programmes show that the large majority of township children fail at tests of standard orthography, in English and in indigenous African languages; but such tests do not explain what it is that these children do, instead of ‘doing things right’. Such tests and assumptions are not much good in giving direction as to what should be done, beyond more testing and more work on ‘basic skilling’.

As Blommaert et al (2006: 2) explain it

The ‘margin’, so to speak, is not necessarily a space in which people fail to *meet norms*, but it can as well be seen as a space in which *different but related norms are produced*, responding – ‘ecologically’, so to speak – to the local possibilities and limitations. Such norms, of course, do not matter much in the larger scheme of things. Lifted out of their local context, they bump into the homogenising, singular images of normativity dominant in most societies and get disqualified without much ado.

If these local norms are only seen as lacks, or absences or errors, however, then we fail to take account of how they happen and what to do about them. Approaches to differences in unequal societies that simply see them as errors obscure an accurate view and appraisal of the dynamics in that setting. Strategies for change that don’t take account of how local norms are grounded on practices can’t deal with the persistence of these ‘errors’. Blommaert et al (2006) show this in relation to print literacy ‘errors’ in their study at one school in Khayelitsha, Cape Town. They show that consistent, patterned and repeated errors in children’s writing and spelling display a kind of skeleton writing competence in which acoustic images of words are written that do not match standard orthography. They argue that this displays one particular ‘literacy culture’ or ‘sub-elite literacy economy’ (p. 10), with a degree of autonomy in relation to the standardised practices of the mainstream. They argue that the norms or codes of literacy are deployed differently in these settings, in a different system of visualisation of

meaning. They constitute a hetero-graphy as opposed to an ortho-graphy.<sup>6</sup> The authors suggest that these literacy practices present a “sociologically realistic” form of literacy in that they mirror the marginalised status of the community in which they occur. The teachers deploy this literacy in their teaching practice, as is clear both in their pedagogy and in the way they correct and mark learners’ assignments.

On the basis of this analysis we can go on to examine further how the teaching of literacy and the use of computers and the Internet in classes are embedded in a local economy of semiotic resources. We draw further on the perspective on digital literacies as situated social practice to do so.

### Digital literacies as situated social practice

The view on digital literacies that we are applying here conceptualizes literacy as sets of social practices that are contextually embedded and situationally variable, rather than as an autonomous skill, practice or social technology whose forms, functions and effects are unchanging and neutral across social settings (cf. Street 1983, 2001; Warschauer 2003; Snyder and Prinsloo 2007; Walton 2007). Reading and writing, in this view, appear as not exactly the same thing, in their uses, functions, modes of acquisition and status across groups of people and across specific social domains within societies. Blommaert (2002, 3) made this point with regard to language in African settings: “Even if language forms are similar or identical, the way in which they get inserted in social actions may differ significantly and consequently there may be huge differences in what these (similar or identical) forms *do* in real societies”. We can say the same about screen-based communication. The transfer of linguistic and semiotic signs across social spaces does not automatically entail the transfer of their functions and values, unchanged.

Following from this epistemological and methodological orientation, digital literacy practices, as one example, have meaning in relation to their contexts of use, rather than having unchanging functions independent of their social location. Reading ‘effectively’ and ‘correctly’ does not involve just the finding and decoding of words, images, and multi-media screens but also includes the practices of ‘seeing through’ the representational resources of the texts to make sense in particular ways, which vary across social settings. Meaning, in this view, is related to the readers’ uses of the text. So the same multimedia text on screen is therefore not functionally the same in a different setting. It necessarily follows different meaning conventions, and requires different skills for its successful use, when it functions in different social contexts for different purposes, as part of different human activities. It is no wonder, then, that ethnographic enquiry across multiple sites produces evidence of substantial variety and specificity in the ways reading and writing were embedded in social practices. The particular uses of ‘skill and drill’ software and ‘googling’ sessions that we reviewed in this

paper are consistent examples of a 'school literacy' culture that is widespread across sub-elite schools in the Western Cape, elsewhere in South Africa (Prinsloo and Stein 2004; Prinsloo 2005) and elsewhere in Africa (Williams 1996)<sup>7</sup>. As Blommaert et al (2006) suggest, this is not simply a restricted or limited literacy whose limits can be seen with reference to 'how things ought to be done'. If we think of digital literacy as an "autonomous" matter of technique ('how to use a search engine to best get the information you need') then we also think that we can "train" people in Internet use as a neatly packaged set of technical skills. We have shown in the data and the arguments above that digital literacies are situated within diverse cultures of reading and writing and need to be addressed as such<sup>8</sup>, while tools such as Google are informed by the default values of their designers and users, and these values can and should be challenged.

A key point to recognize in trying to understand these dynamics is that signs of communication (spoken, written, visual, gestural, artefactual) are also and always signs of social value. Bourdieu (1991: 55) made this case with reference to 'linguistic markets' whereby linguistic differences (e.g., of dialect, pronunciation, vocabulary in a common language) in their social uses reproduce the system of social differences, so that particular competencies function as "linguistic capital, producing a *profit of distinction* on the occasion of each social exchange". 3). We can equally think about digital literacy and the new media in similar kinds of ways, as carrying social capital in situated ways within specific social economies, and as working in particular and variable ways depending on how they are inserted in social action in local contexts.<sup>9</sup> When children (and adults, of course) make sense of and interact with particular instances of screen-based, multi-modal writing they always draw on much more than 'purely' linguistic, semiotic and literacy-coding knowledge. An interpretation of any utterance or text always involves an interplay of linguistic, semiotic and social frames of interpretation. So that when children google an answer to a question and faithfully transcribe a paragraph from an obscure foreign web-site, for instance, they are acting consistently with a local cultural understanding of how such literacy acts are and should be done in schools. Such activities both endorse and neutralise (by way of recontextualising processes) the content that they are receiving, giving it an altered and localised significance.

This understanding of how digital literacies work in marginal setting starts to help us understand why, indeed, computers in classrooms are not the silver bullet that will take care of learning problems in marginal African settings. As Snyder (forthcoming: 3) summarises a review of two decades of research on digital literacies and school learning: "there is still no commanding body of evidence demonstrating that students' sustained use of word processing, the Internet and other popular applications has any impact on academic achievement" and she refers to "a growing recognition that computers in classrooms were unlikely to negate the influence of social class on students' achievement" in the context of international research. The earlier research by Snyder et al (2003) studied the effects on academic success that computer access in school and at home had

on a range of children from different class backgrounds had on their school achievements. They concluded that such access alone was not enough to enhance young people's literacy achievement at school. They concluded: "Access cannot be seen merely as a matter of having a way to use computers and a connection to the Internet. 'Access' needs to be rethought as a much more complex and multileveled social goal." (Snyder et al. 2003: 381) They conclude that access should be concerned with not only who gets how much of the technology resources but who gets the benefits associated with such resources and how much of them. We have brought a perspective from Africa to this debate and have tried to clarify further how these dynamics work themselves out in this context and more generally as well.

### Notes

1. We talk about digital literacy and digital literacy practices in this chapter to refer to the reading and writing practices via electronic screens on computers (and other electronic devices) and to the linked reading and writing practices that use these electronic media via the Internet and other forms of networked communication.
2. This data and analysis were first presented in Prinsloo (2005).
3. This data is reported on in more detail in Walton (2007).
4. This data is discussed more fully in Walton (forthcoming).
5. Subsequent to this study, localization features have been introduced in Google which ironically, boost the ranking of spam sites which use the keyword 'apartheid', but which exist to sell the African diet drug, Hoodia,
6. The 'errors' are not completely chaotic and display a kind of order. The authors show that many of the (deviant) features that they detected in the learners' writings also occurred in the writing of teachers (One example of teacher writing: "Learners feel shy to speak a minority language. Mostly make use of code switching." Blommaert et al, 2006: 14).
7. Williams (1996) described the dominant pedagogic practice of both trained, experienced and inexperienced teachers in Zambia and Malawi, in the teaching of both first language as well as English reading, as being that of the 'look and say' approach, with no attention to the presentation or checking of meaning.
8. See the papers by Street, Snyder and Warschauer in Baynham and Prinsloo (forthcoming) for further discussion on these conceptual and methodological points.
9. A case in point is the differences in what is considered high status writing amongst academics and amongst cell-phone users. Most older academics identify themselves as clumsy 'digital immigrants' in their 'orthodox' orthography cellphone writing, in comparison to their 'digital native' children.

### References

- Baeza-Yates, R., Saint-Jean, F., and Castillo, C. (2002) Web Dynamics, Age and Page Quality', in *Proceedings of SPIRE 2002*, September.
- Blommaert, J., Muyllaert, N., Huysmans, M. and Dyers, C. (2006) Peripheral Normativity: Literacy and the Production of Locality in a South African Township School. *Linguistics and Education*, 16(4): 378-403.
- Blommaert, J. (2002) 'Writing in the Margins. Notes on a Sociolinguistics of Globalization', Unpublished written version of a lecture given at Cardiff University, April 2002, during a workshop of the Leverhulme Trust project on Language and Global Communication.

- Bourdieu, P. (1991) *Language and Symbolic Power*. Cambridge: Mass: Harvard University Press.
- Castells, Manuel (2000a) *The Information Age: Economy, Society and Culture*, Updated edition, Oxford: Blackwell, 3 volumes.
- Castells, M. (1996) *The Information Age: Economy, Society and Culture. Volume 1. The Rise of the Network Society*. Oxford, Blackwell.
- Castells, M. (1998) 'Information Technology, Globalization, and Social Development'. Paper prepared for the United Nations Research Institute for Social Development, 'Possibilities for Development in the Information Age'. Geneva, March 22-24.
- Cho, J. and Roy, S. (2004) 'Impact of Search Engines on Page Popularity', in *Proceedings of the 13th international Conference on World Wide Web* (New York, NY, USA, May 17-20, 2004).
- Department of Education. 2002a. Revised National Curriculum Statement Grades R-9 (Schools) Social Sciences. Available: [http://www.thutong.org.za/resources/ncsdocs/GET/Statements/GET\\_RNCS\\_Social%20Sciences\\_2002.pdf](http://www.thutong.org.za/resources/ncsdocs/GET/Statements/GET_RNCS_Social%20Sciences_2002.pdf). [11 February 2008].
- Department of Education. 2002b. Revised National Curriculum Statement Grades R-9 (Schools) Natural Sciences. Available: [http://www.thutong.org.za/resources/ncsdocs/GET/Statements/GET\\_RNCS\\_Natural%20Sciences\\_2002.pdf](http://www.thutong.org.za/resources/ncsdocs/GET/Statements/GET_RNCS_Natural%20Sciences_2002.pdf). [11 February 2008].
- Dugmore, C. (2004) 'A New Era in Education', *Kbanya: Education through Technology*, 5(3).
- Etta, F. and S. Parvyn-Wamahiu (eds) (2003) *Information and Communication Technologies for Development in Africa: Volume 2, The Experience with Community Telecentres*. Ottawa: International Development Research Centre. Downloaded, Dember 2004. [http://web.idrc.ca/en/ev-33004-201-1-DO\\_TOPIC.html](http://web.idrc.ca/en/ev-33004-201-1-DO_TOPIC.html)
- Gee, J. (2003) *What Video Games have to Teach us about Learning and Literacy*. New York: Palgrave.
- Gee, J. (2000) 'The New Literacy Studies: from 'Socially situated' to the Work of the Social', in D. Barton, M. Hamilton and R. Ivanic (eds.) *Situated Literacies: Reading and Writing in Context*. London: Routledge, pp. 180-196.
- Gee, J. (1990, 2<sup>nd</sup> ed.1996) *Social Linguistics and Literacies*. London: Falmer Press.
- Kress, G. and T.van Leeuwen, (1996) *Reading Images: the Grammar of Visual Design*. London: Routledge.
- Kress, G. (1997) *Before Writing*. London: Routledge.
- Kress, G. (2001) Keynote presentation, 'Writing, Knowing, Learning in the Era of Multimodality'. International Literacy Conference, Cape Town, November. Downloaded from <http://www.ched.uct.ac.za/literacy/GuntherKress.html>
- Leu, D., C. Kinzer, J. Coiro and D. Cammack (2004) 'Toward a Theory of New Literacies Emerging From the Internet and Other Information and Communication Technologies', in R. Ruddell and N. Unrau (eds.) *Theoretical Models and Processes of Reading*. International Reading Association. Pre-print copy downloaded, December 2004 from [http://www.readingonline.org/newliteracies/lit\\_index.asp?HREF=/newliteracies/leu](http://www.readingonline.org/newliteracies/lit_index.asp?HREF=/newliteracies/leu)
- Machill, M., Neuberger, C., and Schindler, F. (2003) 'Transparency on the Net: Functions and Deficiencies of Internet Search Engines', *Info The Journal of Policy, Regulation and Strategy for Telecommunications*, 5(1): 52-74.
- One Laptop per Child. (2007) One Laptop Per Child (OLPC), a \$100 laptop for the world's children's education. Retrieved July, 2007. <http://www.laptop.org/>
- Page, L, Brin, S., Motwani, R., Winograd, T. (1998) The PageRank citation ranking: Bringing order to the Web, technical report. Available: <http://citeseer.ist.psu.edu/page98pagerank.html>. [11 February 2008].
- Prinsloo, M. (2005) 'The New Literacies as Placed Resources', *Perspectives in Education*, 23(4): 87-98.
- Prinsloo, M. and Stein, P. (2004) 'What's Inside the Box?: Children's Early Encounters with Literacy in South African Classrooms', *Perspectives in Education*, 22(2): 67-84.
- Prinsloo, M. and M. Breier (1996) *The Social Uses of Literacy: Theory and Practice in Contemporary South Africa*. Amsterdam: John Benjamins.

- Reinking, D., M. McKenna, L. Labbo and R. Kieffer (eds.) (1998) *Handbook of Literacy and Technology: Transformations in a Post-typographic World*. Mahwah, NJ: Lawrence Erlbaum.
- Sinclair, J. and Coulthard, M. (1975) *Towards an Analysis of Discourse: The English Used by Teachers and Pupils*. Oxford: Oxford University Press.
- Snyder, I. (forthcoming) Shuffling towards the Future. Draft paper for Baynham, M. and Prinsloo, M. *The Future of Literacy*. London: Palgrave Macmillan.
- Snyder, I. (ed.) (1997) *Page to Screen: Taking Literacy into the Electronic Era*. London: Routledge.
- Snyder, I. and Prinsloo, M. (eds) (2007) 'Young People's Engagement with Digital Literacies in Marginal Contexts in a Globalised World', *Language and Education*, 21(3) Special Issue.
- Snyder, I., L. Angus and W. Sutherland-Smith. (2003) 'Building Equitable Literate Futures: Home and School Computer-Mediated Literacy Practices and Disadvantage', *Cambridge Journal of Education* 32(3): 367-383.
- Street, B. (ed.) (2001) *Literacy and development*. London: Routledge.
- Street, B. (1984) *Literacy in Theory and Practice*. Cambridge: Cambridge University Press.
- Vaughan, L. and Thelwall, M. (2004) 'Search Engine Coverage Bias: Evidence and Possible Causes', *Information Processing & Management*, 40(4): 693-707.
- Thelwall, M. and Vaughan, L. (2004) A Fair History of the Web? Examining Country balance in the Internet Archive, *Library & Information Science Research*, 26(2): 162-176.
- Walton, M. (2008) *Semiotic Machines: Software in Discourse*. University of Cape Town (Ph.D.)
- Walton, M. (2007) 'Cheating Literacy: The Limitations of Simulated Classroom Discourse in Educational Software for Children', *Language and Education*, 21(3): 197-215.
- Warschauer, M. (forthcoming) Digital Literacy Studies: Progress and Prospects', in M. Baynham and M. Prinsloo (eds) *The Future of Literacy*, London: Palgrave Macmillan.
- Warschauer, M. (2003) *Technology and Social Inclusion: Rethinking the Digital Divide*. Cambridge, MA: MIT Press.
- Wells, G. (1999) 'Language as Education: Reconceptualizing Education as Dialogue', *Annual Review of Linguistics*, 19: 135-55.
- Williams, E. (1996) Reading in Two Languages at Year Five in African Primary Schools, *Applied Linguistics*, 17(2): 182 – 209.