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Weaving the literacy Web: Changes in reading from page to screen

"Web literacy" requires a rethinking of skills. More and different strategies are needed for decoding meaning.

Teachers differ widely in their attitudes toward and ability to cope with technology. In the case of Internet technology, changes have swept through Australian schools at an unprecedented pace. Inevitably, the role of the classroom teacher is also affected, and indeed altered. Additionally, in Australian schools, there appears to have been a tangible shift from pen-and-paper writing to digital text production, which also relocates traditional teaching parameters. This shift in the mode of textual production has prompted me, as a teacher, to consider whether my students use different strategies when reading print text than when reading digital text. Further, it raises the question about reading strategies: Should I teach different reading strategies in the computer-based classroom? If so, what different strategies are required?

In this article, I explore the unique reading strategies needed for the World Wide Web. I consider additions needed in the repertoire of teaching reading strategies when computers are the medium. I argue that Internet technology has had a significant impact upon reading strategies, resulting in a need to reshape our thinking about classroom reading practice. I suggest a number of areas that are altered in the digital reading environment, and offer teaching ideas that appeared to be effective in a study I carried out in an Australian Grade 6 classroom. I have used quotes from some students who participated in the study to illustrate points about Web literacy.

The historical development of reading literacy

Purves (1990) suggested that as the world of text is one of information, citizens must have access to information to internalise and refine it, through personal experience, to knowledge. If people cannot undertake this knowledge-enrichment process they are disadvantaged, and the education system has failed to give them adequate literacy skills. If we apply this concept to Web literacy, it means that our students must become proficient in accessing and analysing information, so that a level of understanding can be reached. When this has been achieved, information has been converted to knowledge and can be used by the student to fulfill tasks or stored for future reference. The implication for us as teachers is clear. If students do not gain these skills, they are disadvantaged and may, perhaps, suffer exclusion from global literacy communities. As Leu (1997) pointed out, "individuals unable to keep up with the information strategies generated by new information technologies will quickly be left behind" (p. 65).

Gilster (1997) also claimed that the change in literacy concepts and paradigms of thinking are based on the shift in the major medium of communication, as experienced by many countries in the world. This shift is, of course, the Internet-based system of communication, information transfer, and information holding. Many researchers support this notion (Bolter, 1998; Kamil & Lane, 1998; Leu, 1997, 2000; Morris & Tchudi, 1996; Reinking, 1998; Selfe & Hilligoss, 1994; Sorapure, Inglesby, &

Yatchisin, 1998). Their ideas are encapsulated in Gilster's comment:

> The Internet and its accompanying blitz of technological transformation pushes up against a media model we have long accepted. It forces a shift in paradigms that will make you re-evaluate older ways of information gathering even as you learn to incorporate them into the new. The Internet is not a gradual shift in the way we work. Instead, it is an analog-to-digital transformation that will alter the rules of communication. (p. 38)

Clearly, literacy is not a static concept. Leu (1997) saw it as a "deictic" term, because "its meaning is continually changing, dependent upon the technological context in which it occurs" (p. 62). In Australia, literacy appears to be industry focussed, as schools prepare the literate being for the workplace by teaching literacy skills deemed necessary for employment. Kamil and Lane (1998) described this as an "administrative-efficiency" perspective, where the goals of education and reading are "to provide education that is relevant to job demands" (p. 326). Governing policy for education, such as the Victorian Curriculum Standards Frameworks (Board of Studies, 2000), specify that 21st-century literacy is closely linked with technology, and in particular with the World Wide Web. (Leu, 2000, also outlines Australian Federal government policies with respect to technology in education.) So what, then, constitutes Web literacy?

Web literacy and the application of reading to onscreen text

Web literacy is a term for finding, scanning, digesting, and storing Internet information. It is "an ability to recognize and assess a wide range of rhetorical situations and an attentiveness to the information conveyed in the source's nontextual features" (Sorapure et al., 1998, p. 410). This understanding is significant, as it represents a "fundamental change" (Leu, 2000, p. 424) in thinking about the literate being in the 21st century. The speed and degree of change that Web literacy brings to teaching reading is an implementation challenge for us as teachers. As Sorapure et al. pointed out, the Web is a "vast, open, and uncatalogued library, and one in which reference librarians are nowhere to be found" (p. 410). The Internet can be an intimidating and difficult medium to manage, with its constant rapid changes, but technology skills are essential for survival in the 21st century. Therefore, students and teachers must be competent and, more important, comfortable with the medium. Part of our professional development and personal methodology necessitates becoming critically attuned to the world of the Web as it integrates our classrooms by school charter, government policy, and industry lobbying.

Web literacy demands an incorporation of key reading or navigation skills. These include accessing information, analysing information (including multimedia), and processing procedures to store or move text.

While these skills appear to be the same as those used with print text, academic writers tend to agree that Web literacy involves expanding critical reading skills to incorporate evaluation of visual and nontextual features and a greater use of associative logic (see Bolter, 1991; Burbules, 1997; Charney, 1994; Leu, 1996; Reinking, 1998; Shetzer & Warschauer, 2000; Snyder, 1999).

Web literacy: Have our hopes been met?

Many writers oppose using technology in classrooms and advocate a critical approach to the issue of technology. Birkerts (1994) and Postman (1995) believed the advent of computer technology will lead to an impoverishment of the English language. They contended that poor concentration skills in dealing with lengthy and deep textual reading, poor writing skills, and a superficial understanding of issues, due to the lack of depth in reading, will result from technology in English teaching classrooms. Stoll (1995, p. 26) added that he "rarely finds prose that's articulate and creative" from the "mediocre writing and poorly thought-out arguments" of Internet-based writing. Leu (1996), whilst supporting the advent of digital literacy, advocated that we keep the concerns of Birkerts (1994) and Stoll (1995) in mind or "we may become familiar with much but understand little" (p. 163).

As a teacher operating in both print-based and technology-mediated classrooms, I consider it crucial to institute that critical evaluation of the manner in which technology is used in the classroom. This means not only evaluating reading and writing products or technology programs, but also investigating whether technology is being used simply because it *is* technology (see also

Lankshear, Snyder, & Green, 2000). It is, however, implausible that the impact that the Internet is having on society and education can be ignored. In fact, "the Web has already entered our classrooms even as we debate its value and its effects" (Sorapure et al., 1998, p. 412), and we, as teachers, must weave the expanding web of technology into our classroom practice. The reality in Australia is that technology is already in the classroom, and government policies indicate it will increase. The Victorian Curriculum Standard Frameworks education policy mandates all teachers to be aware that "The increasing use of technological tools has implications for literacy acquisition and development. New and emerging uses of literacy need to be considered in the English classroom" (Board of Studies, 2000, p. 6).

Therefore, whilst I advocate a critical perspective must be maintained as to the purposes and appropriateness of technology in our classrooms, as teachers we are required to assist our students with new Web text reading strategies. In addition, we need to become "technology critics as well as technology users" (Selfe & Selfe, 1994, p. 484) in order to effectively implement education policy for our students.

Student perceptions in reading Web text and print text

The student comments and perceptions presented in this article arose in a 10-week study I undertook in a local coeducational primary school in the eastern suburbs of Melbourne, Australia. The total school population was 580 students from 72 different ethnic backgrounds. I observed and informally spoke with all students in the two Grade 6 classes (48 students; 29 female and 19 male, between 10 and 12 years of age) over the 10-week teaching term. (Pseudonyms are used for all students.) All students could read and write in English but came from multilinguistic backgrounds in the home, such as Chinese, Indian, Thai, Polish, Mauritian, Bhutanese, and Malay. I was in the school each day and attended the traditional pen-and-paper English classes and the computer-based writing classes, as well as the library lessons for both classes.

Students perceive Web text reading as different from print text reading. Jake (age 11) said, "On the Internet, you have to be really quick and can go lots of places to find out heaps of stuff, but with books, you need to go slower." Similar comments indicated that students felt there was a necessity for speed in an Internet reading task. There was almost a snatch-and-grab philosophy adopted by students in the Web text classroom that was not apparent in print text environments. In library classes, for instance, students adopted a more leisurely attitude to print materials, and often browsed through only a couple of books for the entire 45-minute session. Sue (age 10) said, "You need time to look at the book, but, like, you need to be real fast at typing and clicking to find the stuff you want on the Net."

Other students enjoyed the visual images provided by the Internet, which they saw as "more lifelike" (Hannah, age 10) than static images in printed material. Students did have some misapprehensions about the authority and authenticity of Web text, and comments such as "Who writes on the Web?" (Angela, age 12) typified their concerns. The same concerns were not felt about printed texts, and students accepted books as an embodiment of authority. One student's response, when asked whether she believed all the information in the book, was "It's in a *book*, isn't it?" (Elisa, age 12; her emphasis)

Furthermore, student expectations of print text and Web text differ in terms of information yield. Students expected, indeed almost demanded, that the Internet produce immediate results, after one or two searches taking 10 to 15 minutes. However, there was not a similar expectation for print text. Students expected to devote time, perhaps several library sessions of 45 minutes duration, looking at books, and did not expect instant gratification in their task. Also, students expected to consult a myriad of texts, such as encyclopedias, biographies, and almanacs. In contrast, students expected that a couple of searches of one website would offer all information necessary to complete a task.

Implications for reading from the Internet

Web text reading is different from print text reading because Web text has additional features, which means alternative reading strategies are required to decode meaning. Reading Web-based text

- permits nonlinear strategies of thinking;
- allows nonhierarchical strategies;

- offers nonsequential strategies;
- requires visual literacy skills to understand multimedia components;
- is interactive, with the reader able to add, change, or move text; and
- enables a blurring of the relationship between reader and writer.

In Web-based reading, students rarely follow a linear-sequential reading model. As Slatin (1991) said, "Reading, in hypertext, is understood as a discontinuous or non-linear process, which, like thinking, is associative in nature, as opposed to the sequential process envisioned by conventional text" (p. 158). Students jump from one place to another and are cued by colour, in the form of previously determined links, to other information sites. Burbules and Callister (1996) suggested that "the seamless shifting from text to text is only possible online" (p. 30). Hypertext presents nonlinear thinking models for students, and the Web "offers the opportunity to extend literacy skills—such as associative logic, visual rhetoric and interactivity" (Sorapure et al., 1998, p. 410).

The Internet provides opportunities to extend thinking skills beyond the hierarchical, linear-sequential model that serves so well in the world of print text. Burbules and Callister (1996) claimed it encourages "metacognitive awareness that recognises alternative forms of organisation for information" (p. 43). Students need to understand that traditional forms of thinking about locating information on the Internet are not the most expedient. Teaching students strategies of "relational thinking" (Landow, 1991, p. 83)—for example, using related words and synonyms to think more laterally about a topic—is effective.

Web reading requires high levels of visual literacy skill to enable comprehension of multimedia components. Successful Web reading requires evaluation of text and nontext (graphics, multimedia, and images), as students must differentiate between important visual images and mere beautification of sites (Kress, 1997). This is problematic for some students; as one commented, "Which picture is the *right* one (student emphasis), because they both look good, but they're both different and about the same thing?" (Jude, age 11). It was clear that many students could not discern the value of Web graphics, which were taken at face value and incorporated as a beautification process.

The intensity of purpose to download Web images was not replicated in the print environment. Students did not hand-copy or photocopy pictures from print materials to nearly the same degree, nor with the same desire. When I asked them about photocopying images or hand-illustrating their work, one student said, "Who wants to see a project with *black-and-white* pictures! (student emphasis).... I mean, you know, it needs to be colourful or people won't look at our project" (Sharnie, age 12). Julia (age 12) said, "You're kidding.... I mean would *you* draw your own picture?.... *I* can't draw at all!" (student emphasis).

I gained an overwhelming sense that a static, one-dimensional print image did not captivate students, and therefore was not evaluated in terms of its message. On the other hand, are Web images simply accepted as truth because the colour, style, and movement appeal to students? This issue surfaced in conversation with students, and further research is needed in the area of student perception of images and how teachers might heighten student awareness of the importance of evaluating visual material.

Web text reading also allows a blurring of the relationship between reader and writer, as readers can add, move, and comment on text and seek clarification from the author if there is an e-mail link. This is not possible in the static world of the book. These factors influence the approach taken to Web reading and the strategies needed for successful reading navigation.

Strategies for teaching Web reading

Additional teaching techniques are required for teaching students to read Web-based text. The following strategies were developed jointly by the classroom teachers and me. They are not intended as an exhaustive list, merely strategies that worked in our classroom environment.

Use the "snatch-and-grab" reading technique

One strategy we teach in reading print text, reading to the end of a text chunk for deeper comprehension, is not necessarily effective in the world of the Web. For example, two 10-year-old female English as Second Language (ESL) students in the class diligently read all information on each link before advancing or retreating in the search, even when realising halfway through that

the information was not pertinent to their work. They continued to read because they assumed they should, as they were required to do when reading novels. In the snatch-and-grab approach students skim text to identify a key word or phrase and grab the text onto disk or save the site as a bookmark. The aim is that students read only superficially, with limited comprehension of the complete text, and compile a grab-bag of references. Teachers must reinforce that students need to read the compilation of texts in a more detailed manner and that references should be culled after a closer scanning of texts. We found this technique is effective in the limited computer laboratory time many classes are allocated. The technique also follows the Burbules and Callister (1996) notion that links can be "surfed" (p. 41), emphasizing the broad nature of searching and the desire to obtain a great deal of material in a limited time frame.

Focus on refining key-word searches

Students must develop additional strategies for staying focussed in their reading searches on the Web. Teaching students to design a set of focus key words or questions before searching the Internet was useful. For example, searching the phrase *printing press* on the Internet located 595 hits, but it is not until search number 52 that Johannes Gutenberg's invention is mentioned. Teacher modelling of how to narrow the key word search from *printing press* to *invention of* or *history of the printing press* immediately refined the search. This strategy cut extraneous sites from 595 for the general *printing press* search to 12 sites for *history* and two sites for *invention*. It applied equally well to whichever search engine was used. Therefore, students need to be explicitly taught how to narrow the scope of their key-word search to find information more efficiently.

Provide clear search guidelines

Exploring ways to help students overcome the panic that can beset them when confronted with the sheer volume of information on the Web is essential. "I get lost on the links with Internet finding information," Sangreesh, age 10, complained, and he appeared to be overwhelmed by the "bricolage of elements, mixing the momentous and the trivial, the local and the global" (Burbules, 1997, p. 114). Often clear guidelines as to the purpose of the search and an approximation of how many searches may suffice assisted students who perceived the task as monumental. Clear purpose statements also help overcome the problem of students who have poor technical and task orientation skills. Some students often pressed the "back" key on the Web toolbar, but did not really comprehend how or why they arrived at that point in the first place or where they should try next. Quite often these students resorted to "channel surfing" (Burbules & Callister, 1996, p. 41), which meant they scanned text randomly, in very short bursts, with no overall sense of coherence or meaning in the search. Their searches were too general, vague, or ambiguous, and not organised so that a topic could be coped with in small chunks.

Use the "chunking technique"

The *chunking technique* is a term I coined to show students the ways in which a complex topic could be broken down into manageable sections or chunks. For example, when researching the creation of Qantas, Australia's first airline, the teacher explained how students could think about the topic in chunks: Qantas the airline, its historical significance for Australia, when and why it was created, and its effect on remote communities. Students then brainstormed words and ideas to use as a search focus for the "chunk" of information they would deal with, for example the historical focus, before moving to the next chunk. This technique assisted students who possessed poor search or organisational skills and encouraged a broader conceptualisation and more lateral thinking about project topics.

Develop teaching mechanisms to overcome frustration with technology

Teachers also need to help overcome student frustration with technology. In addition to coping with the usual technical problems such as terminals not working, the Internet crashing, sites having moved, and dead-end links, students became disillusioned when they could not immediately locate information. This frustration is often heightened for primary-age students, as movements between links make it increasingly difficult for the reader to predict results as more links appear. When this happens, many readers simply "opt out of the process in frustration" (Slatin, 1991, p. 164). David (age 11) confirmed this, saying, "In books you know where to go, but on the Internet you're playing by chance." Ying, (age 12) said,

"Sometimes I would find completely unrelated information; like while I was searching A.B. Paterson, I found things like Paterson car restorers and A.B. Fridges!" Therefore, our role is to assist students in developing a range of strategies to deal with traditional unmet reading predictions in the Web text environment.

Provide short-cut lists to sites or search engines

Teachers can assist students by providing preset lists of short cuts or bookmarks to reliable sites and hints for students to effectively organise their lists of Web addresses. It is essential for us to realise that these strategies must be explicitly taught, as they are not obvious to many students in computer-mediated classrooms. A most effective method was teacher modelling of explicitly taught search techniques, following a handout that was distributed to students as a step-by-step guide.

Limit links

One strategy assisting weaker students was to limit the number of links students followed. As some of the weaker students tended to follow many links and became confused about their topic, they were easily distracted from the focus questions. Consequently they finished the class with little tangible progress. This is not to suggest that learning did not occur, but frustration was displayed by students when limited progress in tasks was evident. As Brett (age 10) said, "I work hard all the class but at the end, the Net has given me *nothing*!" (student emphasis). Therefore, limiting the number of links assisted some students to refocus on key words or questions and keep on task. Teachers monitored this by checking the bookmark entries for each student's links at the teacher's station in the computer laboratory.

Evaluate nontextual features (images, graphics)

Evaluation of nontextual features is crucial to Web literacy. Visual elements can distract readers and cause difficulty finding written information on the Web. This is not to suggest that written text is of greater importance than images; rather, some students need explicit instruction in how to decode the image and not regard it merely as an "illustration" (see Kress, 1997, p. 58 for a clear description of the "tectonic shift" from written to visual modes). Many sites simply have a vast array of visual images that are focal points, where "the image as well as the text conveys pertinent information" (Sorapure et al., 1998, p. 417). There may be scant written text, as the website is designed to appeal to visual learners. As Bolter (1998) pointed out, "literacy in electronic environments may have more to do with the production and consumption of images than the reading and writing of either hypertextual or linear prose" (p. 7).

Incorporating evaluation of multimedia components into our teaching will assist our students in discerning credible and reliable visual elements. As Leu (1997) suggested, we need to encourage our students to become "healthy skeptics" (p. 65) in terms of Internet information. We need to expand student consciousness of the possible disparity of text and visual images on a website. "Students need, at the least to be made aware of the possible ways visual information can be manipulated. Charts and graphs are not just neutral presentations of facts. Pictographs can lie.... Drawings and photographs can manipulate the eye through tricks of perspective and visual illusions" (Sorapure et al., 1998, p. 418). Many of these skills can be effectively taught using a scaffolding approach, where teachers are explicit about steps to be taken early in the learning cycle, modelling steps in a "follow me" approach, then gradually withdrawing support as students become more confident and competent in experimenting with technology.

Reflections on the potential of technology in the reading classroom

Internet technology has affected a number of areas in the reading classroom. First, a significant difference in reading strategies is evident when students read on the Web when compared with traditional print text reading. This affects our methods of teaching in computer-mediated environments. In addition, we need to realise that because technology changes so rapidly, we will probably always play "catch-up" in the educational sense. We must be willing to learn from technological changes and also acknowledge that some of our students may be a great deal more technoliterate than ourselves, and encourage them to help in the classroom.

I do not support the view that technology will replace teachers. In fact, we have an integral role to play as part of the literacy community in

evaluating the use of technology in classrooms and insisting that designers produce educational software that is pedagogically sound. We must continue to help students evaluate all textual environments critically. Use of technology does not necessarily mean better teaching. The Internet does not represent an alternative "better than books"; it signifies an option "different from books." As teachers, we must approach technological change by asking ourselves whether our teaching has the potential to be enhanced by technology, and whether technology serves a purpose in aiding student learning. If not, then why use it? Web literacy has implications for how we effectively teach reading strategies in both print and digital environments, so schools and educational funding agencies must consider professional development needs of teachers in a real and practical sense. Only through adequate professional development will the average classroom practitioner be able to cope with the changes taking place now and in reading classrooms of the future.

The World Wide Web offers teachers and students an opportunity to enrich and expand concepts of literacy. However, new effective reading strategies for this largely unfiltered array of information need to be incorporated into classroom practice. The Web invites a nonlinear, interactive, nonsequential approach to reading by students, and the multimedia elements add to the visual literacy skills they require. Web literacy requires a rethinking of the skills needed by the literate being in the 21st century. The Internet provides a gateway to content, and Web literacy represents the digital bridge that will reshape our teaching of reading skills in this new millennium.

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