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Scaffolding instruction for reading the Web

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Research has found that text reading and Web reading, while sharing some similarities, require a different balance of strategies. Adult language learners, especially those with limited previous experience with the Web, may therefore need explicit, scaffolded instruction in order to read the Web. This article reports on teacher action research and demonstrates the scaffolded activities teachers developed to help learners read and navigate the Web. First, a linguistic analysis of web pages was conducted. Through this analysis, it was determined that, while there is much published research on web page design, many web pages that could be used in order to support the ESL curriculum do not employ a readable design. The study then followed a collaborative action research model (Burns, 1999) with five teachers across Australia. The study revealed two distinct, but interrelated, reading activities learners need to engage in to use the Web: reading web pages to find their way around a website (that is, reading to navigate) and navigating web pages in order to find and read information to achieve some other language learning goal (that is, navigating to read). The research indicates that learners can read and navigate with fewer problems and less stress for them and their teachers, if instruction includes carefully scaffolded activities that help learners become independent readers and navigators of the Web.

I Introduction

The Web has become an integral part of work and family life in many parts of the world, resulting in scholars observing that different literacies may be required online: computer literacy (Corbel and Gruba, 2004), visual literacy (Kress, 1997), digital literacies (Glistler, 1997; Snyder,

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1999), electronic literacies (Warschauer, 1999) and silicon literacies (Snyder, 2002). While scholars and researchers have noted different requirements for online literacy, most research in language education has taken computer literacy as a given and examined how online activities facilitate language learning. However, since only approximately 12% of the world's population is online, language education in particular also needs to examine the facility with which learners of a particular language can access, find and use information on the Web. In other arenas, research has shown that access includes both physical access to computers and facility with Web functions. In her work with a random group of Internet users, Hargittai (2002), for example, showed that a number of factors influence such facility – age and previous experience with the technology result in variance in skills. A study of low-literate adults' navigation (Zarcadoolas *et al.*, 2002) demonstrated that these adults found both navigation and content were barriers to their ability to find and use information on the Web.

While digital/silicon/electronic literacies encompass both computer-mediated communication (CMC), such as e-mail and instant messaging, as well as finding, selecting and even writing text on web pages, in this article we restrict our usage to the latter. Elsewhere (McPherson and Murray, 2003) we have described a study where teachers worked with learners using CMC; here we report on a study that was designed to document how explicit, scaffolded instruction can help language learners develop the digital literacies they need to find, select, evaluate and transform web-based content effectively. To frame our discussion, we examine what we know about reading, both in print and online and what theoretical approaches to instruction can inform the teaching and learning of reading on the Web. Much of the research on online reading draws on L1 research. Little research has been conducted with language learners, whether English or other languages.

II Reading

Research into reading has included both investigations into the processes involved in reading and also into the nature of texts that makes them readable. The former is mostly limited to print-based reading, where the texts are primarily educational texts, rather than highly visual texts, such as advertising or magazines. Readability research, on the other hand, has

been conducted for both print and online texts and with a variety of text types, but not with second language learners.

1 Reading processes

Reading research can be discussed in two categories: cognitive approaches and sociocultural approaches. Reading is a cognitive process that involves decoding at word, sentence and discourse level and also interacting with the text. These two aspects of the cognitive process of reading are also often called bottom-up and top-down processes, even though these are not accurate descriptions of the interactive nature of reading as a cognitive process. Other researchers have noted that reading is an interactive process in which decoding contributes to comprehension and comprehension strategies, such as prediction and activating background knowledge, contribute to decoding (Baynham, 1995; Grabe and Stoller, 2002).

In contrast to cognitive approaches to reading, sociocultural approaches note that texts are embedded in sociocultural contexts, are created for social purposes and reflect ideologies of writers and their context. Readers, as sociocultural beings, interpret texts they read based on their own sociocultural views of the world, which include previous experiences and current positionings. From this perspective, while reading strategies may be the same when reading in L1 or L2, many of the practices identified in this paradigm are likely to differ when reading in an L2. Baynham (1995: 88) identified three layers of language in social context: language as text, language as social process (getting things done through language) and language as social practice (how ideologies and institutions operate through language). Freebody and Luke (1990; Luke and Freebody, 1999), working in the same paradigm of language in social context describe reading processes from the point of view of the four practices of the reader: 1) code breaking ('how do I crack this?'); 2) participating in understanding the text ('what does this mean?'); 3) using the text ('what do I do with this, here and now?'), and 4) analysing the text ('what does all this do to me?'). Baynham equates code breaker and text participant with his language as text, text user with his language as social process, and text analyst with his language as social practice. How does online reading differ from print reading? In order to answer this question, we first need to examine the nature of digital texts.

2 *Digital texts*

Within language education, the nature of digital texts is often taken for granted, yet other researchers have noted differences between online texts and print texts, leading to discussions of the features of digital/silicon/electronic literacies. Bauman (1999), among others, identifies digital texts as those that appeared electronically, never having appeared as print texts. Since such a distinction is not linguistically based, it leaves no principled way to describe similarities and differences among texts that appear in print and those that appear electronically. Lipscomb (2002) provides a more useful distinction for linguistic and pedagogical purposes: conventional texts found on the Web and Internet-specific texts. The former include the genres found in print text, such as narratives, information texts, procedural texts and so on, genres whose conventional language features and organizational structure have been described. The latter include texts such as web home pages or the texts produced by a search engine, text types which have, as yet, not been fully described linguistically. Despite the evidence that a variety of text types can be found on the Web and that the new Internet-specific genres have not been fully described, a number of researchers working outside linguistic paradigms have loosely used genre as a term to describe various online texts. Dillon and Gushrowski (2000), for example, claimed that the personal home page was the first, uniquely digital genre. However, their definition of genre only included those content elements that are typically found on personal home pages, elements such as site maps, welcome messages or updates. They did not take into consideration either the linguistic properties or organizational structures typically found in these personal home pages. Other researchers, also using genre as a means of description, have identified the development of different genres in computer-mediated communication (Orlikowski and Yates, 1994) and on the Web, such as hot lists and home pages (Crowston and Williams, 2000). Crowston and Williams, like Lipscomb (2002), also noted that some texts on the Web were reproductions or combinations of genres known in print, such as book, FAQ or script. However, as one can see from the examples listed, their criteria for genre classification rely more on content and organization than on linguistic features.

Some researchers working in the field of web page design and usability have identified features that are becoming standards, such as

the three-column format for web home pages, where the left-hand column typically provides a table of contents, the centre column the relevant content of the web page and the right-hand column functional links, with a heading or menu at the top (Nielsen, 1998). Nielsen's (2003) studies have also identified the typical contents and their size of a home page: navigation constitutes about 20% as does content of use to the reader, while advertisements constitute about 2% of the home page. Linguistic features they have identified include chunking, high lexical density, groupings and subheadings (Morkes and Nielsen, 1998), use of icons (Kress, 1997), bulleted lists and objective language (Gibbs, 2000), discussed below in terms of how these features facilitate or hinder Web reading.

The other distinctive feature of web pages is its hypertextuality, the non-linear nature of texts and information on the Web. Within a web page, texts and information can be accessed through a variety of hierarchies; in addition web pages link to other web pages, making intertextuality explicit, immediately accessible and often all available on the screen through having different windows open. In print text, on the other hand, writers may invoke intertextuality through allusions or citations, but they are not immediately recoverable. Since Internet-specific texts differ from print texts, how does digital reading differ from print reading?

3 *Digital reading*

The research into reading online is still in its infancy and has been dominated by researchers in areas such as design and readability, with little or no attention paid to comprehension or to the possibility that readers of web pages in English may well be second language speakers. Additionally, digital texts chosen for research have primarily come from e-commerce, rather than from a broad range of websites, such as government or non-profit, and study subjects have been young North Americans. The generalizability of their findings across cultures or to websites teachers might use in classrooms is therefore unjustified. Further, because the research has not considered comprehension or how the reader takes from and interprets information on the Web, we have no insights into the reader as text participant, text user or text analyst (Freebody and Luke, 1990).

Focusing on the reader as code breaker, the research has examined the characteristics of the screen itself and the text on the screen, especially the features of web pages referred to above. Nielsen and his associates (1997) have conducted numerous studies on the readability of web pages. Although their studies have not included language learners, we could extrapolate that, if competent first language readers find certain features facilitate readability while others limit it, then second language learners are also likely to find difficulty with features that limit readability for first language speakers. Both colour itself and the colour difference between text and background have been shown to affect decoding, with blue text negatively affecting readability (Nielsen, 1999). However, the change of colour from blue to purple of links that the reader has already accessed facilitates a reader's ability to find his or her place in this hypertextual environment (Spool *et al.*, 1999). Other features that facilitate readability include lexically dense text, including nominalizations and chunking of information, especially chunking using dot points, boxes or short paragraphs (Nielsen, 1997; Spool *et al.*, 1999). While this finding is counter-intuitive, it results from users scanning, rather than reading, much of the information on the Web. Therefore, texts with primarily content words that are chunked using devices such as boxes or lists are more highly readable, because they are easy to scan. Objective language is also more readable than subjective (Morkes and Nielsen, 1998). Organizers such as headings or bold or coloured key words also facilitate readability, whereas a wide choice of links with vague or ambiguous labels hinders readability, as do graphics and video because they compete with text and place additional cognitive load on the reader's short-term memory (Hoven, in press; Kalyunga, 2000). Readers prefer vertical to horizontal scrolling (Spool *et al.*, 1999), but find even vertical scrolling disorienting (Thurstun, 2000). One other research direction has been the reading process for web pages; however, unlike the research on print reading, which has included physical reading, reading strategies and comprehension, this research has focused almost exclusively on the physical reading of the text and has found that readers scan, only reading in detail when they find what they are looking for (Nielsen, 1997; Obendorf and Weinreich, 2003) and that readers skim graphics (*Eyetrack study*, 2000).

Because of the hypertextuality of web pages, readers can choose their own path through the text, unlike print texts which are designed to be read sequentially. This choice, however, can confuse and disorient

readers. Readers with an understanding of the structure of the hypertext have fewer difficulties navigating than do novices (Knobel and Lankshear, 2002), while background knowledge of content has also been found to be a major determiner of ability to read web pages (Kumbruck, 1998).

In an earlier study (Murray and McPherson, 2004), one of the participating teachers (Lipscomb, 2002) found that her intermediate learners, who were proficient readers of print text in English, had great difficulty with reading Internet-specific texts. She used two types of texts for her study – conventional texts found on the Internet and Internet-specific texts. The former included a Frequently Asked Questions (FAQ) about Osama Bin Laden, which had standard characteristics of a biographical statement genre; a cyclone warning information text with map; and a procedural text for how to access the World Wide Web. Internet-specific texts included the CNN home page and the results of a Google search. To remove possible difficulties associated with the technology, such as using a mouse, colour or drop-down menus, she provided learners with printed versions of these texts and asked standard language-teaching comprehension questions. She found that learners comprehended the conventional texts found on the Internet, but many experienced great difficulty with the Internet-specific texts. In fact, these learners did not know how to find the information on the home page and could make no sense of the results of the search. Learners' ability to read Internet-specific texts depended on their previous experiences of using the Internet, not on their reading ability in English. In other words, those who had previous Internet experience in their L1 had less difficulty than their equally English-proficient peers who had no or minimal experience using the Internet in their home language.

While research on reading the Web in an L2 is still quite limited, a few studies have identified issues for language learners. Other research on L2 learners reading the Web has found that navigational vocabulary or even content vocabulary can present difficulties and that instructional tasks need to be carefully designed to take advantage of the different strengths of Web and print texts (Ganderton, 1998). Others have found that learners get lost in hypertext as they follow interesting, but unrelated links and have difficulty refining their searches (Sutherland-Smith, 2002; Walz, 2001). In a series of experimental studies, De Ridder (2000; 2002; 2003), examined vocabulary learning and text comprehension in two different CALL conditions. In one, vocabulary items that had

glosses provided were highlighted, while in the other, they were not. While one would expect that the highlighted links to glosses would increase salience for learners and so increase vocabulary and text comprehension, the study instead found that the invisible links enhanced L2 reading, perhaps because of the additionally thoughtful choices that learners needed to make.

If Internet-specific texts are different textually from print texts that learners are familiar with, and learners find them difficult, what strategies have teachers used to help learners so they do not get lost? This question is of even more importance for language learners who: have fewer linguistic resources for decoding; have less experience with a variety of texts in the L2 and so for whom intertextuality is often rather tenuous; and have experienced fewer sociocultural contexts to interpret the sociocultural meanings in texts and how they position both reader and writer. In other words, L2 learners are still developing the roles and practices of code breaker, text participant, text user and text analyst (Freebody and Luke, 1990; Luke and Freebody, 1999).

III Choosing appropriate web pages for language learners

Our previous study (Murray and McPherson, 2004) found that randomly chosen web pages or random searches using a search engine often produced texts that were inappropriate (promotional rather than informational or with culturally insensitive content), beyond learners' current linguistic level (lexical, syntactic or discourse), or had uncertain reliability of the information presented (personal sites or those written by children). As a result, teachers in that study used a variety of strategies to ensure learners accessed sites that were pedagogically appropriate:

- using a course management tool such as eBoard and entering links under content (for example, The Melbourne Cup) and language learning topics (for example, grammar, puzzles);
- checking all websites before class and providing learners with precise URLs;
- explicitly teaching search skills, including a heuristic for recognizing appropriate sites for the task (for example, .gov or .edu sites rather than .com sites);
- teaching skimming and scanning so learners can assess the results of a search or quickly view and assess a web page.

This study also found that many of the web pages that teachers find to support their curriculum objectives (whether content or language) do not employ a readable design. Teachers are therefore left with the choice of choosing specific websites for their learners and ignoring such low-readability web pages, or explicitly teaching learners how to find the specific information on that web page. While such instructional strategies are relevant to L1 reading, it is especially relevant to L2 learners who are not only struggling with a new text type, but also with a new language (see, for example, Ganderton, 1998 on vocabulary).

IV Theoretical framework for instruction

Since our previous study found that learners who had not had Web experience in their first language had difficulty in reading to navigate and navigating to read Internet-specific texts, for this follow-up study we wanted to explore whether explicit, scaffolded instruction would help learners to navigate and read Internet-specific texts. Within the AMEP, many teachers use an explicit instructional approach to teaching the linguistic features and structure of texts (Feez, 1998). This approach includes activating background knowledge, providing and explicating models of a text type, jointconstruction of the text type with teachers and learners working together, independent construction of the text type and application to a similar text. What we wanted to explore in this study was whether carefully scaffolded activities during this process facilitated learners' reading of the Web.

Scaffolding was first used to describe the way tutors guide the development of problem solving in young children (Wood *et al.*, 1976) and later extended to describe how teachers assist learners to complete a task (Maybin *et al.*, 1992). Wood *et al.* note that 'the learner must be able to *recognize* a solution to a particular class of problems before he is himself able to produce steps leading to it without assistance' (1992: 90). Assisting the learner in this recognition, interpreting discrepancies and finally confirming the learner's individual achievement can be termed scaffolding. The concept of scaffolding is based on Vygotsky's (1978) theory of learning as collaborative and driven by interaction. For Vygotsky, learning takes place when children are challenged by a task beyond their current level of competence, but provided with task-specific support by a more competent adult or peer. This gap between

what the child can do unaided and can do with support Vygotsky called the zone of proximal development (ZPD). Scaffolding then is the explicit, task-specific instructional support provided by a teacher or more experienced peer so that a learner can complete a task. Scaffolding should result in learners becoming independent of the support, able to complete a new task based on similar context and skills (Mercer, 1995). Scaffolding, then, is more than help and instruction because it involves the use of task-specific explicit strategies that help the learner become independent by exploiting their ZPD.

Recent research in Australia (Hammond and Gibbons, 2001) has identified two types of scaffolding – pre-planned and contingent, which they call macro- and micro-scaffolding. They found that ‘the hallmark of effective teaching lies both in teachers’ abilities to plan, select and sequence tasks in their programmes in ways that take account of different levels and abilities of specific groups of students, and in their ability to make the most of the teachable moment’ (Hammond and Gibbons, 2005: 10–11). These two types of scaffolding interact to provide effective pedagogical practices. For the study reported here, however, teachers drew upon the concept of macro-scaffolding as they designed their instruction for ‘the ways in which classroom goals are identified; how classrooms are organized; and in the selection and sequencing of tasks’ (Hammond and Gibbons, 2005: 12).

While teachers may have used contingent scaffolding in their classroom instruction when responding to learners’ attempts to produce or understand new texts in English, the focus of both instruction and the research was on how teachers could plan lessons to select and sequence web pages and tasks so that learners moved from explicit instruction, to production with help, to independent production.

V Methodology

1 The research setting

The research was conducted in three states in four different centres in Australia’s Adult Migrant English Programme (AMEP). The AMEP is a national programme that has provided English language instruction with a settlement focus for newly arrived immigrants for more than fifty years and is funded by the Commonwealth Department of Immigration and Multicultural and Indigenous Affairs (DIMIA). Immigrants and

refugees with less than functional English language skills are entitled to 510 hours of AMEP instruction. Additional hours are available for learners with particular needs, such as youth or survivors of torture and trauma. The Commonwealth Government funds state and territory organizations to provide English language instruction through distance learning, a home tutor programme, independent learning centres and classes at various sites and times. The national curriculum used in the AMEP is competency based, with assessment of learning leading to four levels of certificates roughly equivalent to beginner, post-beginner, intermediate and advanced. Recently, an additional level has been added at the pre-beginner level. The majority of learners in the AMEP are at post-beginner and below levels, are female, and many have limited previous schooling. They come from a variety of different linguistic and cultural backgrounds. For example, in 2002, the AMEP provided instruction for 32,000 clients drawn from 142 language backgrounds, with the major countries of origin being China, Vietnam, Iraq, Lebanon and Sudan.

The AMEP is supported by the AMEP Research Centre, which provides research, professional development and information services to the AMEP nationally. This study was conducted as part of the AMEP Research Centre's national research programme, in which teachers and centres volunteer to participate in research studies.

The five teachers who participated in the study reported here taught across three states in four different cities and towns. Four of the five teachers worked in state capital cities, while the fifth worked in a regional centre. All learners in this study were post-beginner or intermediate and had at least secondary education, but differing levels of computer experience. One teacher's class was well educated and had computer skills in their first language, while the other four classes had learners with mixed computer abilities. Because the study was conducted over four 10-week terms, the learners in the class varied from term to term. Additionally, some teachers focused their action research on specific learners, especially those with minimal computer or reading skills, rather than on the entire class. Therefore, the learner profile data provided below in Tables 1 and 2 are for the 65 learners teachers focused on in the study. Teachers rated their learners on a three-point scale for assessment of computer literacy and also asked their learners to rate themselves.

Table 1 Learner profiles: computer skills and level of education (n = 65)

Teacher assessment of computer literacy			Self-assessment of computer literacy			Previous Internet experience			Level of education		
High	Medium	Low	High	Medium	Low	Yes	No		Primary	Secondary	Tertiary
24	16	25	29	14	21	45	20	5		22	38

Table 2 Learner profiles: country of origin

Country	Number of learners
Taiwan	7
Former Yugoslavia	6
China	5
Russia	5
Thailand	5
Hong Kong	4
Indonesia	4
Sudan	4
South Korea	3
Other	22

The gender balance of 21 males and 44 females was typical of the AMEP, where nationally, 65% were female and 35% male in the 2004–2005 financial year. The learners came from 29 different countries, but were distributed differently from the AMEP overall, where the top five countries of origin in 2003–2004 were China (PRC), Vietnam, Sudan, Iraq, Lebanon. As Table 2 shows, the top five countries of origin of the learners in this study were Taiwan, former Yugoslavia, China, Russia and Thailand. The category ‘other’ includes countries from every continent.

2 *Collaborative action research*

The study employed a collaborative action research methodology (Burns, 1999). Collaborative action research was chosen so that the cycles of teachers’ reflections and action could be shared. In this way, teachers learned from each others’ practice so they could intervene to improve their own teaching practice. The research cycle was as follows:

- teachers came together at the beginning of the project for a professional development session that included reporting from the previous research project and instruction in scaffolding theory and action

research and on the structure of web pages. Teachers also discussed their particular class and how they anticipated incorporating the Web to support the learning of English;

- in the first term, teachers observed and took notes as their classes used the Web for various instructional activities;
- at the end of the first, second and third terms teachers came together to report to each other on their class and learner profiles, their management of web page use in their classrooms, and emerging issues;
- during the end-of-term reporting sessions, teachers learned from each other strategies that learners found useful and that supported language learning;
- teachers adapted their strategies based on their own observations, input from fellow teachers and the profiles of the learners in their classes for the following term;
- teachers observed and took notes as their classes used the Web for various instructional activities;
- teachers came together to report on their findings at the end of the fourth term and to complete the writing of their reports.

VI Scaffolding reading

The goal of this study was to investigate whether explicit, scaffolded instruction assisted learners to read the Web. We frame the findings around the distinction between reading to navigate and navigating to read that one teacher (Philippa) discovered in our earlier study. Within these two concepts a number of literacy practices emerged during the study. In some cases, these practices were decoding; in others, they involved learners in critical literacy as learners examined texts in terms of their sociocultural context or intertextuality. Learners became code breakers, text participants, text users and text analysts (Freebody and Luke, 1990).

1 Reading to navigate

All teachers in this study conducted a needs analysis at the beginning of term to provide a framework for their instruction – for all language needs, not only digital literacy. However, they identified additional and different needs throughout the course of the study. They found that the

literacy practices that learners needed to acquire in order to find their way around the Web included conducting effective searches, selecting appropriate websites from the search results and locating different elements of the web page.

a Conducting effective searches: Rather than perceiving web-searching as a discrete skill to be learned, teachers identified a complex set of skills and understandings that underpinned the task of conducting effective web searches. They recognized that learners needed specific reading skills, linguistic skills and knowledge of text structures in order to:

- choose keywords and search terms pertinent to the required content area;
- construct search terms that are recognizable to the search engine, appropriate to the content, and that elicit good website results;
- manipulate search terms to narrow or broaden their searches.

In the classroom, teachers selected print-based information texts and learners worked in pairs and groups to practise skills in identifying research topics, using skimming and scanning strategies to locate information, and selecting appropriate content keywords. Intensive work on vocabulary development included collocation exercises, brainstorming and mind maps, synonyms and homonyms to broaden lexical knowledge and target spelling accuracy. All teachers reported the need to emphasize and reiterate the importance of accurate spelling if searching by typing a URL.

Honing reading and language skills with familiar print texts in the classroom meant that learners were better able to apply these skills in the Web environment where they could focus on more technical aspects of keyword entry. To scaffold learning from skimming and scanning in print to the Web, one teacher (Shirley) used a website with graded, interactive exercises in which learners located key content words in online texts. Applying learned reading skills to the Web environment in structured exercises took learners a step further towards applying skills learned on print based texts to the Web environment.

Search terms that are appropriate to the topic area, and keyed accurately, are prerequisites for effective web searches, yet this is an aspect of web-searching that creates difficulty for many second language learners, more particularly those in early stages of English literacy.

Rather than handing out rules and instructions and then rescuing learners lost in unsuccessful searches, teachers had learners reflect on the steps taken and diagnose their own errors. Developing the skills to self-diagnose errors enabled learners to increase their capacity to work independently, and in cataloguing their 'mistakes' they developed checklists and heuristics to use as guides in future searches. An additional step teachers used for less experienced learners had the teacher following class directions in a step-by-step search for information on a specific topic. As the class evaluated each result they produced a checklist to guide future joint and independent searches.

Learners were shown how to broaden and limit search results from search engines using Boolean terms or advanced search options in the search engine and worked out situations where these tools are most useful. Structured group and individual exercises were essential for practice of the learned techniques. As a result of these instructional interventions, the learners furthered their skills in conducting effective searches. As one teacher (Louise) noted, 'informally, learners said they had learnt useful techniques to search for information more accurately and with less frustration'.

b Selecting appropriate websites: Teachers had learned of previous studies that demonstrated the difficulties learners experience reading the results of search engine searches and choosing appropriate websites from the displayed list. One teacher (Robyn) reviewed reading strategies she had taught for reading print-based lists and indexes such as telephone directories. She drew their attention to the similarities between printed indexes and search engine directories, both of which summarize information and direct the reader to locations with fuller information. While telephone directories direct readers to other pages for fuller information, search engines use keywords to show summaries of information held on listed websites, and provide a link directly to the sites.

Another teacher (Louise) used graphical representations and the familiar metaphor of books to describe the function of searching the Web with search engines. She likened websites to books, and search engine lists to a catalogue of book titles. She explained that selecting a website from the search engine's list enabled the reader to browse a website's contents and return to the list. She likened navigating websites to turning the pages of a book. She led the class through exercises where

they deconstructed the structure of the 'URL', exploring the sequence of elements in it. Working from known lexis and abbreviations, learners discovered the meanings of domain and country names in the URL. Several teachers used predicting and matching exercises to highlight the ways URL names and domains can be pointers to the authority and reliability of website content.

Intensive instruction and practice exercises for skimming and scanning print texts were later applied to search engine lists of websites to identify content most closely related to chosen keywords, and criteria for reliable, authoritative sources of information.

c Locating elements of web pages: Teachers chose websites whose content was aligned with the language learning goals of their course, and offered opportunities for learners to develop reading skills and demonstrate their understandings of a range of text genres as specified by the curriculum. They chose websites across a spectrum of text genres, such as formal reports, procedures, and information texts in formatted tables and provided interactive sites in which learners were able to complete forms, purchase goods, make event reservations, and so on. While learners were exposed to a range of website styles, the teachers focused their instruction on those elements and functions and navigation structures that are commonly found, regardless of the content. These include underlined word hyperlinks, drop-down checklists, website search boxes and site maps.

Instruction generally began with a discussion of the purposes of the website and prediction of its content, drawing on the URL, images, headings, learner experiences and other cues. To teach the language and navigation structures on the websites teachers drew heavily on the print medium. They downloaded web page screens, modifying them to highlight important vocabulary, navigation tools or elements of the website structure and used these as an instructional tool.

One teacher (Philippa) produced a printed study guide with a carefully graded sequence of illustrations and instructions demonstrating the parts and elements of a website. In the classroom, this was used to conduct a 'virtual tour' of the website and was complemented by a workbook she created to assess and consolidate their understanding of the study guide and to revise computer, web and site words and skills in the classroom. Finally, learners used an activity book which required

them to interact with the website to retrieve information using the knowledge and skills acquired in the previous stages. Print-outs of computer screens allowed learners to compare the structural elements of different websites without the pressures and difficulties of navigating across several sites at once, and to discuss their findings in group and pair activities.

Another teacher (Louise) instructed learners on the structure of web pages constructed in typical three-column format, using activity sheets with print-outs of the web page and a set of questions directing learners' attention to the URL, browser tools and functions and the location of different sets of information.

As learners became familiar with the structure and navigation patterns of one website, the teachers introduced different websites and learners applied their skills in using search boxes, indexes, and drop down lists to consolidate their Internet skills while engaging with new language content or text structures.

2 Navigating to read

Once learners had developed skills in reading to navigate, they then needed skills of reading, evaluating and transforming the information they read on the Web.

a Reading web pages: Teachers found that scaffolding was most effective if they began with print materials in the classroom, away from the distractions of the computer screen and mouse. Teachers built background knowledge by asking learners what they thought the site would be about, based on its name. Teachers used overhead transparencies or data projectors and printed worksheets showing the web page and identifying the different elements: scroll bar; icons such as back/forward; banner; columns; search boxes; drop-downs; hyperlinks; advertisements; address box with URL; tool bars. Teachers also helped learners identify appropriate links from a home page. Teachers gave learners tasks to complete based on these materials. One teacher, for example, had learners read whole screen printouts from two different websites on the same topic (their city). They identified the elements of each home-page and then compared the two, deciding what elements were the same and what were different. Only after the learners had mastered the

navigation and language of these virtual web pages did teachers have learners work in a computer classroom, access the websites online and respond to various activities that reinforced the previous learning.

Vocabulary was identified as a potential barrier to effective web reading, both vocabulary for navigating and identifying the elements of web pages and also the vocabulary found in the authentic texts on the Web. So, as well as teaching the elements of the web page, teachers also taught reading strategies such as modelling for learners how to read texts with unknown vocabulary.

Although teachers chose web pages so learning could be carefully scaffolded without learners becoming frustrated and lost with the results of search engine searches, one teacher (Robyn) found that ‘the middle section of the home page changes frequently and can be confusing as well as problematic when preparing class work in advance’ and that on one occasion, ‘the web page layout and design changed between preparation and the computer session so that some of the activities could not be completed’.

b Evaluating information: If their task was to read an information text, teachers taught the steps for reading such a text: read the title for the text; read the headings; predict what will be under each heading; read the comprehension questions, underlining key words; tie each question to a particular part of the text; reread the text quickly to determine its purpose and the type of information text (for example, newspaper article, scientific); reread, looking for key words. Teachers taught skimming and scanning so learners could quickly assess the relevance of particular information they found on a website. As one teacher (Shirley) stated, ‘they became more discerning in their assessment of material on the Internet, more able to judge its usefulness for them. This was evident in their oral presentations which were informative and interesting’.

c Transforming information: Since the goal of the web page explorations was both to teach learners digital literacy and to develop language outcomes such as writing an information report, learner tasks often included manipulating the information they found on the website for some particular purpose. For example, one group, having analysed a model information text about Australia, navigated the Lonely Planet

website on their city, Adelaide, and, having selected appropriate information from the site, wrote their own information text about Adelaide, based on the model text. In another class, with the learning outcome of being able to participate in a discussion, learners identified the elements of two home pages about Brisbane in print and then, in pairs or groups compared the two websites, discussing why they would choose one more than the other.

3 Evaluating learning

All the teachers evaluated student learning through multiple measures, including observations of learner progress; learner self-assessment, either through class discussion or feedback sheets; assessment of learners performing various tasks and comprehension-type exercises. In addition to language learning outcomes for the particular term and learning to read and navigate the Web, teachers found that learners had gained confidence and developed evaluation skills.

a Language learning: The language-learning goals varied across the five classes, but in all classes teachers assessed learner achievement of language-learning outcomes, which included reading a procedural text, completing a formatted text, writing a recount, doing an oral presentation or responding to spoken instructions. As indicated above, the curriculum used in the AMEP is text based and has required learning outcomes of text types. So, for example, for reading a procedural text, learners are taught (and assessed) as in the chart shown in Table 3. The 'assessment criteria' identify the elements that need to be present in the text the student reads; 'conditions of assessment' establishes the context for the text; while 'evidence guide' provides teachers with ideas for the type of task they can both teach and use for assessment (New South Wales Adult Migrant English Services, 2003: 6).

In addition to the curriculum-specific language learning outcomes, learners had developed proficiency in the meta-language of the Web; had read and used navigation tools to access the information they needed; learned to skim and scan for key words and the gist of a site's content and purpose; learned to read the basic structure of a home page; and in some cases, had learned how to take notes from information on the Web and incorporate it in a written report or oral presentation.

Table 3 Certificate III in Spoken and Written English: can read a procedural text

Assessment criteria	Conditions of assessment	Evidence guide
a. identifies actions/steps sequenced in text	1. 8 to 10 instructions	<i>Sample tasks</i> Learners read text and answer questions/perform procedure on, e.g.: • operation of equipment/computer • safety procedures • fire evacuation procedures • first aid procedures
b. demonstrates understanding of sequence of actions/steps	2. text appropriate to learner's context but procedure not familiar to learner	
c. demonstrates understanding of key vocabulary	3. recourse to dictionary	
d. responds appropriately to grammatical structures signalling required action, e.g. imperatives, modal verbs, dependent clauses of condition or time	4. 6 to 8 questions including 1 on sequencing	
	5. answers 6 questions correctly	
	6. responses need not be grammatically correct or in sentence form but errors must not interfere with meaning	
	7. time limit: 20 minutes	

b Reading and navigating the Web: In the final stage of a scaffolded approach, teachers provided learners with new tasks, which learners were to complete independently of the teacher. Teachers reported that learners were able to perform such tasks competently without asking for help, even though some learners took longer. As one teacher (Shirley) noted,

In a final reading exercise I gave them a simple Internet site with several questions to answer. I deliberately refrained from giving any clear help whatsoever except my initial instructions were comprehensive and as clear as I could make them. All learners completed the exercise successfully although those with lower computer skills took much longer to complete it.

As another teacher (Louise) expressed it,

Once learners are taught the basics in regard to searching the Internet, the language involved and basic troubleshooting, they find it extremely empowering doing free searches where they discover pages with different and creative layouts, interesting images and sounds, information they may not usually come across and new and motivating language.

What is evident from this study is that even post-beginner and intermediate English language learners can use the Web as part of their language learning. However, what it also demonstrates is that for the Web to be

used successfully to support language learning and teaching, teachers need to explicitly teach strategies for reading the Web, including explicit instruction on the structure of web pages. Merely instructing learners to 'use the Web' to gather information for a project, for example, leads to confusion, frustration and inappropriate choices of information.

c Confidence: All teachers and learners reported that learners had gained confidence in their Web abilities as a result of instruction and had a sense of accomplishment. As one teacher (Katherine) noted, 'Learners who had previously been reluctant to attend computing sessions became more enthusiastic due to the familiar structure and step by step approach.' Another (Shirley) commented: 'All learners said they felt more confident and competent when using the Internet.' One teacher (Philippa) was absent the day the class was to work in the computer room and a tutor observed her learners. The tutor noted 'the majority of the learners followed the instructions in the task and needed little or no help to complete the task. Having done the theory class [paper-based scaffolding], the learners were familiar with the makeup of the web page so they were more willing to scan a page seeking a solution rather than putting their hand up for help'.

d Learner self-assessment: Learners and teachers also reported that the learners had developed independent learning strategies and were better able to evaluate their own progress and the websites they visited. Through this scaffolded instruction, learners became more discriminating in their evaluation of websites, realizing that beautiful colours and lots of advertisements and graphics did not necessarily mean the website was easy to read and gather information from. One class, learning how to do oral presentations, used information on the Web for both content and for sites that gave advice and instruction on oral presentations. The teacher provided the learners with the URL for a university study skills site and guided them in reading the advice. Learners had already evaluated other sites they had read with the teacher. Their response to this study skills site as reported by the teacher (Shirley) was 'When I asked them for their comments on this website they said it was easy to read with clear, simple and well organized information but that it was a bit boring without pictures or colour.' In contrast, the website she used to scaffold for content they found

more attractive. ‘They loved the colour and beautiful pictures on the site, but some found the site cluttered with too many advertisements. Some thought the print was too small.’

VII Reflections on the collaborative research process

We specifically chose a collaborative action research model for this study because, as Burns (2000: 32) has noted:

Such evidence as exists in the ESL teaching field seems to point to the capacity for collaborative action research to reduce teachers’ isolation and to help them generate rich insights about classroom practices and to enhance their own theories about teaching and learning.

Our goal was not only to investigate learners’ progress as a result of scaffolded instruction, but also for teachers to discuss each other’s approaches, evaluate these different approaches, reflect on their own practice and adjust their own practice if they believed this was warranted. Over the period of the study, as teachers came together, they bounced ideas off each other, evaluated (in a supportive, not judgemental manner) each other’s tasks and strategies and reflected on their own. This reflective practice has been shown to facilitate professional growth of teachers (see, for example, Bartlett, 1990). While we did not specifically ask teachers to evaluate the collaborative approach, from our own observations, we noted that teachers supported each other’s work such that all participated, sharing ideas and strategies with confidence. On one occasion, as Robyn demonstrated the ‘brisbanelivingheritage’ website that she planned to use with her class, her colleague noticed how difficult it was for her to read the small font size. She also queried Robyn about the meaning of some vocabulary (Heritage Locations, Image Gallery, Getting Around). Noticing this, Robyn immediately began a discussion with us about the problems with this website that she herself had not initially noticed. This led her to develop additional scaffolded steps to help her learners navigate the site.

VIII Conclusion

Our teacher teach us step by step how to get in to the Internet. Yes, I like to learn that way. Because easy for me to understand.

(Learner in Philippa’s class)

We would argue as one teacher (Louise) did that

things like meta-language related to computers and the ability to use a variety of programmes is very important for new migrants who may go on to further study, seek employment or communicate with their homeland ... and this is all taught through the use of English so it will further enhance their English skills as well. Using computers to teach is one thing, but it is also important for learners to learn about computers. It is important to remind us that computers are a separate literacy ...

However, in order for learners to be not only code breakers, but also text participants, text users and text analysts (Freebody and Luke, 1990), teachers found they needed to explicitly teach, through targeted, scaffolded instruction. Through explicit instruction in how to choose search words and how to read the results of a Web search the frustration and getting lost that has been documented in previous research (Sutherland-Smith, 2002) was avoided. Through explicit instruction in the vocabulary, elements and structure of web pages, the disorientation that has been reported for hypertext reading in previous research (Ganderton, 1998) was also avoided. By focusing on both the language and structure of web pages, learners were introduced to a new literacy, one that is important for their educational, social and working lives and one which many learners are anxious about using.

As one teacher (Shirley) noted, 'at the beginning of each term, many learners confess that the Internet is a frustrating and complicated tool for them. At the end of the term, with reading strategies to aid them and a successfully delivered oral presentation behind them, they are much happier to embrace its many possibilities'.

IX References

- Bartlett, L.** 1990: Teacher development through reflective teaching. In Richards, J.C. and Nunan, D., editors, *Second language teacher education*. Cambridge University Press, 202–14.
- Bauman, M.L.** 1999: The evolution of Internet genres. *Computers and Composition* 16: 269–82.
- Baynham, M.** 1995: *Literacy practices*. Longman.
- Burns, A.** 1999. *Collaborative action research for English language teachers*. Cambridge University Press.
- 2000: Facilitating collaborative action research: some insights from the AMEP. *Prospect* 15(3): 23–34.

- Corbel, C. and Gruba, P.** 2004: *Teaching computer literacy, teaching with new technology*. NCELTR.
- Crowston, K. and Williams, M.** 2000: Reproduced and emergent genres of communication on the World Wide Web. *The Information Society* 16(3): 201–16.
- De Ridder, I.** 2000: Are we conditioned to follow links? Highlights in CALL materials and their impact on the reading process. *Computer Assisted Language Learning* 13(2): 183–95.
- 2002: Visible or invisible links: does highlighting of hyperlinks affect incidental vocabulary learning, text comprehension, and the reading process? *Language Learning and Technology* 6(1): 123–46.
- 2003: *Reading from the screen in a second language*. Grant Uitgeverij.
- Dillon, A. and Gushrowski, B.** 2000: Genres and the Web: is the personal home page the first uniquely digital genre? *Journal of the American Society for Information Science* 51(2): 202–5.
- Eyetrack study**, 2000: Retrieved 5 May 2004 from <<http://www.poynterextra.org/et/i.html>>
- Feez, S.** 1998: *Text-based syllabus design*. NCELTR.
- Freebody, P. and Luke, A.** 1990: 'Literacies programs': debates and demands in cultural context. *Prospect* 5(7): 7–16.
- Ganderton, R.** 1998: New strategies for a new medium? Observing L2 reading on the World Wide Web. *ON-CALL* 12(2): 2–9.
- Gibbs, D.** 2000: Cyberlanguage: what it is and what it does. In Krause, K., editor, *Cyberlines*. James Nicholas, 11–30.
- Glister, P.** 1997: *Digital literacy*. John Wiley and Sons.
- Grabe, W. and Stoller, F.** 2002: *Teaching and researching reading*. Pearson Education.
- Hammond, J. and Gibbons, J.** 2005: Putting scaffolding to work: the contribution of scaffolding in articulating ESL education. *Prospect* 20(1): 6–30.
- Hammond, J. and Gibbons, P.** 2001: *Scaffolding teaching and learning in language and literacy education*. Primary English Teaching Association.
- Hargittai, E.** 2002: Second-level digital divide: differences in people's skills. *First Monday* 7(4): 1–19. Retrieved 5 May 2004 from <http://firstmonday.org/issues/issue7_4/hargittai/index.html>
- Hoven, D.** in press: Communicating and interacting: an exploration of the changing roles of media. *Calico Journal*.
- Kalyunga, S.** 2000: When using sound with a text or picture is not beneficial for learning. *Australian Journal of Educational Technology* 16(1): 161–72.

- Knobel, M. and Lankshear, C.** 2002: Critical cyberliteracies: what young people can teach us about reading and writing the world. Paper presented to National Council of Teachers of English Assembly for Research Mid-Winter Conference, February 2002, New York.
- Kress, G.** 1997: Visual and verbal modes of representation in electronically mediated communication: the potentials of new forms of text. In Snyder, I., editor, *Page to screen: taking literacy into the electronic era*. Allen and Unwin, 53–79.
- Kumbruck, C.** 1998: Hypertext reading: novice vs expert reading. *Journal of Research in Reading* 21(2): 160–72.
- Lipscomb, P.** 2002: *Reading what? On the Web*. AMEP Research Centre.
- Luke, A. and Freebody, P.** 1999: Further notes on the four resources model. *Reading Online*. Retrieved 5 May 2004 from <<http://www.readingonline.org>>
- Maybin, J., Mercer, N. and Steirer, B.** 1992: ‘Scaffolding’ learning in the classroom. In Norman, K., editor, *Thinking voices: the work of the National Curriculum Project*. Hodder and Stoughton for the National Curriculum Council, 186–95.
- McPherson, P. and Murray, D.E.** 2003: *Communicating on the Net*. NCELTR.
- Mercer, N.** 1995: *The guided construction of knowledge: talk amongst teachers and learners*. Multilingual Matters.
- Morkes, J. and Nielsen, J.** 1998: Concise, scannable and objective: how to write for the Web. Retrieved 5 May 2004 from <<http://www.useit.com/papers/webwriting/writing.html>>
- Murray, D.E. and McPherson, P.** 2004: *Using the Web to support language learning*. NCELTR.
- New South Wales Adult Migrant English Services** 2003: *Certificate in Spoken and Written English*. NSW AMES.
- Nielsen, J.** 1997: How users read on the web. Retrieved 5 May 2004 from <<http://www.useit.com/alertbox/97110a.html>>
- 1998: Conservatism of Web users. Retrieved 5 May 2004 from <<http://www.useit.com/alertbox/980322.html>>
- 1999: When bad design elements become standard. Retrieved 5 May 2004 from <<http://www.useit.com/alertbox/991114.html>>
- 2003: Homepage real estate allocation. Retrieved 5 May 2004 from <<http://www.useit.com/alertbox/20030210.html>>
- Obendorf, H. and Weinreich, H.** 2003: Comparing link marker visualization techniques – changes in reading behaviours. Paper presented to Proceedings of WWW Conference, May 2003, Budapest, Hungary.

- Orlikowski, W.J. and Yates, J.** 1994: Genre repertoire: the structuring of communicative practices in organizations. *Administrative Sciences Quarterly* 33: 541–74.
- Snyder, I.** 1999: Digital literacies: renegotiating the visual and the verbal in communication. *Prospect* 14(3): 13–23.
- 2002: *Silicon literacies*. Routledge.
- Spool, M., Scanlon, T., Schroeder, W., Snyder, C. and DeAngelo, T.** 1999: *Web site usability: a designer's guide*. Morgan Kaufman.
- Sutherland-Smith, W.** 2002: Web-text: perceptions of digital reading skills in the ESL classroom. *Prospect* 17(1): 55–70.
- Thurstun, J.** 2000: Screenreading – challenges of the new literacy. In Gibbs, D. and Krause, K., editors, *Cyberlines*. James Nicholson, 61–78.
- Vygotsky, L.** 1978: *Mind in society*. Harvard University Press.
- Walz, J.** 2001: Reading hypertext: lower level processes. *The Canadian Modern Language Review* 57(3): 475–94.
- Warschauer, M.** 1999: *Electronic literacies: language, culture and power in online education*. Lawrence Erlbaum.
- Wood, D., Bruner, J.S. and Ross, G.** 1976: The role of tutoring in problem solving. *Journal of Child Psychology and Psychiatry* 17: 89–100.
- Zarcadoolas, C., Blanco, M., Boyer, J.F. and Pleasant, A.** 2002: Unweaving the Web: an exploratory study of low-level adults' navigation skills on the World Wide Web. *Journal of Health Communication* 7: 309–24.