“Exploring how to effectively teach the searching capabilities of Google to pupils engaged in inquiry-based learning.”

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Abstract

An ICT facilitator attempts to improve the strategies he employs when teaching gifted and talented pupils in an inquiry-based learning class how to utilise the more complex functions of Google. Having ascertained that the pupils were only employing Google’s ‘basic search’ function the ICT facilitator attempted to introduce the pupils to the advanced functions of Google so they could search the World Wide Web more effectively. The pupils’ initial resistance to looking beyond the results offered by simplistic search procedures presented a challenge for the ICT facilitator. The ICT facilitator had to come to terms with revising his preferred mode of instruction to encompass the pupils’ self-efficacy.

Introduction

In response to the Information and Communications Technology (ICT) revolution the Ministry of Education (MOE, 2003) has set in place a strategy to ensure that pupils attain both information and digital literacy. One of the Ministry’s goals is that pupils should “have systematic opportunities to develop digital and information literacy, and enjoy using ICT creatively, constructively and critically in extending their horizons and growing as lifelong learners” (p.3). Becoming “competent in using new information and communication technologies” and learning to “use a range of information-retrieval and information-processing technologies confidently and competently” (MOE, 1993, p.18) have been identified as essential skills that students need to acquire.
At my school, just as it has worldwide, Google has become one of the most popular information finding tools available among the general directories, search engines and specialised directories that abound on the WWW. The advantage of using a web search engine such as Google is that “allows searching of a large data base of web pages by word, phrase or other criteria” (Hock, 2004, p.61). Google enables searches to be specified by phrase, title, URL and domain, link, language, date, and file type.

The Google Corporate Profile states that:

We maintain the world's largest online index of websites and other content, and we make this information freely available to anyone with an Internet connection. Our automated search technology helps people obtain nearly instant access to relevant information from our vast online index. (http://investor.google.com/)

Alexandria and Mohammed are Year 6 pupils in an inquiry-based learning class and they love using the basic search function of the Google search engine to find information from the World Wide Web (WWW). And why wouldn’t they? Enter a few words pertaining to their respective inquiry learning topics into Google’s basic search field, push the button labelled ‘Google search’ and within a few seconds a hyperlinked list of ‘hits’ populates their monitor. The list indicates a proliferation of relevant information ready and waiting in an alluring set of web pages replete with pictures, animations, sounds, games, and easy to read bite sized snippets of information.
As part of their inquiry-based learning instruction, Alexandria and Mohammed have been introduced to the concept of identifying key words in preparation for searching for information on their research topic. They consider this approach arcane compared to the instant gratification provided by Google’s basic search function. Who wants to tediously identify search strategies or parameters when there is a good chance they can enter their research topic title and retrieve a link to a website containing the very information they want to know? Alexandria and Mohammed trust that if a website has found its way to the top ten lists on the Google pages then it is worthy of a look.

Having been identified as gifted and talented pupils, Alexandria and Mohammed were invited to join their school’s inquiry class wherein they are constantly encouraged by their teacher to take charge of their learning and follow their passions and interests. The inquiry class engages the pedagogy of collaborative learning and negotiated curriculum described by their teacher as based on the teaching and learning philosophies of the Reggio Emilia district in Italy. At the core of this pedagogy is letting pupils explore their symbolic languages through a project approach to learning (New, 1993) because;

Once children are helped to view themselves as authors or inventors, once they are helped to discover the pleasure of inquiry, their motivation and interest explodes. The age of childhood is more characteristic of this than the ages that follow. (Malguizzi 1998 cited in Millikan, 2003, p.34)
Alexandria and Mohammed are supported by their teacher as they negotiate specific learning objectives from the curriculum and then organise their own learning by employing thinking tools, information organisers and ICT. While observing in the participants’ class I witnessed Alexandria engrossed in learning tasks while also noting that Mohammed was not always so meaningfully engaged, despite the teacher’s varied attempts to keep him on-task.

Inquiry-based learning requires exacting organisation on the part of the teacher who via conferencing, checking milestones and on-going discussion is able to scaffold pupils’ learning. The teacher ultimately entrusts the pupil to do what is on their learning plan. Pupils need to engage self-discipline in all of their tasks including information gathering.

One of my key tasks as the ICT facilitator at my school is to instruct pupils on how to effectively find information on the WWW. In the past I have taken pride in my methods of introducing pupils to the possibilities afforded by Google when searching for information from the WWW. I taught pupils how to use Google’s ‘basic search’ and ‘advanced search’ features and the ‘search within results’ function. I initially viewed my instructional methods as a success as the lessons were well received and I noted pupils using these information searching strategies during the teaching sessions.

Over a period of time I observed pupils reverting to the ‘basic search’ mode instead of the more complex functionalities of Google’s ‘advance search’ functions. I noted that pupils often settled for what information Google’s basic search provided.
These observations, in combination with my belated realisation that I was only scratching the surface of Google’s search capabilities, lead me to question just how effective my teaching of WWW information retrieval skills really were. I hoped that by engaging in an action research case study I would be able to identify how pupils currently search on the WWW and if necessary explore, with the pupils, new strategies to improve their learning and my teaching respectively.

In this study I investigate the participants’ ability to utilise the more complex functions of Google. I also examine the efficacy of my preferred teaching methods. Before beginning this case study I suspected that pupils needed to more effectively exploit the functionalities of search engines. I presumed pupils would want to learn, how to effectively distil the quality from the quantity of information on the WWW. I viewed this as an integral part of the process of becoming ICT literate. I also knew from past experience as a teacher and learner that ICT literacy fits into the larger picture of literacy.

I undertook a literature review to find out if others had explored the areas relating to my case study. I was interested in finding out how researchers ascertained how people use search engines. I was also interested in any research relating to how to teach students how to use Google. I also looked for literature focussing on the importance of ICT literacy. The literature I discovered confirmed that my case study fits within an area of current topical interest for as Pearson (2003) maintains “the ability to search the web for relevant information may become one of the central skills for participants in the information society” (p.32).
The technical proficiencies required to gain access to information on the WWW is often subsumed within discussions of scaffolding and information literacy. For instance, the MOE avows that if pupils are to become life-long learners and participants in the ‘information society’ they need to be able to “identify, locate, gather, store, retrieve, and process information from a range of sources” and then “organise, analyse, synthesise, evaluate, and use information” (MOE, 1993, p.18). Consideration of these overarching aims must not overlook that ICT literacy requires the possession of “the knowledge, skills and abilities needed to understand and use the basic functions of commonly-used hardware and software” (Frand, 2000, p.17). Cox (2003) affirms this view stating that “the impact of an ICT activity on children’s learning will be influenced by the ability to work within the medium. In other words, learning achievements may be influenced by the learners’ ICT literacy skills” (p.166).

My school is increasingly shaping its pedagogy around the constructivist paradigm, which includes recognition of deep thinking skills and contextual learning. Teachers actively look for ways to introduce pupils to ICT as a tool that can be used to aid learning in scenarios that are meaningful to pupils. It has been noted that pupils do require technical help when using ICT and scaffolding of learning is an acceptable paradigmatic strategy (Cleverly, 2004; Herring, 2004; Williamson-Leadley, 2001).

Information literacy is ultimately the key to meaningful enfranchisement which in the current political situation is espoused as the ultimate right and responsibility of democratic citizenship. Pupils must be information literate if they are to be able to make meaningful decisions about their lives for;
an information society can only function when citizens are able to gain free access to information, and shape it for their own ends – search and use retrieval skills, display the ability to process information, make sense of it, and manipulate it into new forms. (Pearson, 2003, p.31)

The participants of the first meeting of the World Summit on the Information Society (WSIS) held in Geneva in December 2003 confirmed that information literacy has come to be recognised as crucial for citizenship of our planet. The WSIS Declaration of Principles and Plan of Action states that there is a;

common desire and commitment to build a people-centred, inclusive and development-oriented Information Society, where everyone can create, access, utilize and share information and knowledge, enabling individuals, communities and peoples to achieve their full potential in promoting their sustainable development and improving their quality of life, premised on the purposes and principles of the Charter of the United Nations and respecting fully and upholding the Universal Declaration of Human Rights. (WSIS, 2003)

To be literate is not only to understand the conventions but the intentions of the text and the societal forces that will have influenced the text. We may need to learn about the technical aspect of the medium but this must never be at the expense of the discourse.
Aronowitz, (2003) confirms this viewpoint stating that;

...any reasonable concept of democratic citizenship requires an individual who is able to discern knowledge from propaganda, is competent to choose among conflicting claims and programs and is capable of actively participating in the affairs of the polity. (p.215)

The WWW enables, those who have access to it, instantaneous up-to-date information on a plethora of subjects. As part of the ‘global community’ “the WWW allows humankind the opportunity to engage in emancipatory dialogue regardless of political and geographical boundaries” (Carvin, 2002, p.42).

When pupils connect to the WWW they face a vast array of interconnected information. This information is largely unmapped or un-indexed in the traditional sense. There is no standardised or systematic categorisation, editorial process or peer review (Andersen, 2001). This requires educators to teach pupils how to effectively find information on the WWW. Harrison (2003) points out that;

Some pupils make little progress where they are confronted by information which is either too difficult or simply too extensive for them to work with readily. For example, pupils confronted with a large number of ‘hits’ have not developed the skills to enable them to refine the search, or to establish which of the hits are most useful for the purposes of their enquiry. (p.40)
ICT has been identified as a catalyst for pedagogical change that will see the teaching methodologies of the past replaced with the empowerment of pupils through meaningfully engagement with contextualised information (Apple Classrooms Of Tomorrow [ACOT], 1995; Aiken, 1994; Frand, 2000; Yelland, 2002). Once this pedagogy that places emphasis on information literacy is in place it is predicted that the optimum power of ICT will be enhanced for;

Until the nature of the educational relationships change in the classroom and at the institutional level, we will not realize the full value of the computer, communication, and information technology investments that we are making today. We need to think in terms of transforming the educational experience so that it is meaningful to the information-age learner. (Frand, 2000, p.24)

Inquiry-based learning is one attempt to change educational relationships by empowering the learner to design learning tasks that embrace both his/her passions while meeting curricula requirements. Underpinning inquiry-based learning is the belief that the greatest service that education can provide to a pupil is to allow them the freedom to form their character from the inside by being allowing them to be themselves (Neill, 1992). Access to information and ICT are seen as prerequisites of inquiry-based learning in my school. Access to information is now synonymous with having both the means to access the WWW and the ability to engage in a synchronistic process of refinement, critical judgement and prudence to gain access to relevant information.
I attempted to find other research undertaken in the area of WWW searching instruction. I discovered that one way for pupils to learn how to effectively search the WWW is to participate in one or more of the interactive web searching tutorials available on-line (British Broadcasting Corporation [BBC], 2004; Flannagan, 2004; Warner, 2004).

Via the Ministry of Education’s portal, Te Kete Ipurangi (MOE, 2004) I examined a variety of on-line lesson plans and noted that searching the WWW was an integral part of the pupils’ learning experiences (Akroyd, 2000; Oamaru ICTPD Cluster, 2003; Woods, 2001). These lesson plans showed no evidence of search instruction being given beyond pupils being instructed to use key words and particular search engines.

After reviewing research into WWW searching behaviours Koyani and Bailey (2002) conclude that people are not inclined to use the advanced search features of search engines. Three overseas studies bore particular relevance to my research. Examination of high school students, teachers, university students and members of the general public in England lead researchers to conclude that their subjects “had little or no concept of searching as a process and the effect of syntax, semantics and Boolean logic on the results returned” (Uden, Tearne & Anderson, 20000, p.546). Lazonder (2000) conducted a study in the Netherlands of the WWW searching capabilities of fourteen pre-university students described as both novice and expert (author’s italics). By delineating WWW searching into four processes; goal formation, strategy selection, strategy execution and monitoring Lazonder (2000) reported that in respect to strategy execution “novices made errors and performed unnecessary actions” and that;
performing these skills requires at least some basic understanding of the WWW browser and search engine. For example, to locate a site by *content-based searching* users must know where to enter a query, how to use multiple search terms, and which button to click to start the search.

(p. 328)

A German study by Hölscher and Strube (2000) compared the WWW searching behaviours of people they refer to as *experts* and *newbies* (authors’ italics). They discovered that people who had little knowledge of effective web searching strategies in combination with little knowledge of their ‘domain specific’ search topic were particularly impeded when searching the WWW. Hölscher and Strube concluded that “because successful searching on the Web turns out to be so difficult for novice users, learning how to use search engines efficiently should be a central part of any Internet skills training” (ibid. 2000).

I have been unsuccessful in finding literature that describes the ‘nuts and bolts’ of working with Google within a primary school environment. This paucity of ‘warts and all’ research is indicative of the fact that in relation to ICT “very little is known about the real problems that rank-and-file teachers face in their daily work” (Brown, 2004, p.3). This case study is a small contribution towards rectifying this.
Key Research Questions

What are two students doing when they search the web using a search engine?

What are the implications for my teaching within my school?

What are the implications for teachers working to support students’ effective WWW searching strategies?

Methodology and Sources of Data

I chose to undertake this case study using interpretive action research methodology as it “provides a framework for the introduction and evolution of strategic action that recognises the effect of and uses local contextual factors in its advancement” (Waterman, Tillen, Dickson & de Koning, 2001, p.12). Unlike positivist research which is predicated on “absolutist claims about the existence of reality and our capacity to determine what is true” (Blaikie, 1993, p.212) qualitative research emanates from interpretivist epistemology that embraces the “knowledge as contextual and therefore relative” (ibid. p.212). By acknowledging the importance of context I was able to “get at qualities” (Davidson & Tolich, 1999, p.7) and tell a story from within my educational community thus hopefully “further enhancing our understanding of why we experience the world as we do” (Kaufman-Hall, 2001, p.126). By employing a variety of sources, data and research methods I afforded myself the “potential to deal with the subtleties and intricacies of complex social
situations” (Denscombe, 2003, p.35) while writing about “the relationships and connection of our everyday stories of researching within the larger stories of our cultures and the societies in which we live” (Horsfall, 2001, p.91). A key to interpreting information is to be cognisant of the forces that are contingent in its construction. Stating a constructionist viewpoint Crotty (1998) points out that:

all knowledge, and therefore all meaningful reality as such, is contingent upon human practices, being constructed in and out of interaction between human beings and their world, and developed and transmitted within an essentially social context. (p.42)

This study provided me with an opportunity to establish an atmosphere that encourages the pupils to see that we can construct new things together. I believe that “meaning is created through participating in social activity” (McCormick & Scrimshaw, 2001, p.39). Vygotsky (1978) concluded that;

Every function in the child's cultural development appears twice: first, on the social level, and later, on the individual level; first, between people (interpsychological) and then inside the child (intrapsychological). This applies equally to voluntary attention, to logical memory, and to the formation of concepts. All the higher functions originate as actual relationships between individuals. (p.57)

Action research also gave me the opportunity to focus “on processes rather than measurable end-products” (Denscombe, 2003, p.39). By focusing on processes I was able to examine the actions, interactions and intra-actions of both the participants and
myself. It was the processes engaged in by the participants that were of particular interest to me for they “can be the key to understanding what needs to be done to change things” (Gillham, 2000, p.7). By employing action research methodology I could both explore and improve my own teaching methods while providing an opportunity for two pupils to explore and improve their learning methods.

I hoped that this action research would have benefits for me as a teacher as the information gained gives me the chance to gauge my efficacy by looking at a particular learning situation in my own school (Ham, Gilmore, Kachelhoffer, Morrow, Moeau & Wenmoth, 2002; Mills, 2003).

Analysis of the data allows the pinpointing of key themes and areas for re-engagement in the action learning cycle (Munford & Sanders, 2003). From this analysis I hope to be able to offer recommendations on how to improve current teaching strategies in searching the WWW. This adheres to Davidson’s and Tolich (2003), assertion that action research starts from the idea “that research should do more than understand the world, that it should help change it” (p.129). The self-reflective research component of my action research centres around my being able to assess and improve the strategies I employ to teach pupils how to search for information on the WWW. I hope it will also enable me to contribute to the building of a “professional culture” (Sagor, 2000) through the sharing of findings. When undertaking this action research I accepted the “uncertainty of the journey” (Mills, 2003, p.2) as I was and am “committed to taking action and effecting positive educational change (author’s italics) based on their findings rather than being satisfied with reporting their conclusions to others” (ibid. p.3).
Researcher Positioning

As a researcher I am aware that “there is no such thing as an objective or impartial observation” (Davidson & Tolich, 1993, p.28). I accept that my epistemology will influence my chosen research methodology. This is because “each epistemological stance is an attempt to explain how we know what we know and to determine the status to be ascribed to the understandings we reach” (Crotty, 1988, p.18).

As a teacher I reject the notion of an “apolitical methodology” (Saravanmutha, 2002, p.86) and believe that pupils should be taught skills that enable them to make informed decisions concerning the choices they make in life. This involves empowering my pupils to examine the social constructs that are in place to influence their life choices because teachers need to have “an overriding commitment to the well-being of their clients” (Carr & Kemmis, 1986, p.220).

I consciously try to resist the conjoining pressures of neo-liberal economic rationalist policies and fundamentalism (Elliot, 1991). I begrudgingly acknowledge that “economic justification for schooling, coupled with faith in technical solutions for complex problems, has overwhelmed the civic and moral purposes for schooling children and youth…” (Cuban, 2001, p.7). I am disappointed that children “are not taught how to identify and interrupt the ideologies that make dominant forms of information production and use appear natural, normal, objective, logical” (O’Neilly, 2003, p.7). The ultimate purpose for all involved in education should be emancipation not indoctrination (Freire, 1970).
I feel it is crucial that I declare that I am not working towards uncovering a universal truth. Instead I wish to engage in a “mobilisation of the research process” (Burr, 1995) so my students can become information literate, life-long learners.

I acknowledge the importance of context, process and my influence on the research. I have constantly taken cognizance of Davidson and Tolich’s (1993) statement that; “Researchers must self-consciously reflect upon what they did, why they did it, and how they did it. The values of the researchers become an explicit part of the research process” (p.39).

I may well have limited the interactions in this case study because I initially believed that ICT is best learnt through a structured set of lessons (Gillham, p.47; Yin, 1994, p.89). I endeavoured to keep an open-mind when the participants wished to explore directions I did not agree with but I was not wholly successful in doing this. I was an “active participant observer” (Mills, 2003, p.50; Mason, 1996; Cleverly, 2004; Williamson-Leadley, 2001) gathering and presenting the information from an “interpretivist viewpoint” (Baskerville, 1999) As a result my interactions with the research participants will have a bearing on their actions. As a researcher I ascribe to the concept of “conscious partiality” (Blaikie, 1993, p.211).

During the case study I was aware of the observer effect because “when humans become aware that they are the focus of attention for research, there is the very real possibility that they will act differently from normal” (Denscombe, 2003, p.66). One effect of this can be ‘the halo effect’ which is seen when research subjects “become self-conscious or alter their behaviour to take account of the purposes of the research” (ibid., p.66). I acknowledge these ramifications. Being the teacher and observer, my
presence may well have inhibited the participants indulgence in tangential web surfing and other behaviours that they may undertake when not being so closely observed.

Gillham (2000) informs us that "you don’t deal with the ‘observer effect’ by denying it: you look for the probable influence of your presence" (p.47). I was conscious of the need to fulfil Munford and Sanders (2003) prerequisite of having an established relationship with the participants. I had worked with both participants before in my role as an ICT facilitator and on occasion as their relieving teacher over the course of the past two years.

I have engaged in the process of methodological triangulation of the data to ensure "that the meaning of the data has some consistency across methods and that the findings are not too closely tied up with a particular method used to collect the data" (Denscombe, 2003, p.133). As my research data gathered from different sources lead me to the same conclusions I gained confidence in the validity of my findings (Davidson & Tolich, 1993, p.34).

There is truth to the assertion that "in human behaviour, generalisability from one group of people to others, or one institution to another, is often suspect-because there are too many elements that are specific (author’s italics) to that group or institution" (Gillham, 2000, p.6). Following Mills (2003, p.79) recommendations I collected "detailed descriptive data" in combination with "detailed descriptions of the context" so that consumers of the research will be able to judge for themselves the generalisability of my methodology and findings. How generalisable this research is can only be answered by the consumers of the research once they are assured of the trustworthiness and grounding of the research (Denscombe, 2003). It is crucial that I "must be able to demonstrate reliability or accuracy of method, and validity of both
method and interpretation” (Mason, 1996, p.154) if I wish to generalise in my analysis. The “internal generalisability” (ibid., p.82) of this research is important as I would hope my teaching colleagues within my school may take cognizance of my findings because of its relevance.
Participants

The participants in this project were two Year 6 pupils in an inquiry-based learning class at my school. The school is a state funded decile 9 co-educational school in a suburban area of a city. Both pupils had been identified by the school as being gifted and talented. I asked the classroom teacher to select the pupils she saw most suitable for participation in the project taking into account the pupils’ timetables and ability.

Ethics

I firstly gained ethical consent from the Christchurch College of Education Ethics Committee to undertake this study (Appendix A). I then outlined the aims of this research to the school principal (Appendix B) and the inquiry-learning class teacher (Appendix C). I then requested access to 2 Year 6 pupils in the Inquiry Learning Class. I took no place in the selection of the pupils. Once the pupils had been selected I sent home a “child-friendly” information sheet for themselves (Appendix D) and one for their parent/caregivers to read (Appendix E). I invited the pupils to become participants in this case study and asked that pupils and their parent/caregiver sign the ‘Declaration of Consent’ form (Appendix F). It was explicit on the consent form that if the pupil did not want to participate in the case study they should not sign. I ensured that the participants in this case study were well aware of who I was, what my purpose was and how I would be attempting to undertake the research as;
The first requirement for the participant observer is to identify himself or herself: who you are, where you’re from, what you are trying to do or find out. The latter is particularly important. It won’t bias the members of the group. You will only bias them if you say what answers or results you expect to find. (Gillham, 2000, p.52)

All information pertaining to the study has been kept on or about my person when in transit. All information pertaining to the study is kept in a locked cabinet in my home or in a password protected file in my computer. The participants chose their own pseudonyms. Participants, their teacher and the school principal were given the opportunity to read and discuss any matters of concern before the final submission of this study for marking and subsequent publication.

Data Collection and Analysis

The project involved two one hour teaching sessions per week, carried out over a period of eight weeks. Sessions took place in the pupils’ class, school library or ICT suite. Data was collected in the form of interviews, observations, (which I recorded in note form), video recordings, and the tracking of the hyperlinks pupils selected while searching on the WWW. As the pupils in the class constantly use ICT equipment I deemed it unnecessary for pupils to experience an “extinction time” (Bogdan & Biklen, 1992, p.102) whereby they have the opportunity to get over the novelty of being videoed or using the WWW.
In the first session I interviewed and observed the pupils to ascertain their current *modus operandi* when searching the WWW. I compared the participants’ search strategies with what they stated they wished to find. In the second session I employed what has been my traditional method of web searching instruction in an attempt to teach the pupils how to use the Google search engine to access information from the WWW. I noted the results of both of these sessions as baseline data. I stated at the end of these sessions that there may be some ways we could look to improving their use of Google.

In the remaining sessions I invited the participants to go on a journey with me to discover if we could improve their searching strategies and my teaching/facilitation strategies respectively. I suggested that once this was done we could look at ways to tell others in the school how to use Google more effectively. From these interactions I hoped that the pupils and I would be able to improve upon our respective learning and teaching. The last sessions were dedicated to observing the pupils interactions with each other.

I was able to complete three cycles of the “Dialectic Action Research Spiral” (Mills, 2003, p.19) wherein it was my aim to “identify an area of focus”, “collect data”, “analyze and interpret data” and develop an “action plan”. How many action research cycles were completed depended upon the progress of the students and on the number of times teaching strategies had to be repeated. I shared the action research process with the pupils and placed particular emphasis on the action plan. As the teacher it befell me to provide scaffolding so as to “provide sufficient structure to keep students productive without confining them to straight jackets that destroy initiative, motivation and resourcefulness” (McKenzie, 1999).
Table 1: Range of Data Collection Methods

<table>
<thead>
<tr>
<th>Questions</th>
<th>Interview</th>
<th>Observation</th>
<th>Video/Audio</th>
<th>Tracking Links</th>
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<tbody>
<tr>
<td>How do pupils understand the WWW operates?</td>
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<tr>
<td>What strategies do pupils use to search the WWW prior to research?</td>
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<tr>
<td>What strategies do pupils use to search the WWW post research?</td>
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<tr>
<td>What strategies is the teacher/researcher employing?</td>
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I employed a range of data collection methods (see Table 1) comparing and contrasting the resultant data to ensure the accuracy of my findings. Triangulation occurred due to the overlapping methods of observation and data collection. I also engaged in reflective practice recording my ponderings in diary form to enable me to refer to them at later stages. Semi-structured interviews proved to be a particularly illuminating data collection method. Gillham (2000) confirms that the semi-structured interview “is the most important form of interviewing in case study research. Well done, it can be the richest single source of data” (p. 65). In respect to semi-structured interviews I found Elliot’s (1991) following guidelines very helpful:
In the initial stages of action research, when one wishes to remain as open as possible on the question of what information is relevant, an unstructured interview format is probably best. Later, when one is clearer about the sort of information that is relevant, one can shift towards a more structured approach. But even here the interviewer should leave room for the interviewees to raise their own topics and issues. (p.80)

The participants responded to the more semi-formal approach. It was during the semi-structured interviews that I established a rapport with the participants by answering questions regarding my purpose and dispelling myths such as ‘teachers know everything’ or that ‘I would just tell them what to do.’ Gillham (2000) confirms that “people will disclose a great deal if they feel they can trust you” (p.53).

During this research I constantly faced challenges finding available times when both participants could work together. The nature of the pupils timetables meant they had to align the inquiry-learning class requirements alongside such wider year 6 programmes including cycle safety, social practices and life education. Technical glitches with ICT equipment ranging from misplaced adaptors to confusion over logging in and saving procedures proved to be a frustrating impediment to productive use of our limited time together.
What strategies do pupils use to search the WWW prior to research?

Although their school portal to the WWW gave equal prominence to the search engines Yahooligans and Google, both participants used the basic search feature of Google almost exclusively. I saw no proof that either participant pre-planned their searching strategies even though they had a range of information organisers at their disposal. I observed both pupils spending considerable chunks of time trolling through lists of websites looking for information of use or interest. On one occasion I noted that Mohammed spent ½ an hour with no tangible results at the end of his search.

Alexandria indicated that she had considered more sophisticated search strategies but ultimately trusted that entering a ‘topic’ in Google’s basic search field would elicit appropriate hits.

Alexandria: You just like take your question and leave out the ‘is’ and ‘whens’ and all the joining words and type in the important words and then it comes up with what you want (slight hesitation) usually.

What strategies is the teacher/researcher employing?

My first teaching strategy involved introducing the pupils to a collection of sites on the web aimed at teaching WWW users how to improve their searching capabilities. These sites include explanations of how the WWW is constructed, what is on the WWW and how to search the WWW effectively for information.
My second teaching strategy was to ask the pupils to search as they usually would for information pertaining to their research topic. I asked them to look for information on the WWW as they usually would. At one point I simply said “You go for it and I’ll just watch”. I would then interject with suggestions as to how they could clarify the key concepts they were searching for. After some discussion we teased out some key concepts pertaining to his particular interest in ‘advertising’ and discussed ways that we may be able to narrow our search. I then asked the participants if they would be more successful if they entered phrases that more accurately defined what they were looking for. We agreed that it would be more fruitful to use the phrase ‘advertising techniques.’ At this point I introduced the pupils to the Google help pages and suggested that they may want to explore the different ways that a search can be delineated. I introduced some of the advanced search features of Google to the participants as we simultaneously searched for information about ‘advertising techniques. For our searching sessions we sat beside each other using individual computers connected to the WWW. As we searched we were engaged in discussion comparing and contrasting our different search strategies while using Google.

My third teaching strategy was to invite the participants to design a text to inform other pupils how to search the WWW. They decided to design a web page. I then made myself available to support them in the design of this website.

During all of the strategies I attempted to collapse the traditional student-teacher dynamic by encouraging candid discussion. I found myself adopting a more dictatorial style of facilitation on occasions when the participants were resistant to accepting each other points of view and became bogged down in minor points of design at the expense of content.
Findings

The use of ICT is a pivotal part of the participants’ school surroundings and their class is often abuzz with talk about how to use various applications. The participants had access in their class to ICT in the form of networked laptops and workstations as well as peripherals such as digital cameras and a scanner. Both participants had spent considerable time on the WWW prior to this case study. Mohammed had come to know the WWW as a place where he could find information on particular interests not necessarily related to his school work. He considered himself adept at finding good deals for cell phones via a trading site on the WWW. He had also found various sites offering information and ‘cheats’ concerning the on-line game of Runescape. To find the best sites for Runescape cheats Mohammed relied on the information provided by the male peers in his class rather than employing any particular searching strategies. There was a considerable amount of techie talk bandied around in the class between the boys with certain boys being recognised as being the experts on particular subjects. Although I witnessed Mohammed engrossed in these exchanges I only observed Alexandria working studiously on her own projects.

Both participants displayed the ability to log on to the school’s network and use the basic functions of applications such as Microsoft PowerPoint and Word. They described themselves as confident searchers of the WWW.

Mohammed: I know pretty much how and what I need to search.

Alexandria: You just put in a word and it comes out.
During informal observations of the class I noted both participants regarded the WWW as their first port-of-call when looking for information. In fact even though the class was adjoing to the school library I noted very little use of the library as a resource to find information. Instead there was a constant demand for the use of computers in the inquiry-learning class. In the most part the computers were being used to find information on the WWW.

During our initial sessions I asked the participants to show me how they usually searched the WWW. Both participants used the ‘basic search’ function of Google exclusively. The participants would enter a word into the ‘basic search’ function and click on the button ‘Google Search’. When I asked Alexandria if she found this way of searching very ‘hit and miss’ she replied:

**Alexandria:** No usually you might just want to know something about one big topic to start working on so you just type it in if you know something about that part of the topic and then you start working on that part of the topic.

Alexandria did explain how she had attempted on occasion to use speech marks when searching the WWW on Google to create a phrase. Nevertheless, Alexandria expressed her frustration in searching.

**Alexandria:** Sometimes if you are searching for something really specific and you can’t really. Well say you’re searching for where Venus flytraps live in the California swamp? That took me about a week because I couldn’t find it. It kept coming up with all this stuff about it but it was never actually where it was. Where do Venus flytraps live? It kept coming up with different ones about they live nicely and they live in swamps, all this stuff I already knew but it never actually did the country.
Both participants told me that they trusted Google’s star system to help them sort through results. I saw no actual proof of this as the participants instead briefly read the description of the site. They would then navigate through the site. It became clear to me that the participants did not understand the function of Google’s star system. Neither Alexandria nor Mohammed were able to explain how or why Google rated the sites displayed on its lists. When asked directly how Google’s star system worked they replied;

**Alexandria:** Because people make sites. They put them on here. But they actually only show ones that are rated two stars and up. People that work for Google rate them and if it’s rated over two stars they put it on and if its not they reject it.

**Mohammed:** I thought was computer programmes that grade it because otherwise...[interrupted]

**Alexandria:** Oh no.

**Mohammed:** Because other wise it would take for ever because when you see how many things there are in Google or else someone would have to go through all of those to put them on.

**Alexandria:** And also the star system is made because otherwise you would come up with a whole lot of crap like just one attacking random words like they might put one in with blah blah this blah blah this blah blah means that you might come up with ones like that so which is why they rate them.

As our discussions continued both participants did indicate that they may be able to learn more about using Google to search the WWW. During our third and fourth sessions both participants became briefly enamoured with the ability to specify a ‘search by type.’ Their interest was sparked when they realised they could search for PowerPoint presentations. This was a medium they were both familiar with and they
were keen to view any PowerPoint presentations relating to the topic of advertising. Neither participant showed an interest in searching for any other type of document or file type. I attempted to show the pupils how searches could be further defined using date parameters but they showed little interest in this feature.

**What are the implications for my teaching within my school?**

Even after they experienced some success in using the ‘advanced search’ feature in one session by the next session both participants reverted to their preference for using the ‘basic search’ function. When asked why Mohammed’s response was telling.

**Mohammed:** It’s easier and faster.

I was unable to sustain either participant’s interest in the different advanced functions offered by Google. During one session I attempted to demand that they enter date and file type parameters. I soon rescinded this request as it went against the tenor of the sessions. I had to face the fact that my simplistic expectation that I would be able to convince the participants that using the advanced search features of Google was desirable was seriously flawed. I had not given due consideration to the desires of the pupils. I approached the task from the view that they would want to be more efficient. I did not stop for a moment to consider from their viewpoint either what being more efficient meant or why it would be desirable. I was also tempered in my approach by the fact that I had put a lot of personal time and emotional investment into setting up the school with various ICT tools. I was approaching my teaching from the viewpoint of what was functional for me instead of considering how to fully contextualise and scaffold Alexandria’s and Mohammed’s learning.
Examining exactly how my teaching dovetails into pupils’ usual classroom programmes is the most obvious implication. In the past I have presented convincing cases as to how my lessons tie in with classroom programmes and how the skills I attempt to teach the pupils are invaluable for their development of information literacy skills. I could provide numerous accounts of how teachers and pupils alike have been grateful of my help with ICT issues and how they have learnt new skills. Yet beyond an increased proficiency by some pupils and staff when operating certain applications there is little evidence that the skills I have attempted to impart have been accepted as integral to learning. There has overall been little buy-in and on occasion the school management has reverted to transactional leadership instead of transformational as a way of ensuring at least some ICT use. My high opinion of myself was quickly deflated by Alexandria who unabashedly voiced her opinion of my how she saw my ICT role in the school in the following manner:

**Alexandria**: You are not our teacher. So all you do is walk – I don’t know what you do- but you just walk around the school. You don’t do anything there.

It was this single comment that gave me pause for thought. As the project continued I began to see myself as an amusing diversion for Alexandria and Mohammed. I was not effective in supporting their learning objectives. I need to be seen as a person who supports learning not a person who supports the use of ICT. My initial response to this was to try and convince both participants that what I could show them would improve their searching abilities. I would then try to show them how this would in turn improve the quality of information that they could present. I noted two sessions in particular where I tried to convince the Alexandria and Mohammed that the
information they would find would be ‘precise.’ In response they reminded me that they were able to find the information they needed.

I also needed to have had more patience and wait for the teachable moment. Who am I to predict when this may have been? I should not have let my frustration temper when I tried to introduce new parameters. I should instead have waited until Alexandria and Mohammed experienced frustration and then worked with them to explore possibilities. This situation did not transpire during the sessions due to my pressing desire to move things along. What I should have done is seized the teachable moment by both recognising it and not letting my own agenda fetter my judgement. The following interchange illustrates how I let a teachable moment disappear because I was focused on pre-determined objectives.

**Mohammed:** Does ‘.dot.com’ mean dot. company or dot. commercial?.

**Allan:** dot commercial is its exact definition though there are several extensions like that in the internet. You see dot. Au and dot.edu is education, au is Australia. O.K.

**Alexandria:** Go through them all.

**Allan:** Well there are heaps of them and more all of the time. I don’t want to do that at the moment but I’m hoping that by the end of the time that we have finished this that you’ll be able to go through them all or at least be able to know where to get them. Because what I would like us to do is explore how the internet works because correct me if I’m wrong please,
Once the participant’s retrieved a list of hits that stimulated their interest they began to delve into the various sites. My observation was that they preferred to explore and reject various sites one by one rather than ‘search within results’ or begin the search again with a different phrase or parameters. Both participants were easily mesmerised by the design of a site as much as they were by any information offered. On several occasions Mohammed would become enamoured with a site because it was ‘cool’. On one occasion he navigated through hyperlinks from advertising to magic tricks without being able to explain why he followed this pathway.

From session to session both participants reverted to entering generic terms into Google’s ‘basic search’ field and then trolling through the welter of hyperlinked websites précis offered by Google on the results page. The participants at no time attempted to tease their search topic into key concepts unless I directly intervened and suggested it. As we experimented further with the ‘advanced features’ there was little doubt that the participants could conceptualise their usefulness. Take for instance this exchange:

Allan: What’s the difference between with ‘all of the words’ and ‘at least one of the words’?

Alexandria: Well if you put say two words in with at least one of the words then it would only have to have one of them. Whereas with ‘all of the words’ and put two words it would have to have both of them. That’s why.

Neither Alexandria nor Mohammed showed any sustained interest in moving beyond trial and error when searching. Even when shown various ways to set parameters they continued to prefer to navigate through various websites. They enjoyed looking at
various websites and delving through the information offered. They would on occasion talk to each other about what they found. They were more often than not content on following their own pathways of discovery. They preferred to hop out of their chairs and look at each others computer monitors rather than enter the URL and disturb their own search. This showed that both participants were parochial about their searches and results. As a teacher I must respect this approach and look for ways that they may wish to explain their search strategies. It is from these discussions that I may be able to find ways to introduce different searching techniques.

Alexandria and Mohammed were not prone to or adept at using ‘help menus.’ This meant that I had to allow time for trial and error. This had particular implications for my teaching because trial and error it is not my preferred way of learning. I have always felt that if the information or instructions are there, why not use them. I also presumed that because both participants were gifted that they would delve into a multiplicity of problem-solving strategies for finding information. This presumption speaks more about my ignorance of the characteristics of gifted children than it does about any failings on the part of the participants. A corollary of the pupils’ belief in their own proficiency was a resistance to accepting other points of view. Not only were any of my suggestions not entertained but neither participant was particularly open to accepting each others’ suggestions.

This left me in a quandary as I had entered into an agreement with Alexandria and Mohammed that we would work together. It became obvious that this was not their preferred way of working and I should have taken heed of this. I should have been more sensitive to their needs. Instead of mediating between them I should have given
them the option to work more independently and suggested that they compare strategies on occasion.

I was surprised and increasingly frustrated by Alexandria and Mohammed’s lack of passion for exploring how they could improve their use of Google. What I overlooked sometimes was their passion for exploring the information available on the WWW. Neither participant had any idea about the construction of the WWW or how Google was designed to extract information. I incorrectly presumed that because Alexandria and Mohammed were using Google on an almost daily basis in a classroom environment steeped in ‘techie talk’ that they would have a deeper understanding of Google. This presumption was initially reinforced when I witnessed Mohammed manipulating Google’s ‘language tools’ to revert the ‘Elmer Fudd’ language interface back to English. After more observation I realised this knowledge was driven by a desire to be able to participate in the class hi jinks more than any in-depth knowledge of Google’s functions. I presumed that if a person is doing something for a considerable period of time that they would want to know how it works. Of course when I think about it this is not true or else I would be a qualified mechanic, a chef and movie director.

Alexandria or Mohammed showed little concern for time constraints. Any concept of working towards an end goal held little traction for either Alexandria or Mohammed. From day one I should have created a timeline with Alexandria and Mohammed. As a teacher I have become increasingly aware of time constraints in the school day. I tend to give the children some time to explore. This in itself is a ridiculous concept. Who am I to be giving time? This leads me to believe that pupils are wasting time if they are not doing exactly what the learning objectives require. Yet the beauty of the
WWW is that it gives pupils the opportunity to explore in a non-linear way. And the argument that in the real world they will need to work to time constraints. Well who am I to impose on them what the real world should be?

When asked how we could share our searching knowledge with the school community Alexandria and Mohammed expressed a desire to create a website. I initially saw this as meaningful contextualised learning. Both participants talked excitedly about how other pupils would be able to read their information to learn about searching the WWW. I hoped that as Alexandria and Mohammed became engrossed in the creation of the website they would revisit the advanced search features of Google. I offered several scaffolding tools for the creation of the site including planning templates, mind mapping tools and looking at exemplars of other sites. These were rejected by Alexandria and Mohammed. The participants’ interest was not captured by any of the instructional websites relating to Google. Of the Google website itself the participants noted the following:

**Alexandria:** It’s boring; it doesn’t have any pictures or screenshots. We want colour screen shots and...they don’t have any colour.

**Mohammed:** Well it’s a lot of blah. Ah well it tells you lots, it’s not really for kids, its all lots of writing. It would take a while.

**Alexandria:** There’s nothing on it to make you read.

Alexandria and Mohammed voiced their preference to start entering information immediately into Microsoft FrontPage. When asked by me where they were going to find information they came up with the following ideas:
Mohammed: We are just going to copy it and not care about the copyright. You can tell us some, you are supposed to be teaching us stuff.

Alexandria: We’ll look at this Google stuff and blend it with our stuff so it’s not copyright.

I did not want to curb their enthusiasm but I did remind them that copyright is there to protect everyone. I insisted that they should plan the construction of their site. The resultant plan amounted to me recording a few words and a sketch on a piece of paper as I acted as their ideas recorder. In resultant sessions little note was taken of the original plan as Alexandria and Mohammed worked on the website.

During the construction of the website technical and timetabling issues came into play more than ever. On two occasions I worked with Alexandria and Mohammed separately as it became difficult to find suitable times to work together. This approach proved to be misguided as neither participant was prone to accepting the work done by each other in isolation. Alexandria also began to display a dislike of me observing her. During one session when she had been experimenting with the colour of a font on the website for nearly 10 minutes I suggested we move on to looking at some content. She responded by demanding to write the following in my notebook:

Alexandria: [Handwritten] It was not long; only about 4m maximum. Who are you to judge me, or observe me without giving me $50?

During these design sessions Alexandria and Mohammed became allurred with the website’s surface design features, such as colour schemes and word art at the expense of content. As a result a lot of time was spent debating over the surface features.
Mohammed: That’s dumb that WordArt.

Alexandria: No it isn’t. O.K. do preset. They’ve got really good ones on preset.

Notwithstanding the slow progress of the task the participants were immersed in the task. I supported the pupils in designing the website and offered myself as a resource. On occasion I had to intervene as an arbitrator to facilitate progress. The participants were determined to learn about the FrontPage application through trial and error. This did not include using the ‘help’ functions of the application. Notwithstanding Alexandria and Mohammed’s independence and tenacity I was left with reservations concerning their ability to learn in a collegial manner. It was after two relatively fruitless sessions that I became more dictatorial in my approach demanding that the participants plan what was to be on each part of their website. The website was never completed due to further complications in timetabling combined with the fact that Alexandria and Mohammed lost interest in providing content. As the initial purpose of the research had been lost I decided to halt further meetings.

What are the implications for teachers working to support students’ effective WWW searching strategies?

I was confident that I had found a zone of proximal development (Dabbagh & Riddle, 1999) wherein I would be able to motivate the participants to use Google’s advance searching capabilities. I presumed that Alexandria and Mohammed would accept there were shortcomings in their information retrieval skills and would then wish to improve them. I was overly optimistic that I had struck upon an idea that could be developed into a co-constructive learning experience for the participants and me. As a
teacher I overlooked the importance of tuning into Alexandria and Mohammed’s passions.

If teachers are to support students in using effective WWW searching strategies they will need to allow time for students to immerse themselves in their topic of study. They will need to allow pupils time to experiment with the information retrieval tools available. Given that finding information is one of the mainstays of inquiry-based learning teachers need to be able to indicate to their pupils the wealth of information available on the WWW. By introducing pupils to the sheer quantity of information available the pupils may see the need to distill information.

Google’s simple functionality aids users who just want to enter a simple search query and is renowned for returning relevant hits with little searching expertise being required. It has become popularly accepted that by entering a word or phrase into Google’s basic search field the user will be furnished with the required information. With this acceptance of the power of a basic search it is difficult to expect either teachers or pupils to be motivated to investigate the advanced features of Google. Teachers and pupils need the opportunity to work out for themselves the strengths and weaknesses of both approaches. To fully engage teachers and pupils in this process they will need time to investigate the importance of research strategies and their place within their pedagogical practices. Teachers and pupils alike will have to grapple with how important an understanding of the functions of the tool is in relation to desired learning outcomes. I would argue that both teachers and pupils need to understand the social and technical mechanisms that impact upon information.
Alexandria and Mohammed are still developing their understanding of in-depth research. Notwithstanding the fact that they were gifted and talented pupils in an environment that supported their inquiries they were still Year 6 pupils coming to grips with the intricacies of synthesising knowledge.

To this point, neither participant had perfected their research skills. In fact whoever does? Just as with many adults Alexandria and Mohammed were content to accept the information proffered by a simple search on Google because it met their needs.

Both participants agreed that finding information on the WWW is important for inquiry-based learning. In fact, finding information on the WWW is a key component of Alexandria and Mohammed’s action plans for learning. The WWW is their first port-of-call when looking for information on their inquiry topics. Teachers are now faced with the challenge of embracing the WWW as an information source in conjunction with primary sources, people and text.

**Discussion and Conclusion**

As this case study progressed the prime focus shifted from the participants’ use of Google into a self assessment of the efficacy of my teaching methods. During this case study I struggled with how to match my desire to improve the participants’ searching strategies while respecting their desire for self-efficacy. There is little doubt that both participants were engaged during this case study. They were just seldom engaged in what I wanted. I found myself on more than one occasion reverting to a traditional instructional approach. I was comfortable with this approach out of habit and because of my experience as a nascent ICT learner. I remember being severely frustrated in my early attempts to master the functionality of some ICT applications as
the approach employed by some teachers was to encourage my self-directed 
exploration while being supported on a need-to-know basis as part of just-in-time 
learning (Reil, 1998). Albeit that the applications were open-ended I responded best to sequential learning and scaffolding. 

When teaching pupils how to use an ICT application I certainly do not wish to fetter their enthusiasm to independently explore an application’s capability. Unless a learner displays a particular proficiency I tend to adopt the approach that I am going to show pupils the basics of the application and then challenge them to use the application to their own ends. This does not have to equate to a set of boring sequential lessons because the basic functions of applications can be presented quickly and hopefully with some aplomb. Then the pupils can explore the application while engaging their own learning wherewithal by accessing support from help menus and others around them including myself.

Alexandria and Mohammed’s use of Google was interwoven with the depth to which they wanted to explore for information. I was not able to inspire them to change the searching method they felt comfortable with. I am left to ponder why the participants would want to change their research method?

It was tempting to adopt a “pragmatic view of truth” (Blaikie, 1993, p.213) during this case study, and to conclude that Alexandria and Mohammed’s inclination to engage in trial and error coupled with their tenacity and self-efficacy meant that they would ultimately learn how to use Google effectively. The reality is that because Alexandria and Mohammed neither understood nor employed the full potential of Google’s search capabilities they were unable to effectively search the WWW for information. I observed both participants employing ill-conceived search strategies which when
coupled with a lack of understanding of search engine functionalities lead to poor information gathering. These impediments left the participants unable to find relevant information in a systematic and time efficient manner. Instead of employing deep thinking search strategies they become all but mesmerised by the number of ‘hits’ they succeeded in attaining and as a result did not explore the depth and wealth of information available on the WWW. As a result Alexandria and Mohammed were learning that the web is a place for a quick fix of information and consequently the information that they found and presented lacked depth and integrity. They did however find the WWW a source of constant excitement and humour. Alexandria and Mohammed were often engaged in the information proffered amongst the wealth of hyperlinks.

Although it may take more time to work with learners who wish to constantly engage their self-efficacy Blacker and McKie (2003) conclude that;

...if one grants that, on the whole, education, as opposed to training, indoctrination, and the like, has more to do with revealing worlds of involvement than it does with closing them off (certainly in the long run), one may generate an imperative for educators to orient themselves toward technology such that the latter are allowed to reveal worlds in as open-ended manner as possible. (p.236)

The primary aim of my research is to “improve practice rather than produce knowledge” (Elliot, 1991, p.49). I found it to be true that Action Research “has the potential to lead not to the unlocking of complexity but to the elucidation of rigid preconceptions” (Brown & Jones, 2001, p.8). I certainly remained affixed to some of
my rigid preconceptions during the course of this case study. It has only been with the passing of time that I have been able to admit to myself that I need to accept the value of self-directed learning. I have also become aware of structural features of my school that inhibit this. What was reaffirmed for me during this case study is that teaching is a complex matrix of pedagogical and personal interactions. I need to accept that my preferred teaching style may not meaningfully engage my pupils.

Hock (2004) reminds us that “no single search engine covers everything” (p.69) and this makes understanding how information is stored and presented extremely important. Alexandria and Mohammed should not be relying or trusting Google. I now realise I need to redouble my efforts in inspiring pupils to access and synthesise information for “given the overwhelming amount of information that is accessible, effective use of the Web has less to do with learning how to surf the Web and more to do with learning how to search” (Klein, Yarnell & Glaubke, 2001, p.1). Ultimately successful searching lies with the user having “to perform the cognitive and meta-cognitive skills required to retrieve information from the WWW (Lazonder, 2000, p. 326). As the ICT facilitator at my school I am determined to help the pupils explore the capabilities of ICT because as Hock (2004) points out;

that there is no one right way or wrong way to search the Internet, there can be no list of definite steps to follow, or one specific strategy to follow, in preparing and performing every search. Rather it is useful to think in terms of a toolbox of strategies and to select whichever tool or combination of tools seems most appropriate for the search at hand.

(p.12)
I think it must be remembered that there are still effective ways to use tools and I see it as my responsibility as an educator to introduce pupils to the capability of learning tools. When Google is seen to be the appropriate tool it is my job to constantly re-examine how I can serve pupils needs, and not presume I know what their needs are. Imbuing pupils with the technical know-how will not in itself improve their searching techniques. Instead the desire to learn how to use Google’s advanced features will possibly only emerge once pupils experience a need to find more exacting information than they can currently access, synthesise and present. My challenge now is to work with my school community to ascertain our beliefs about ICT literacy under the broader umbrella of literacy. The drive for this will only come once stakeholders in the school community are aware of both the full power of information retrieval tools such as Google and how crucial it is to have the skills to attain, assess and present information.
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Definition of Terms

Just-In-Time Learning

Learning when you need it as you need. Learning delivered in separate modular pieces as the learner identifies a need for them. Criticised for its piecemeal approach because the learner becomes nothing more than a collector of bits of information with little idea of where the knowledge fits into a larger picture. Thus whoever provides the knowledge has the ability to separate knowledge form its various discourses. Conversely it is seen as a way of insure that learning is driven by the learner and they have the ability to create their own discourses.
(See Reil, 1998)

Co-construction

“Co-construction theories combine the two views of active constructive learner and the expert ‘tutor’ to explain how learning occurs collaboratively in the context of shared events and interests” (Cullen, 2001 p.54).

Scaffolding

Interrelated with the Zone of Proximal Development scaffolding allows the teacher/facilitator to assist the pupil by outlining task definition and providing direct instruction in sequence. This instruction is supported by equipment where necessary. Reflection on the progress of the task is an integral part of scaffolding. The teacher’s main aim in scaffolding is to support the pupil to learn how to learn independently.
(See Webb, n.d.)

Search Engine

Google, Excite, Lycos, AltaVista, Infoseek, and Yahoo are all search engines. They index millions of sites on the Web, so that Web surfers like you and me can easily find Web sites with the information we want. By creating indexes, or large databases of Web sites (based on titles, keywords, and the text in the pages), search engines can locate relevant Web sites when users enter search terms or phrases.
(http://www.sharpened.net)

World Wide Web (WWW)

It is important to know that this is not a synonym for the Internet. The World Wide Web, or just “the Web,” as ordinary people call it, is a subset of the Internet. The Web consists of pages that can be accessed using a Web browser.
(http://www.sharpened.net)

Zone of Proximal Development

Emanating from the work of Vygotsky the Zone of Proximal Development can be defined as “the distance between what a person can do alone and the level to which he or she can move with the assistance of an expert” (Cullen, 2001, p. 53).
Appendix B

1 August 2004

Principal
School
Road
CHRISTCHURCH

Dear Principal,

As we have previously discussed, I would like to use Year 4-6 students from the Inquiry Learning class in your school as participants in a research project. This project is a requirement of a Masters of Teaching and Learning at the Christchurch College of Education, which I am currently undertaking. I will be working under the supervision of Missy Morton, a senior lecturer at the Christchurch College of Education and Sandra Williamson-Leadley a Research Officer for Ultralab South.

My project is called ‘Pupils use of a search engine as a tool to access information from the World Wide Web as part of an Inquiry Learning Process’. The aim of this research is to evaluate the effectiveness of searching the WWW with the hope, of encouraging pupils to explore their strategies for accessing information.

Students will be asked to participate in a series of eight one hour lessons which should hopefully dovetail into their respective inquiries.

No findings that could identify any individual participant will be published. Since data must be stored for at least five years according to college regulations, participants will be asked to invent a code name. All information will be collected and processed by me and pupils will not be able to be identified.

Participation in the research project is, of course, entirely voluntary. Students who do not participate will not be penalised or disadvantaged in any way.

Students who agree to participate can withdraw at any time by writing to myself. They may also choose not to answer some of my questions.

The Christchurch College of Education Ethics Committee has reviewed and approved this study.

Complaints Procedure
The College requires that all participants be informed that if they have any complaint concerning the manner in which a research project is conducted, it may be given to the researcher, or, if an independent person is preferred, to:

The Chair
Ethical Clearance Committee
Christchurch College of Education
P O Box 31-065
Christchurch
Phone: (03) 348 2059

Please contact me if you have any other queries or concerns about the project or would like to be informed of the aggregate research finding. I can be reached by phone on: (03) 358 3542 or by email: allanrobertson@xtra.co.nz

Thank you.

(Signature)

Allan Robertson
Appendix C

1 August 2004

Teacher
Inquiry Learning Class
School
Road
CHRISTCHURCH

Dear Teacher,

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Christchurch
Phone: (03) 348 2059

Please contact me if you have any other queries or concerns about the project or would like to be informed of the aggregate research finding. I can be reached by phone on: (03) 358 3542 or by email: allanrobertson@xtra.co.nz

Thank you.

(Signature)

Allan Robertson
Appendix D

CHRISTCHURCH COLLEGE OF EDUCATION
MASTER OF TEACHING AND LEARNING

Information Sheet for Child

Kia ora

My name is Allan Robertson and I am currently on study leave from School.

This year I am a student at the Christchurch College of Education and it is a lot of fun and a lot of hard work.

I would like to invite you to be part of my RESEARCH PROJECT for TL802.

This project will involve us working together as part of a group in your Inquiry class to discover if we can all learn how to search for information on the World Wide Web more effectively. I will spend some time observing how you currently search for information on the WWW. After that we will work together to see if we can come up with some working guidelines as to how to access information effectively.

I will be working in the class for eight one hour sessions. The project will involve one hour per week during school time, for eight weeks. There will be two children taking part in the project. You have the right to pull out at anytime.

What I find out during the project will become part of my report and will be seen by the lecturers marking my assignment. You will not be identified, as I will use a fictional name on all the information I collect about you and in the report. The name of the school will not be used and will be identified as ‘the school’. Any information about you and your work that I collect will be kept in a locked cupboard at my home and will be handed in with the report to my project supervisors at the end of the project. Only your parent/caregiver(s), my supervisors, plus you and me will be able to look at the information about you.

The project is being undertaken by me, under the supervision of Missy Morton who can be contacted at the Christchurch College of Education on ph.348-2059 and Sandra Williamson-Leadley who can be contacted at Ultralab South ph. 379-6627. They will be pleased to discuss any concerns you may have about your participation in the project. If you wish to ask me any questions about the project you can email me at allanrobertson@xtra.co.nz. I will happily come to your class if you wish to answer in person.

The project has been given ethical clearance by the Christchurch College of Education.

Cheers

Allan Robertson
Appendix E

1 August 2004

Information for Parents/Guardian of Participants

My name is Allan Robertson. I am working towards a Masters of Teaching and Learning at the Christchurch College of Education. As part of my degree I am required to undertake a research project. I will be working under the supervision of Missy Morton a senior lecturer at the Christchurch College of Education and Sandra Williamson-Leadley a Research Officer for Ultradab South.

My project is called: Pupils use of a search engine as a tool to access information from the World Wide Web as part of an Inquiry Learning Process.

What is the aim of the research project?
The aim of this research is to evaluate the effectiveness of pupils immersed in the Inquiry Learning Process in using a search engine to access information from the World Wide Web.

What types of participants are being sought?
Students in a Year 4-6 Inquiry Based Learning Class.

What will participants be asked to do?
Students will be asked to participate in a series of eight lessons that will on occasion be video recorded, to answer interview questions from the researcher and allow the history of their web browser to be scrutinised.

How much time is involved?
The eight lessons will be of one hour’s duration.

How will confidentiality and anonymity be addressed?
No findings that could identify any individual participant will be published. Since data must be stored for at least five years according to college regulations, your child will be asked to invent a code name which will be used on any information regarding the actions, ideas and opinions of your child.

Are all students required to participate?
No, participation is voluntary.
What happens to students who choose not to participate?
Children who do not participate will not be penalised or disadvantaged in any way.

If I agree to let my child take part, can I change my mind and withdraw my child from the study?
If you agree to have your child take part, you can withdraw at any time by writing to the teacher who is undertaking the research using your child's code name. Your child may also choose not to answer some of the questions.

The Christchurch College of Education Ethics Committee has reviewed and approved this study.

Complaints Procedure
The College requires that all participants be informed that if they have any complaint concerning the manner in which a research project is conducted, it may be given to the researcher, or, if an independent person is preferred, to:

The Chair
Ethical Clearance Committee
Christchurch College of Education
P O Box 31-065
Christchurch
Phone: (03) 348 2059

Please contact me if you have any other queries or concerns about the project or would like to be informed of the aggregate research finding. I can be reached by phone on: (03) 358 3542 or by email: allanrobertson@xtra.co.nz

Thank you.

(Signature)

Allan Robertson
Appendix F

Declaration of Consent

Participant

I consent to participate in the project, *Pupils use of a search engine as a tool to access information from the World Wide Web as part of an Inquiry Learning Process.*

I have understood the information provided to me about the research project and what will be required of me if I participate in the project.

I understand that the information I provide to the researcher will be treated as confidential and that no findings that could identify either me or my school will be published.

I understand that my participation in the project is voluntary and that I may withdraw from the project at any time without incurring any penalty.

If you have any questions, you can ask your parent or guardian to contact me on the number on their information sheet, or you can ask me about it at any time at school. Because it is important that no one is forced to take part in research when they don't want to, no student can take part in this research unless both they and their parent or guardian has said they want this to happen.

*If you do not want to do this – do not sign your name!*

Name: ____________________________

Signature: ____________________________ Date: ____________

Parent/Guardian

I give permission for ____________________________ to participate in the project; *Pupils use of a search engine as a tool to access information from the World Wide Web as part of an Inquiry Learning Process.*

I have read and understood the information provided to me concerning the research project and what will be required of participants.

I am satisfied that ____________________________ understands what will be required of participants in the project.

I understand that the information participants provide to the researcher will be treated as confidential and that no findings that could identify either them or their school will be published.

I understand that participation in the project is voluntary and that either I or the participant may choose to withdraw from the project at any time without incurring any penalty.

Name: ____________________________

Signature: ____________________________ Date: ____________

TL802 Research Report Allan Robertson