THE SALIENCE OF CONTEXTUAL KNOWLEDGE AND INTERPERSONAL INFLUENCES IN YOUTHS' SEARCH AND EVALUATION OF ONLINE INFORMATION: IMPLICATIONS FOR MEDIA LITERACY

MOHAMED ELMIE BIN NEKMAT

(B. Soc. Sci. (Hons), NUS)

A THESIS SUBMITTED FOR THE DEGREE OF MASTER OF ARTS

COMMUNICATIONS AND NEW MEDIA PROGRAMME

NATIONAL UNIVERSITY OF SINGAPORE

2010

0

Acknowledgements

Contents

Summary

The multimodal online environment coupled with the democratic nature of online information has brought about new challenges to Internet users. Experts have proposed various regulatory measures and evaluative criteria to promote safe and effective Internet use amongst the young. Unfortunately, these measures showed a lack of understanding of the importance of cognitive and contextual factors affecting user's search and evaluation of online information. This thesis thus seeks to investigate the salience of the contextual factors such as personal knowledge and interpersonal influences affecting youths' search and evaluation of online information. Framed according to the cognitive-psychological theory for media literacy, the cognitive knowledge structures determining one's ability in coping with media information are broadly categorized into: i) Knowledge of media - a*) media content, b) media effects, c) media industries* , and ii) Contextual knowledge – *a) real world, b) the self*. Other contextual influences affecting one's search and evaluation of online information such as personal knowledge, friends, teachers and family members were also explored.

Data were collected from 47 Singaporean undergraduates between 18 and 25 years of age through two main methods: 1) verbal protocols from recordings of participants' 'thinking aloud' process during problem-solving, and 2) pre and post-task survey questionnaires. Participants' online 'movements' were also recorded using an on-screen recording software. Findings revealed that Singaporean undergraduates are prone to utilize more objective criteria such as knowledge of media as opposed to contextual knowledge structures. And interestingly, teachers who are regarded as authority on knowledge were found to be least influential in users' search and evaluation of online information. The implications of the findings are then discussed with regards to their impact on media literacy research and education.

Background

In today's information society, it is humanly impossible to keep up with the amount of information created and then distributed via the multitude of media forms. On top of the increasing reliance on information and communication technologies, such as the Internet and the World Wide Web, the infinite amount of information which is limitlessly disseminated presents both promises and pitfalls (Quinn, 2006). In the midst of this deluge of information, one issue is growing in salience – that the consequences of basing decisions on incorrect information can be serious and possibly life-changing for individuals. This situation is exacerbated when it is getting increasingly difficult to know exactly how information is produced and the source from which it originates. To complicate matters, the doubts surrounding the veracity of information may inevitably result in further reliance on the Internet for information. This leads to the increasing importance of users' skills, knowledge and experience in order to process and consume information from the Internet as safely and effectively as possible. It is thus pertinent for us to explore the capabilities of the young in light of this increasingly demanding situation.

The optimism for information and communication technologies (ICTs) to facilitate individual countries' economic, social and cultural development is arguably dampened by the looming digital divide in terms of access to these technologies. However, scholars argue that the conventional understanding of the digital divide as an issue of technology access by the 'haves' and 'have-nots' (van Dijk, 2006; Lynch, 2002; Selwyn, 2004), fails to take into account contextual patterns of digital inequality such as the level of users' knowledge (Attewell, 2001; Ono & Zavodny, 2007; Rao, 2005). Efforts to ameliorate the digital divide should thus be focused not only on reducing access gaps, but more pertinently on knowledge divides. Particularly in Singapore's context, the high Internet usage rate amongst the young, with 96% of 15 to 24 year olds having accessed the Internet in 2007

(Infocomm Development Authority [IDA], June 2008), make it both important and timely to focus research on the quality and effectiveness of Internet usage.

To this end, this thesis seeks to explore the pertinent factors which affect the effectiveness of the search and evaluation of online information amongst Singaporean youths, particularly their inherent levels and types of knowledge utilized during this activity. Beginning with discussions highlighting the current conditions contributing to the pertinence of research on this area, the thesis will then present the findings from relevant studies done in this area and highlight the existing inadequacies which need to be examined. This is followed by a review of the relevant studies that have approached this problem from the perspectives of media literacy. Following this, the thesis discusses the theoretical framework utilized for this study, which is the cognitive-psychological framework for media literacy, and explains in-depth the methodology of verbal think-aloud protocols and survey questionnaires used to gather data. The findings will then be presented according to the main factors espoused in the framework, and the ensuing discussions will illuminate the significance and implications of the findings for possible research directions and media literacy education and policies.

1.1.   Threat of second-level digital divide

In Singapore, household access to computers and broadband access have risen steadily to 79 and 77 percent, respectively (IDA, 2008). However, these figures may understate the actual rate of accessibility and usage amongst youths aged between 15 to 24 years old. Of this group, more than 96 percent have reportedly used the computer and the Internet in 2007 (IDA, 2008). This not only illustrates the fact that the young in Singapore have gone beyond the issue of accessibility, but more importantly shifts our attention to the quality and effectiveness in usage patterns of the "tech-savvy"

generation as their lives are increasingly embedded with information and communication technologies. As Cheong (2007) argues, this high penetration rate, comparable to the proportion of Internet users in the USA , Australia, the UK and many countries in the European Union (Internet World Statistics, 2008), makes Singapore a highly relevant context in which to examine the variations in skills and competencies of Internet usage associated with post-adoption digital divides.

In Singapore, the digital divide has to be understood beyond the conventional notion of the 'haves' and 'have-nots' (van Dijk, 2006; Lynch, 2002; Selwyn, 2004). It points towards the importance of understanding the persistent patterns of digital inequality based largely on differing level of skills and knowledge (Attewell, 2001; Ono & Zavodny, 2007; Rao, 2005). In fact, the age-old problem of differential quality of information consumption and usage of information technology caused by varying knowledge levels has persistently underlain the issue of the digital divide (Bonfadelli, 2002; Jackson, Ervin, Gardner, & Schmitt, 2001). As posited by Kling (2000), basing the digital divide on computer ownership and indicators such as time spent online may be inaccurate in contexts where accessibility rates are high, as people possessing different skills and motivations utilize the Internet in varied ways. In the same vein DiMaggio, Hargittai, Celeste, & Shafer (2004), stress that future research should focus on the inequalities in the availability and dependence of social support, autonomy of use, and variation in users' knowledge.

Conceptualized as the second-level digital divide, the widening chasm between highly-effective Internet users and their relatively less effective counterparts is very pertinent in this information age (Hargittai, 2002). A recent study done on Singaporean youths, which found significant differences in users' levels of Internet skills and Internet usage patterns support the existence of this secondary digital divide (Cheong, 2008). Other studies done in the Asian context have also found that in countries with high IT adoption rates, such as Japan, South Korea and

7

Singapore, variations in quality of use exist and threaten to widen the new digital divide chasm (Ono, 2005). In 2002, despite the intensive promotion of ICTs by the government in South Korea, nearly half of the population were found to have low digital skills and about one-third cited complexity and difficulty as a reason for not using a computer (Park, 2002). In Singapore, Cheong (2008) found that contrary to the popular perception of youths as a homogenous cohort of technically-savvy experts, considerable disparities exist in youths' Internet expertise and problem-solving behaviours. The same study also found that youths experience a fair number of problems in their daily Internet use, and that the main solutions to the problems were interpersonal resources and expertise from their family members and friends (Cheong, 2008). The findings above illustrate the existence of disparities in skills and knowledge with regards to youths' Internet use.

The complexities involved in understanding the actual reasons for differentials in usage effectiveness amongst users require us to look deeper into the phenomenon. In this regard, Van Dijk (2006) prompts for investigations to narrow the existing research gaps in understanding the pertinence of personal knowledge relating to individuals' motivations, skills and usage of ICTs. There is currently a clear lack of understanding of differences in individuals' knowledge and usage patterns when looking at the digital divide (van Dijk, 2006). Exploring users' patterns of knowledge is thus an important key in understanding this phenomenon and warrants further investigation (Hargittai & Hinnant, 2008). This thesis thus aims to further our understanding of this phenomenon in the context of Singaporean youths by exploring the knowledge levels and behavioural patterns in Singaporean youths' seeking and evaluation of online information. This thesis frames these aspects through the perspective of media literacy. To begin, it is useful to look at some salient patterns in youths' Internet use and their motivations.

1.2   Online trends and youths' involvement

The Internet is increasingly salient in young people's lives, permeating the different domains of their lives – self, family, and real and virtual communities (Mcmillan & Morrison, 2006). As background, it will be useful to highlight and compare Internet use by youths from different contexts and their motivations for using it. An early study on the patterns of Internet use amongst the young in the United States found that the most popular activities on the Internet among were visiting websites, sending and receiving e-mails, and for academic purposes (Odell, Korgen, Schumacher, & Delucchi, 2000). In order of popularity, the study also found that most children go online to participate in chat rooms and play games with other children. In the UK, a wide-scale research project sampling 1,511 children aged between 9 and 19 years, found similar patterns of Internet use to that of the US. Called the UK Children Go Online Project (UKCGO), the wide-scaled study found that children who used the Internet daily or weekly utilized the Internet to do work for school. The largest percentage, 94%, used it to get information on other things such as to look for information on careers and further education, as well as information on products and services. The breakdown for other popular activities found in the study is: 72% for sending and receiving emails, 70% for playing games online, 55% for sending and receiving instant messages, 45% for downloading music, and 21% to use chat rooms (Livingstone & Bober, 2004a).

In Singapore, a survey conducted in 2007 found youths as the heaviest Internet user group, with 96% of youths between 15 to 24 years of age accessing the Internet at least once a week,. The three most popular groups of activities were communicating (83%), leisure activities (57%), and information seeking (51%). Sending or receiving emails, instant messaging and participating in social networks are the three most popular forms of communications over the Internet, comprising 62%, 45% and 24% of youths, respectively. The two most popular forms of leisure activity on the Internet

9

are downloading and playing online music (28%) and playing online games (25%). Of youths who use the Internet for information-seeking, 34% of them also like to engage in general web browsing. The survey also found that of the 4% of youths not using the Internet, 20% of them cited lack of knowledge and skills as main impediments (IDA, 2008). Singaporean youths are also popularly utilizing blogs and online social networking sites, such as Friendster and Facebook, as forms of communication (IDA, 2008). Cumulatively, the findings above highlight the myriad of Internet activities which youths engage in. Internet usage is thus very pervasive in the everyday lives of today's young. This thesis thus aims to focus on an aspect of these online activities, information seeking, which is salient amongst youths across different countries, especially Singaporean youths.

Scholars have sought to understand the uses and gratifications of youths engaging in online information-seeking. These include informational and social uses (Eighmey & McCord, 1998), entertainment, personal utility, and interpersonal integration (Ferguson & Perse, 2000), as well as to attain knowledge and learning (Cho, de Zuniga, Rojas, & Shah, 2003). Engaging in these activities unfortunately come with challenges. The following section will highlight the main difficulties encountered in seeking reliable information online. These difficulties can be attributed to two key characteristics of online information - the democratic nature of online information and the shifts in the presentation and representation of information.

1.3 The democratic nature of online information

The Internet not only allows users to access information, but also to create and disseminate their own information. This is characterized by the proliferation of Web 2.0[1], which leverages the participatory nature of the web. Web 2.0 heralded new frontiers in the online information-seeking

---

[1] The term was coined to describe the changes in the fundamental workings of the Internet and the content of World Wide Web. These changes are premised around the key principle which holds that the World Wide Web now serves primarily as a platform where users add value by producing data and information on top of existing ones (O'Reilly, 2005). Web 2.0

experience. Changes in users' role of 'publishers' to 'participants' has also led to the transformation of 'personal websites' into 'blogs' and 'Britannica Online' to 'Wikipedia' (O'Reilly, 2005, p. 2). Self-publishing is now "possible for anyone with a computer and modem, requiring no editing or checking for factual accuracy" (Mintz, 2002, p. xvii). Arguably, these transformations contribute to an aura of nonchalance with regards to the seriousness of information creation and dissemination. Coupled with the open nature of the Internet and the 'lack of a gatekeeper of information quality' (Britt & Gabrys, 2001, p. 74), concerns are mounting about site credibility and information reliability. With regard to the structure of the Internet, Ciolek (1996) pointed out that a major problem affecting the assessment of credibility stems from the uncoordinated daily functioning of the Web. The Internet and its volume of information overwhelm users with "un-attributed, undated, and un-annotated" information (p. 3).

To further exacerbate this situation, under the guise of democratic participation and empowerment, commercially-motivated and manipulative information proliferate online (Fabos, 2006). While some sites proudly proclaim their points of view, others do not, or do so in subtle ways. This makes it more problematic for individuals to seek unbiased sources (Hope, 2007). This problem takes on another dimension on the Internet. Readers and information seekers must also be able to set apart the author of specific information from the website it is located in. For example, a poet may have the intention to share his life experiences for others to indulge in nostalgic experiences and emotions. A reader may then find his poem in a website requesting donations. In this case, the motives and the points of view between the author and the website are totally distinct. Thus, information seekers face not only problems in seeking impartial and objective information sources, but also in identifying the source of any bias.

Information on websites can also be edited without proper and adequate notifications. Even websites themselves can come and go without notice. Not only do these situations create problems for students citing web information as references, it also has the potential to confuse average users seeking to verify information which they had obtained earlier. The ease of altering information in websites is worsened by the increasing concern over incredulous images found on the Web. Widely available digital image-capturing devices and inexpensive software facilitate the proliferation of both still and moving images on the Web. As observed by Coiro (2003), whether for fun or fraud, the practice of electronically altering images that appear on websites is fast gaining popularity. The accuracy of online information is also adversely affected by the fact that many websites are out of date. Even in cases where the information is factually sound, the fact that the information is outdated undermines its relevancy. To counter this, scholars have proposed the corroboration or verification with other sources of information to bring such shortcomings to light (Britt & Gabrys, 2001; Meola, 2004). But comparing sources of information only goes as far as the amount of information one is able to process. Obviously, the limitless amount of information begs the question - when is enough, enough? On the other hand, in a study on students' online information-seeking behaviour done by Metzger, Flanagin, & Zwarun (2003), it was found that only a few web users actually took the time to compare a site's information with another source. Either way, the cases above highlight a serious predicament in attempting to ascertain the reliability of information obtained online.

1.4. Shifts in presentation and representation of information online

On the Internet, there are few rules and accepted standards for the presentation of online information. This inconsistency of formats, styles, page sizes and layout are found to easily confuse users (Meola, 2004). This problem is confounded by the nature of the Internet interface, where the "screen", which concurrently provides text, images, sound, and videos, replaces the more traditional

uni-modal "page" as the dominant site of representation and communication (Kress, 2003). One's online information-seeking experience is further complicated by having to navigate hyperlinks, and the multiple "windows" of websites and information. This requires the reader to switch from the much simpler "linear logic of sequence" when reading texts, to one "governed by the logic of space, and simultaneity" in 'navigating' between texts and images at the same time (Kress, 2003, p. 2). Inadvertently, to reduce the mental load required to seek online information, users may engage in the 'automatic processing of information' by 'mindlessly following habits of avoiding messages' and attending only to messages which catch their attention (Potter, 2004, p. 9).

The presentation of online information also challenges users' meaning-making process. The proliferation of multimodal representation of information in the World Wide Web via written texts, images, sounds and videos, not only shifts the process in how meanings are created and understood (Jewitt & Kress, 2003; Lankshear & Knobel, 2003), but may also potentially impose different perceptions of information reliability. For example, in comparing information presented through written text, with images and videos depicting a scene of damages caused by a war, one would be inclined to perceive and attribute different levels of representational accuracy based on the different modes, for example images as more objective than written accounts and so forth. The different modes, for example an image as compared to plain texts, may also infuse an emotional element into one's rational evaluation process.

The various factors discussed above are in no way an exhaustive list of all the factors affecting the credibility of information online. Nevertheless, they serve as a useful background to illustrate the growing challenges faced in seeking information online. In light of this environment, this thesis thus aims to understand the various factors such as personal knowledge levels and personal knowledge styles which affect youths' seeking and evaluating of online information. This thesis is also

motivated by a pressing issue associated with youths' effective usage of the Internet, which is the existing inadequacy of current practices and approaches to promote safe and effective Internet use. The following section will discuss on existing literature highlighting these inadequacies.

Literature review

Extant studies have looked at the quality of online information-seeking and evaluation amongst different segments of users. This section will review relevant literature focusing on children and youths, according to the main problems facing online information-seekers, namely the inadequacies of online content regulation approaches and the inadequacy of current evaluation criteria. This will be followed by review of media literacy approaches and studies done to alleviate this problem.

2.1   Inadequacy of online content regulation approaches

Internet content is beyond governance. Nevertheless, social concerns about the harmful effects on the young of illegal and incredulous content have prompted various regulatory measures. In this regard, self-regulation is purported as being more meaningful and effective than relegating it to the hands of government authorities and legislative interventions (Price & Verhulst, 2005). Here, socially directed self-regulation involves the Internet industry and its citizenry in protecting people, especially minors, from exposure to inappropriate content such as violent or pornographic material, and grooming for illegal and sexual activities. Popular mechanisms include: 1) self-rating and filtering technologies – allowing users to select the kinds of content that can be accessed or not through specific keywords; 2) standards for codes of ethics and conduct – requiring compliance by Internet content and service providers to codes based on community concerns and accountability systems; 3) hotlines – requiring end users to notify authorities or service providers -- and 4) takedown procedures to remove reported content (Machill & Waltermann, 1999; Price & Verhulst, 2005).

However, the efficiency of these self-regulatory measures leaves much to be desired and their sustainability questionable. In the area of children's exposure to inappropriate content, for example, children's experience of the Internet remains unpredictable, and it is almost impossible for parents and authorities alike to establish the definitional standards of harmful content (Selfregulation.info). Filtering Internet content as such can be deemed as preventing children from obtaining otherwise-useful content from the Internet. The effectiveness of filters is also challenged when the highly-skilled young are able to circumvent client-based filtering, software whilst making it appear that the software is still operational (Higginbottom & Packham, 2007). And for the less-skilled, the information for circumventing filters might well be accessible from the Internet itself. Relying solely on the industry to take regulatory initiatives is naive, as the industry constantly requires external pressures and interventions in the form of benefits and repercussions from governing bodies (Price & Verhulst, 2005, p.13). These are, however, only some of the factors affecting the effectiveness and sustainability of self-regulating practices. More often than not, it is more relevant to children who are not able or mature enough to think rationally. From which a question beckons; which point would a child be considered capable of thinking rationally?

As scholars have argued, no self-regulatory mechanism can work without an education and awareness campaign (Machill & Waltermann, 1999). In Singapore, a panel of industry experts, scholars and policy makers was commissioned to look into the future directions of new media regulations. Called the Advisory Council on the Impact of New Media on Society (AIMS) (2008), the panel found that 'filters, restrictive systems and laws are only stopgap solutions' (90) and are only good at addressing short-term problems. Instead, the key lies in education. Further, education should be looked beyond it being just being mechanism to raise awareness and instead regard it as a means to heighten autonomy in users, so that they can place information into different contexts and assess the benefits or harmfulness of online content based on their knowledge of social norms and

rules. This participatory aspect involves being actively reflexive in the production and dissemination of media content, as well as being reflective in the consumption of media content. Therefore, information consumers need to be inculcated with the competencies and skills to critically evaluate online information based on their personal values, knowledge of social norms and law. Livingstone and Bober (2004) argue that rather than controlling Internet use, increasing children's online skills results in enhanced safety and increased opportunities. Fostering critical net-literacy skills in the young is a crucial complement to the existing regulatory approaches for enhancing the quality of online information-seeking.

2.2   Inadequacy of existing evaluation criteria to assess credibility of information online

Researchers, educators and policymakers have begun to recognize and promulgate criteria for evaluating the credibility of websites. Different sets of criteria have been suggested for different segments of society based on the assumption that people possess different goals for information seeking. Also, because websites cater to varied interests, a wide range of criteria are recommended to achieve optimal evaluation of information credibility for websites specializing in topics such as: *education* (Coiro, 2003; Metzger et al., 2003; Murray, Hourigan, Jeanneau, & Chappell, 2005), *health* (Cotten & Gupta, 2004; Eysenbach & Diepgen, 1998; Eysenbach & Köhler, 2002), *politics* (Johnson & Kaye, 2000; Kiousis, 2001), and *business* (Chae, J. Kim, H. Kim, & Ryu, 2002; Lisa & Gary, 2003). Expounded by information scholars in various fields, the different criteria includes: *Accuracy* - Is the information correct?, *Authority or Authorship* - Who wrote it? What are their credentials?, *Objectivity* - Are the opinions or information expressed biased?, *Currency* - When was the information written, posted and/or last updated?, and *Scope or Coverage* - Is the information complete? Are there functioning links to other relevant sources? (Hahn, 1997; Gardner, Benham, & Newell, 1999; Lynch, Vernon, & Smith, 2001; Stapleton, 2005).

While these criteria are important for evaluating information on the Internet, researchers and educators really need to consider that youths, typically students, put enough evaluative effort into their online information searches only if they see it as relevant to their goals (K. S. Kim & Allen, 2002). Otherwise, they have been found to rarely ask enough questions about the sites they are viewing as potential source material (Grimes & Boening, 2001). Kress (2000) further highlighted the inadequacy of these lists of criteria. He posits that in the multimodal hypertext online environment, what is required is for users to critically understand and assess the 'semiotic, communicational, and meaningful aspect of objects' (p. 191). Looking at the representation of online information as 'designs of meaning', scholars echo this approach and stress the importance of comparing and contrasting the different cultural contexts and purposes behind the representation of information online (Cazden, 2000; Kalantzis & Cope, 2000). Termed as 'critical framing', this approach requires one to critically evaluate information in relation to its context by asking two questions: 1) How do the meanings fit into the larger world of meaning, and 2) whose interests are the meanings skewed to serve? (Kalantzis & Cope, 2000, p. 247) Consistent also with the earlier discussion on the need for application of one's contextual knowledge, 'critical framing' requires the ability to apply this knowledge in order to effectively 'transfer the meanings inferred from the designs of information and putting these to work in other contexts or cultural sites' (Kalantzis & Cope, 2000, p. 248).

In short, current practices of evaluating online information are increasingly challenged. And although these criteria serve as a useful list on which to base one's assessment of website credibility, on their own these lists are inadequate. As argued by Fabos (2008), these evaluation strategies serve to create "credibility aesthetics", which merely promote validity guidelines and '[project] an aura of believability' (p. 858). What is increasingly required is to understand the complex perspectives of the critical evaluation of online information as a culturally informed and contextualised practice. Further to this, data from studies on students' web searching behaviour are collected mostly through surveys,

which Thomson (2003) argued are merely "a useful starting point, but are not adequate to judge the quality of their online search skills and ability to select appropriate references" (p. 266).

Therefore, in today's multimedia environment, the autonomy afforded by the Internet and other new media, which allow youths to not only consume but also produce and disseminate information, requires more 'motivated and skilled individuals, displaying a well-resourced socio-cultural knowledge' in their engagement with the Internet (Livingstone, 2007, p. 501). The ability to access and understand information online has shifted scholars' focus beyond the acquisition of skills to understanding motivations and the influence of personal and social contexts in Internet use (Livingstone, 2007; Warschauer, 2003). There is thus a need for research to understand youths' application of contextual knowledge and their personal knowledge styles during their seeking and evaluating online information.

This thesis thus seeks to qualitatively explore this dimension using media literacy approaches in order to achieve a better understanding of youths' search and evaluation of online information. The following discussions highlight the relevant findings from prior research on media literacy. Beginning with an overview of the various approaches to media literacy research, the discussions will then highlight findings from relevant research looking at literacy skills related to effectively seek and evaluate information from the Internet, namely critical media literacy, computer literacy, and information literacy.

2.3 Different approaches to media literacy

In its purest form, the term literacy defines the "possession of multiple tools and the ability to use them advantageously to cope in society" (Martin, 2006, p. 7). Scholars argue that in order to adapt to the demands of today's information society, the research emphasis should shift from skills

to knowledge so that citizens can negotiate the complexities today's environment (Lemke, 2002; Leu, Kinzer, Coiro, & Cammack, 2004). Termed as media literacy and described as "the ability to access, analyze, evaluate and create messages in a variety of forms" (Aufderheide, 1993, pp.2), the importance of media literacy research has been highlighted by the growing popularity and ubiquity of the Internet.

The fundamental objective of the movement for media literacy is developing users' critical autonomy in relationship to the various media forms (Aufderheide, 2001). Shifting the focus beyond accessibility, the central notion has turned to the quality of use, where the divide is between "those for whom the Internet is an increasingly rich, diverse, engaging and stimulating resource of growing importance, and those for whom it remains narrow, un-engaging if occasionally a useful resource of rather less significance" (S. Livingstone & Bober, 2004b, pp. 5). The preceding quote highlights the importance of individual competencies in dealing with information and the media as opposed to the possession and accessibility of media apparatuses. Further explained by Stites (1998), the hard questions have less to do with the quantity and availability of technology than with the quality and effectiveness of the learning and use of technology. Technologies such as the Internet which require newer forms of skills and knowledge have further complicated the notion of what it means to be media literate now.

In today's information age, various scholars and policy makers have used different terms to describe various sets of Internet-related literacies (Markauskaite, 2006; Martin, 2006). The many terms contributing to this "large complex patchwork of ideas" (Potter, 2004, p.34)   include *technological literacy* (Bundy, 2004; International Technology Education Association , 1996; Roblyer, 2000), *information literacy* (Association of College and Research Libraries , 2000; Town, 2000), *digital literacy* (Eshet, 2002; Martin, 2006; Søby, 2003), *computer literacy* (American National Research

20

Council Committee on Information Technology Literacy , 1999; Williams, 2003), *visual literacy* (International Visual Literacy Association, 2006; Kress, 2003), *multiliteracies* (Cope & Kalantzis, 2000; Leu et al., 2004), and *new literacies* (Kellner, 2002; Lankshear & Knobel, 2007). While each of these literacies refers to different sets of capabilities when dealing with different forms of media (Bawden, 2001; Christ & W. J. Potter, 1998), they essentially encapsulate the various sets of skills and capabilities required to be literate in Internet use. Potter (2004) further suggested that "different writers are emphasizing different parts of a complex phenomenon by presenting something unique to extend beyond the commonality" (p. 32). A commonality between these three literacies is that they require strategic knowledge so that users can actively interpret and negotiate the meaning of the messages encountered via various forms of media. Also, the utilization of this knowledge falls under the ambit of critical thinking, which requires one to be able to understand, apply the relevant knowledge and experiences, and critique media messages (Buckingham, 2003; J. Potter, 2005).

This thesis frames itself according to the perspectives of media literacy, more specifically the cognitive-psychological framework for media literacy (explained in the section on research framework), which considers contextual and personal knowledge utilized by users seeking and critically evaluating media messages. Noting further the relevance of the other forms of Internet-related literacies identified above, the following section discusses the relevant findings from studies done in different domains of literacies, particularly critical media literacy and computer literacy. This is also due to the trend of academic research into the concatenation of competences and knowledge required to grapple with today's evolving information and communication technologies, a concatenation increasingly framed as "literacies" (Livingstone, van Couvering, & Thumin, 2008). The following discussions highlight the relevant findings from extant research on critical media literacy.

2.3.1. Critical media literacy

Recently, scholars have been calling for the need for users to possess critical knowledge of the media industry and for recognition of the interests at stake as the new direction for media literacy. These scholars argue that those who own critical thinking abilities are able to analyze, interpret, evaluate, explain, and self-regulate during exposure to media information (P. A. Facione, Sanchez, N. C. Facione, & Gainen, 1995). This definition of critical thinking is thus analogous to the fundamentals of literacies in media. In other words, critical thinking is essentially the central tenet of the various forms of media literacies. Worryingly though, studies done on critical thinking with regards to media indicated that children and students may not perceive critical thinking as an important and useful skill and therefore do not recognize its value (Jonassen, Carr, & Yueh, 1998; Ruminski & Hanks, 1995). The inculcation of critical skills in analyzing and evaluating content is also essential in online media (Leu, 2002; Livingstone, 2002; Perkel, 2008). However, this issue is difficult to tackle when information consumers do not know the owners of websites, are ignorant of the motives behind the websites, and worse, have not thought about this question at all when they encounter the Internet environment (Livingstone & Bober, 2004b; K. Montgomery & Pasnik, 1996; Turow, 2003).

Critical media literacy education and research is approached differently in different countries. In developing countries, it is typically focused on equal access to opportunities and empowerment, vesting youths with the requisite skills to make the most of available computer and technology resources (Asthana, 2006; Kincade & Macy, 2003). These skills are fostered through participatory activities by youths at the grassroots level and were found to foster the development of Internet literacy amongst the young (Asthana, 2006; Facer & Furlong, 2001; Hill, 2003). By providing youths access to digital media and production opportunities, critical media literacy is fostered through the

understanding of how information is created and disseminated through the media. Children are then also able to understand the influence of bias and the different angles of information-creation through first-hand involvement.

In Australia, media literacy education takes an approach similar to that of developing nations. Like the empowering notions for critical media literacy in developing nations, the approach begins from the position that 'critical' literacy education would have to go beyond individual skill acquisition to engaging students in the "analysis and reconstruction of social fields and power relations" (Luke, 2000, p. 4). This approach to media literacy has been argued to take "a different pathway from North America or for that matter from Singapore" (Luke, 2000, p. 4). While critical media literacy in Australia's context of empowerment serves to *prepare* youths, Singapore on the other hand is focused on a protectionist stance (Buckingham, 2003). Basically, it seeks replace the "wrong" or "bad" beliefs with the "correct" or "good" ones by through pragmatic rationales (Buckingham (2003).

In most   countries with more liberal media systems, particularly in North America, many media educators see the term "critical media literacy" as referring to aspects of thinking and comprehension emphasizing "inferring endings", "authorial intent", "bias" or "stereotypes" (A. Luke & C. Luke, 2000; D. Singer & J. Singer, 1998). On the other hand in the United Kingdom, it focuses on the possession of skills for effective evaluation of information. As Livingstone (2007) notes, the UK definition of critical media literacy is effective and useful in that it advocates a relatively neutral skills-based approach. However, this approach does not necessarily translate to an easy or efficient inculcation of critical literacy skills in youths. In a large-scale project measuring children's level of critical media literacy, Livingstone and Bober (2004a) found that four in ten children surveyed trusted most of the information they found on the Internet, with only 10% sceptical about the information. The same study also found that 67% of the children had never been told how to judge the reliability

of online information (Livingstone & Bober, 2004a). In sum, critical media literacy can therefore be seen to branch into two main directions, a functional approach and a critical approach. The latter stemming from the critical cultural studies paradigm (Lewis & Jhally, 1998) differs from the approach of the present study, which seeks to provide empirical evidence for the importance of personal knowledge for the critical evaluation of online information amongst Singaporean youths.

2.3.2. Computer literacy

Media literacy studies pertaining to technology usage such as computers have been especially popular in the U.S. and U.K., and focused on educating children and students. Researchers and educators believe that this particular group is at a level where they are still developing their worldview and are more receptive to a variety of evaluative and analytical techniques (Hobbs & Frost, 2003; Livingstone, 2003). Targeting this particular group for study has been justified by the need to inoculate the young against viewing potentially harmful behaviours depicted and erroneous information in today's multimedia environment (Bajkiewicz, 2002).

One of the earliest large-scale studies on computers and literacy was done by Andersen, Klassen, Krohn and Smith-Cunnien (1982) where 3,600 students were surveyed on their adoption, skills and knowledge of computers. The study measured the information literacy of the participants, specifically their ability to organize and make information easily analyzable and accessible through the use of computers. Although computer technology was vastly different from the new media technologies and the Internet of today, nevertheless the study reflected the early importance of computers in classrooms. The study found that on average, students were largely not sufficiently capable in handling information and computers (see Andersen, Klasses, Krohn and Smith-Cunnien, 1982 for greater details). Another large-scale study was done in the 1980s by Electronic Testing

Services (1986) to test the usage and computer literacy levels of students. The study was administered to over 25,000 students and found that principally students with high social economic status and better-educated parents had a major advantage in the use and understanding of computers (Martinez & Mead, 1988). This was due to the significant development of personal computers first penetrating homes, where accessibility to this technology had privileged the more affluent.

Although these studies highlighted the importance of using the computer well, being literate was looked upon then as being able to produce and communicate information effectively through computer programming. On the other hand, large-scale studies such as the U.S. Teaching, Learning and Computing study in 1998 and the Second International Technology in Education Study in 1997 highlighted new and more relevant priorities with regards to looking at the issue of literacy in computer use. Contextual influences such users' beliefs about teaching and the quality of technology support were emphasized and found to correlate with their computer skills affecting computer use were emphasized (Dexter, Anderson, & Ronnkvist, 2002). Other contextual factors such as participation in communities of practice were also found to affect the efficacy of computer and Internet use for education, especially amongst children (Becker & Riel, 1999). A similar study of high-school students found that in conducting their school research, students tend to choose sites based on peer recommendations. These sites are more often than not commercial websites which may have little or no relationship to their academic objectives (Ebersole, 2000). This is unsurprising bearing in mind that a large percentage of the Web is dominated by commercial enterprise (Lawrence & Giles, 1999).

One of the more significant studies on this group's level of Internet literacy was done in the UK, where Livingstone & Bober (2004a) found that nearly one-third of children between 9 to 19 years

of age reported having received no lessons at all on Internet skills or Internet literacy. The susceptibility of this group of users was also illuminated in various studies which found them unclear or confused about how to discriminate between different kinds of websites – which could be commercially motivated, politically biased or simply of poor quality (Hobbs & Frost, 2003; Livingstone & Bober, 2004a; Shenton, 2004). However, most of the existing studies are focused mainly on assessing the level of skills and the inculcation of techniques for critically evaluating online information. In reaction to this, scholars are arguing for the urgent need for more educational support and research on Internet-related skills, especially going beyond basic skills to encourage development of critical Internet literacy (Livingstone, 2003; Livingstone & Bober, 2004b). Other studies further noted the lack of skills comprising of students not adequately questioning the context of the information found online, or adequately reasoning with regards to their personal knowledge in assessing the validity of online information (Berger, 1998; O'Sullivan & Scott, 2000).

2.3.3. Information literacy

Research into students' interaction with information from media such as online databases tend to be viewed through the lens of information literacy (Fabos, 2008), which is defined as "the set of skills that enable the individual to recognize when information is needed and to locate, evaluate, and use effectively the needed information" (Association of College and Research Libraries, 2000). Handling of information is therefore an important element of literate media use, and that being information literate is invaluable to present and future workers in the information society In this regard, studies done in the domain of education and library science found students to be constantly overwhelmed by information and getting 'lost' in the 'hypertext-linked pathways of the Web' (Arnold & Jayne, 1998, p. 43; Blandy & Libutti, 1995; Claus-Smith, 1999). More recent studies measuring information literacy found an over-emphasis on the dimension of skills (Virkus, 2003; Wen & W. L.

Shih, 2008) and habits of users (Zins, 2000). However, these studies are framed according to a criterion-based framework for information seeking and evaluation. There is a significant lack of studies stressing the importance of user knowledge and cognitive aspects relevant to these skills (Aviram & Eshet-Alkalai, 2006).

Closer to the focus of this thesis' focus on online information, studies looking at students' interaction with online information had found that when students have little prior knowledge of their topic or information, they tend to be nervous and to glean information from the top of the search engine results list (Fabos, 2008; Watson, 2001). Fabos (2008) further explained that in discerning the "biased" from the "objective" information from the list produced by the search query, the "biased" is too easily interpreted as "bad" and frequently rejected (p. 858). The simple dismissal of "biased" information as "bad" or false is highly problematic because of the fact that virtually all information produced and disseminated is inherently "biased". Research thus needs to document the complex knowledge styles and the contextual reasoning undertaken by users during their evaluation of "biased" information to promote understanding of why potentially important information is easily rejected or accepted. In this regard, this thesis found Potter's (2004) cognitive-psychological framework for media literacy particularly relevant in exploring the significance of these factors.

Theoretical Framework

So as to understand the various contextual knowledge and interpersonal influences involved in youths' search and evaluation of online information, Potter's cognitive-psychological framework of media literacy was adopted as an applicable theoretical framework. The following discussions explicate the main ideas espoused in this framework, beginning with its central tenets of one's personal locus for media literacy to the different foundational cognitive knowledge structures which allow users to effectively search and evaluate information.

3.1   A cognitive-psychological theory of media literacy

According to the cognitive-psychological theory of media literacy, everyone possesses some degree of media literacy, which is displayed in varying levels of awareness and knowledge regarding the media, media messages and the impact of media on their lives (Potter, 2005, p.7). The question then is what are the factors contributing to the varying levels of effectiveness when one interacts with media and information, such as the seeking and evaluation of online information? In order to grapple with this question more effectively, emphasis should be given to the cognitive influences and patterns displayed by individuals when using media. Further supported by Martin (2006), media literacy can now be seen to be diverging into the cognitive aspects of influence, exemplifying the importance of personal motivations and behaviour, as opposed to the largely skills-based approach in media literacy studies. In this regard, James Potter's (2004) cognitive theory of media literacy offers a useful heuristic which encapsulates the various contributory factors in a coherent albeit predetermined fashion.

This thesis will thus adopt Potter's cognitive-psychological framework of information processing and meaning construction. The theory postulates that achieving higher levels of media literacy calls for *active* processing of messages rather than *passive* information consumption. He proposed a three-part definition of media literacy composed of: (1) *a broad overview* – which rests on the assumptions that one's mindful evaluation of media exposures depends on the level of one's knowledge structures (e.g. media contents, media effects, media industry, real-world, and self); (2) *cognitive processes* – which are mainly separated into one's *active* and *passive* involvement, with active involvement requiring one to apply and develop further the knowledge structures during exposures to media messages, and passive involvement allowing the media to be more in control of message interpretations and the effects of those interpretations; and (3) *purpose* – which refers to one's being affected and motivated by the long-term, as well as immediate goals set during the exposure to media messages.

3.1.1 The personal locus

Central to the cognitive capability of different individuals is the hypothetical construct of the personal locus (Potter, 2004). This is the most important indicator of media literacy expertise. One's personal locus for media literacy "occupies a central position by drawing information from the five foundational knowledge structures, then governing the use of competencies and skills" (p. 97). This locus then fulfils three functions: (a) to make the individual aware of more options in any problem-solving activity, which includes information searches; (b) to glean from knowledge structures the standards needed to weigh the various options and select the best one, which increases personal control; and (c) to increase drives in a positive direction as a result of success in the first two functions, which helps the individual succeed in more difficult tasks (W. J. Potter, 2004). In short, this central locus links individuals' expenditure of their inherent levels and types of cognitive knowledge

structures, which in turn is manifested as the capabilities and willingness to utilize skills and competencies when seeking and evaluating media messages. Diagram 1 below illustrates the various factors in individuals' personal locus which affects their level of literacy when dealing with media information.

3.1.2 Foundational knowledge structures

Within one's personal locus, the theory proposes the acquisition of five foundational knowledge structures in order for one to achieve a high degree of media literacy. They can be broadly categorized into: i) **objective knowledge of media** - a*) media content, b) media effects, c) media industries* , and ii) **contextual knowledge** – *a) real world, b) the self*. These knowledge structures allow people to approach problem-solving with a greater variety of "resources". The possession of more elaborate knowledge structures also gives people not only more available options for accessing media messages but also more options for constructing meaning from those messages. Also, these knowledge structures implicitly assume that different people possess varying levels of knowledge in these structures and that these structures are individualized and contextualised. Similarly, Park (1993) proposed that relevance of any particular information as perceived by users cannot be isolated from the particular context he or she is in, thus "efforts need to be focused on discovering the meaning experienced by a user within this context" (pp. 136-137). Notably, possession and application of these knowledge structures help shape a positive direction for one's media literacy competencies by stimulating the emotional elements. Through the possession and application of these desires, people tend to experience either (1) good feelings about their media exposure that stimulate the desire to repeat those feelings; or (2) frustration over the idea that the new information does not fit into their existing thoughts, triggering the desire to reduce that negative emotion through media literacy (W. J. Potter, 2004).

Personal locus

Knowledge structures

Objective media-related knowledge structures

Contextual knowledge structures

Media content

Media industries

Media effects

Real world

Self

A. Content formulas
B. Aggregate figures
C. Values in content

A. Development of industries
B. Economics
C. Ownership and Control
D. Marketing messages

A. Broad and narrow effects
  I. *Timing*
 II. *Level of effect, Direct vs Indirect*
III. *Sought vs Incidental*
 IV. *Valence*
B. Risks

A. Non-media sources
B. Life experiences

1) Meaning-construction
2) Relevance criteria

Goals

Knowledge styles

1) Long-term goals
2) Immediate goals

1) Type of intelligence
2) Field dependency
3) Tolerance for ambiguity
4) Conceptual differentiation
5) Reflectivity

Diagram 1 Illustration of the factors affecting individual's personal locus for media literacy

The goal of this thesis is thus to examine the various levels of knowledge structures and contextual references utilized in users' search for and evaluation of online information. The descriptions of the different knowledge structures are summarized in table 1 below and utilized as a framework for uncovering youths' level and conscious application of these knowledge structures in their Internet use.

Knowledge structures	Description
Media Contents	A. **Content formulas** – identifying standard formulas for messages (e.g. news stories, ads, fictional entertainment, etc). Knowing the formulas allows the person to follow content easily and the ability to judge the 'creativity' of message makers. B. **Aggregate figures** – identifying commonalities and patterns in messages that direct attention to the big picture (i.e. violence, gender). Considers length of messages, types of messages (e.g. economic, political, sports, etc.), sources (e.g. formal, informal, etc.), and credibility. C. **Values in the content** – underlying themes in messages (e.g. consumption in advertising, fun and conflict in entertainment, etc.).
Media Industries	A. **Development of Media industries** – knowing where the media come from and how they evolved. B. **Economics** – knowing the economics that drive the production and marketing of the content, c.f. the typical focus of criticisms mainly for content of media. C. **Ownership and Control** – possessing knowledge of the ownership of media. Understanding the implications of ownership for the producers of messages. D. **Marketing messages** – understanding which marketing niches one is in from the message encountered. Ability to put oneself in and avoid niches identified.

Media Effects	A. **Broad and narrow perspectives**
	   I. *Timing* – identifying short-term or long-term media effects.
	  II. *Level of effect* – recognizing different levels of effects (i.e. societal, behavioural, physiological, emotional, attitudinal, cognitive).

	III. *Direct vs.* **Indirect** – recognizing direct effects (i.e. from media messages) and indirect (i.e. influences on and from large scale structures and institutions).
	IV. *Sought vs. Incidental* – differentiating between planned seeking of effects (i.e. finding out sports results in the media) and unplanned effects (i.e. desensitization from watching violent programs).
	V. *Valence* – possessing individual judgments on whether the effects are constructive or destructive.
	B. **Risks** – Awareness of the possibilities and risks for manifesting the positive as well as negative effects.
Real World	Applying knowledge obtained from non-media sources and life experiences and applied during exposure to media information.
Self	Relate exposure to media information to:
	A. **Personal knowledge style** – different people encounter and use information differently (i.e. based on their basic cognitive, emotional, and moral development).
	B. **Personal Goals** – Includes a person's immediate and long-term goals. Immediate goals are based on information needs as well as emotional needs. Longer-term goals deal with the core of who one is, who one thinks he or she is, and what he or she wants to become, and are focused more on career and relationship matters.

Table 1 Description of Potter's foundational knowledge structures for media literacy (Potter, 2004)

To further understand the importance of contextual factors, this study delves deeper into the types of contextual knowledge and influences, particularly in the knowledge structures of *Real World* and *Self* within the framework. When processing media information, knowledge of the *real world* facilitates the ability to apply knowledge and construct meaning from life experiences and non-media sources during exposure to messages. As literacy scholars argue, consuming the increasingly multimodal digital information is 'all about building perspective' from personal and unexpected insights emerging from one's experience (Gilster, 1997, p.195; Livingstone, 2004; Warschauer, 2003). Termed as "knowledge assembly", the ability to collect and evaluate online information increasingly lies in relating the information to "non-networked sources of information" and personal viewpoints

(Gilster, 1997, p.198). These contextual approaches shift away from the popular view of information

evaluation based on prescriptive criteria of "what to and not to do", to the focus on "how and why"

social and personal experiences influence evaluative perspectives (Neely, 2002). On the other hand,

knowledge of *self* also requires individuals to be aware of their goals during exposure to media

content.

The present study acknowledges the importance of these contextual factors in literacy

research. Similarly, as posited by literacy scholars - research pertaining to users' evaluation of

information needs to go beyond an objective skills-based approach (Neely, 2002) and; i) to be derived

from users' experiences, ii) to see literacy as not measurable, iii) to be focused on describing, and iv)

to be focused on individuals' qualities in relation to the environment (Bruce, 1997, p. 13). This thesis

thus aims to investigate the significant contextual knowledge structures and the various informal

methods utilized by youths as well as interpersonal influences, such as: i) friends, ii) family members,

iii) teachers, iv) other types of media sources, v) other online information, and vi) personal

experiences and knowledge, on their critical evaluation of online information.

3.1.3   Research questions

Informed by the earlier discussion, which highlights a gap in media literacy research that

focuses on the impact of varying levels of knowledge and the contextual influences affecting one's

effective use of media for information, and framed according to the cognitive-psychological theory

for media literacy, this thesis thus asks the following questions: **RQ1)** What are the significant

knowledge structures possessed by Singaporean undergraduates, and how are these utilized during

their search and evaluation of online information, if at all?, and **RQ2)** What are the salient informal

methods and interpersonal influences affecting Singaporean undergraduates when they seek and

evaluate online information? The focus on undergraduates does not allow the findings to be

generalized across the population of youths in Singapore. However, narrowing the scope to this segment of population enables the present study to examine more validly the differences in the abilities to discern online information from within the similar literacy level possessed by this segment of youth.

Research methodology

4.1   Verbal protocol analysis

Protocol analysis, also known as the "think aloud" method, has been found to effectively uncover users' cognitive processes such as judgment and decision-making during problem-solving tasks (van Someren, Barnard, & Sandberg, 1994). The method basically consists of 1) asking participants to verbalize their thoughts while solving a problem, and 2) analyzing the verbal protocols collected. This study thus finds protocol analysis a very appropriate method for gathering data on users' thought processes whilst engaged in information-seeking and website evaluation processes online. Described as the most widely used evaluation method for usability studies in the computer industry (Jacob, 1998), this method had also been a very significant tool in the field of educational research in studies on teacher and student cognitive processes and learning outcomes (Wittrock, 1986). This method has also lent itself effectively to both quantitative and qualitative data analysis (Hoppmann, 2007). These internal thought processes manifest themselves through the choices people make (Rieh, 2002). The think aloud method thus lends itself well to obtaining insightful analyses on participants' evaluative behaviour by recording the thought processes of participants during their search and evaluation of online information.

In every choice situation experienced during problem-solving, two types of cognitive judgments are made: *predictive* and *evaluative*. Predictive refers to what people expect to happen, and evaluative refers to how users think about what is going to happen (Hogarth, 1987). Therefore, in the context of online information searching, predictive judgement will guide a user's choice in selecting a website from the results of a search engine such as Google, for example. After entering the selected site, evaluative judgements are then made on its appearance, usefulness, quality, and

such (Hope, 2007). These internal judgement calls, which are always used as a guide for making decisions leading to a choice for actions and production of outcomes (Rieh, 2002), will be captured in this study through respondents' simultaneous verbalization of thought processes when carrying out the tasks given. This is also an advantage of protocol analysis, in that it creates hard objective data which are accessible to anyone and when "applied under any conditions will produce the same results" (Hope, 2007; van Someren et al., 1994, p. 119)).

Stemming from the introspection method used in psychology, researchers have documented some limitations with regard to the validity of most verbalization techniques. Introspection methods are found to be plagued by invalidity and incompleteness due to interpretation by the subject (van Someren et al., 1994; Stratman & Hamp-Lyons, 1994). These problems are caused mainly by respondents being required to self-reflect and tap on their long-term memory during the problem-solving tasks. However, the thinking-aloud method differs from the introspection method in that it focuses on the verbalization process that involves primarily the working memory (van Someren et. al., 1994). The long-term memory holds a large amount of procedural and factual knowledge which can be accessed with deep introspection. On the other hand, short-term memory can be quickly accessed and the knowledge reported (Pressley & Afflerbach, 1995). By tapping on this working memory during thinking aloud, the problem of invalidity is thus greatly reduced (van Someren et. al., 1994).

Also, as compared to retrospective verbal protocols collected after the completion of tasks, concurrent think-aloud protocols have been found to be more advantageous in certain aspects (Ericsson & Simon, 1984; Kuusela & Paul, 2000; Nielsen, 1994). Although post-hoc protocols avoid the problem of doing two things or more at once (Branch, 2000), the method tends to take a substantially longer time and to produce distorted recalls of the reasons for actions caused by

imperfect memory due to false rationalizations and constructed interpretations (Norman & Murphy, 2004). On the other hand, studies utilizing concurrent protocols found that participants "felt that it was easier to do think-alouds because it was difficult to remember all the steps after the end of the search" (Branch, 2000).

4.1.1   Previous think-aloud studies

This methodology has been applied widely in collecting expert knowledge that provides the basis for computer programming (Ericsson & Simon, 1993; van Someren et al., 1994). They have been effectively applied in software usability studies (e.g., Roberts & Fels, 2006)) and in the identification of website usability issues (e.g., Benbunan-Fich, 2001; George & Yamamoto, 2005; Norman & Panizzi, 2006; van Waes, 2000). This method has also been effectively applied to studies of online user experience as well as on users' information processing. Hughes, Packar and Pearson (1998) utilized the method in observing students' reading patterns in a hypertext environment. In other similar studies, understanding web browsing behaviour helped inform the development of hypertext and hypermedia (Carmel, Crawford, & H. Chen, 1992). The method has also been applied to previous studies on online search and information-seeking behaviour, similar to the present study (Hung, 2005; Madden, N. Ford, Miller, & Levy, 2005; Yang, 1997). Yang (1997) applied the method together with observational analyses in a qualitative examination of information-seeking behaviour exhibited by university students in their access of information. In another study, Hung (2005) also applied the think-aloud method with another data-gathering strategy by collating transaction logs of students' information-seeking patterns when searching for visual information.

Closer to the present study's objective of assessing critical Internet literacy, prior studies have also applied this method to understand user approaches to evaluation of site material (Hirsh,

1999; Hope, 2007; Lubans, 2000) . Hirsh (1999) utilized the method in exploring elementary students' search strategies and their evaluative criteria for information during a school project. Her study identified 254 mentions of relevance criteria for the assessment of website information. Hope (2007) found the method especially useful for collecting a large amount of data with thirty student respondents in one session at a computer laboratory. The same study also administered survey questionnaires to supplement the data collected. The data-collection procedures for the present study are described in-depth in the section below.

Studies applying the protocol analysis method had consistently applied at least one other data-gathering method to supplement and strengthen their findings. In the same vein, this study will also combine the protocol analysis with survey questionnaires and an on-screen recording of participants' "movements" and search patterns in order to gather richer and more reliable data. Further, Hope's (2007) novel strategy of administering the think-aloud protocols to a group of users simultaneously stand out as a very productive method, which is replicated in this thesis. Moreover, there is to date a lack of studies wholly framed under a media literacy framework that utilize this method. The present study thus attempts to fill this methodology gap in literacy research.

4.2   Data collection procedures

Data for this study were collected through two main methods, survey questionnaires and the verbal protocols collected during participant's task-solving process. Participants' on-screen "movements" were also recorded using on-screen recording software. Further, users' thought processes were also recorded by participants' writing out their own thoughts on a word document in the computer. In a pilot session conducted with eight undergraduate students, it was found that some participants experienced difficulties in verbalizing their thoughts whilst searching and

evaluating information online to solve the problem. More interestingly, those who experienced this difficulty found it easier instead to jot down their thoughts on a word document in the computer; an action which they are more accustomed to when using the computer. This is potentially a novel supplement to the think-aloud method not previously utilized. The following discussions describe the data collection procedures in greater detail.

Two main sets of questionnaires were administered, one before and another after the think-aloud session. The first questionnaire (Appendix A) was semi-structured and administered before the start of the activity. It obtained the background of participants' with regards to their experiences and perceptions of false and biased online information during the past year. Participants were also asked how they knew that the information they encountered was false or biased, how they were affected by it, and what they did to alleviate the situation. The questionnaire also measured participants' long-term goals and motivations for using the Internet well to gather information. The second questionnaire (Appendix B) was administered at the end of the session. This questionnaire recorded participants' demographic profiles so as to control for these variables during data analysis. This semi-structured questionnaire also collected participants' responses about the various informal methods and interpersonal influences utilized by them for evaluating online information.

Given the limited resources for this study, Hope's (2007) collection protocol was replicated to obtain more data for greater empirical strength. A computer lab with 25 work stations to simultaneously record data from multiple participants was used for this study. The computers were prepared for use before participants arrived, and the desktops were cleared of icons. Each computer station was equipped with a fully functioning headset and microphone to record the vocalized thoughts of participants. The visual and verbal data recordings of participants' on-screen

"movements" and vocalized thoughts were recorded by the CamStudio2.0™[2] program pre-installed in the computers. The session began with an explanation that they were part of a thesis study to learn about how users search for information online and what types of information they would consider during their online searches. It was emphasized that this researcher was interested in the way they solved the tasks and not in their unconscious emotions or hidden thoughts. Participants were also briefed on the procedures of the tasks, which was basically to continuously vocalize their thoughts while solving the tasks to navigate the Web as they normally would.

Participants were also assured that the data collected would be handled with strict confidence. This was very important to ensure that participants were not nervous, as this may potentially affect their speaking out loud (van Someren et al., 1994). They were then asked to sign an indemnity form as required by the National University of Singapore's Institutional Review Board (IRB) for research involving human subjects. Finally, participants were told that should they choose not to continue participating in the study at any point in time, they may raise their hand to indicate their disinterest and leave the lab quietly without disrupting the rest of the participants. The research activity then began with a five-minute warm-up session with participants given the task of collecting online information in order to prepare a report on the severity of spousal abuse in Singapore, profiling the perpetrators and victims. Participants were then asked to check that all equipment was working properly and to surface any questions or problems they may encounter during the activity process.

During the session, participants were intermittently reminded to verbalize their thoughts by non-directive statements such as "please keep on talking" and "continue thinking out loud". As advised by past researchers, there were no explanations offered on the process to prevent

---

[2] CamStudio 2.0 is software that captures screen activity as well as audio input from the microphone in AVI and other formats.

participants from interpreting their own task processes (Ericsson & Simon, 1984; Eveland & Dunwoody, 2000). The whole think-aloud session lasted for one and a half hours, with forty-five minutes given to solve the task. Participants were then told to leave all the questionnaires on the table when they left. During collection of the questionnaires, each one of the questionnaires was labelled to the corresponding computer terminal. The visual and audio data recorded were then stored in CD storage devices and marked according to the corresponding questionnaires and computer terminal.

4.2.1 Participants

Forty-seven Singaporean undergraduates from the National University of Singapore participated in the present study over four lab sessions. This is considered a large number of participants considering that think-aloud sessions tend to generate large amounts of rich data from relatively small samples of fewer than 30 participants (Eveland & Dunwoody, 2000; van Someren et al., 1994). However, this contingency is necessary considering problems of participation attrition and hardware and software lapses during think-aloud sessions that have occurred in previous studies (Henry, 2005; Hope, 2007). This is also important in circumventing the problem of collecting inaudible or unclear verbal protocols from participants. For example, in a study done by Hope (2007) involving 114 participants, only 27 data compact disks were usable for analysis. Eventually, a total of 32 usable think-aloud data were collected for the present study. The rest of the verbal protocols, which were either incomplete due to faulty equipment or inaudible verbal recordings, were discarded. Table 2 below shows the participants' demographics.

Age

25	3
24	3
23	7
22	7
21	5
20	3
19	2
18	2

Gender

Female	17
Male	15

Household Income

>$7,501	5
$6,001-$7,500	2
$4,501-$6,000	6
$3,001-$4,500	8
$1,501-$3,000	8
<$1,500	1

Usage frequency

Weekly	2
Daily	30

Average hours daily

>6hrs	6
6hrs	1
5hrs	2
4hrs	0
3hrs	9
2hrs	8
1hr	4

Age of first access

20-24yrs	0
15-19yrs	10
10-14yrs	22
5-9yrs	0
<4yrs	0
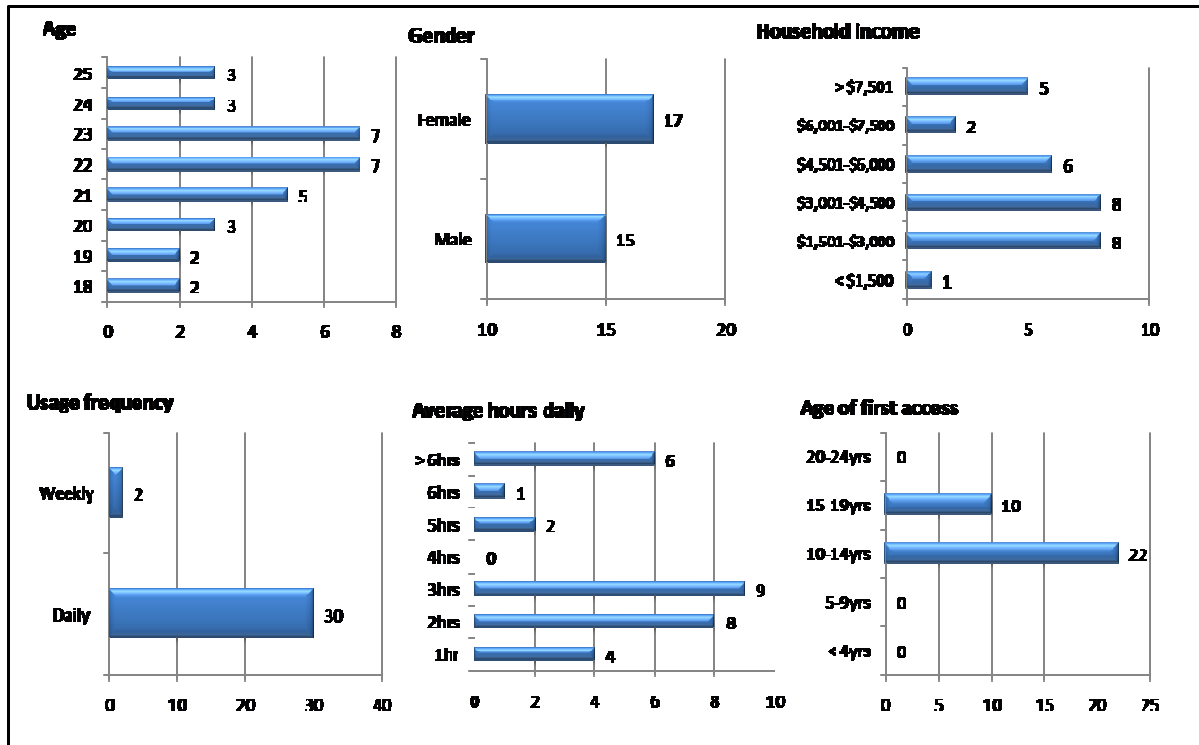
Table 2 Demographic breakdown of participants with usable think-aloud data (n=32)

The selection of participants was also based on two main screening criteria which were announced to the participants before they signed up for the study. First, participants were informed that they had to be familiar with the Microsoft Windows operating system and particularly Microsoft Internet Explorer and Microsoft Word. Secondly, the participants were also informed that they must be proficient in English as a spoken language. This was done by confirming that they had completed minimal coursework in standard English at the primary level of education. Furthermore, crucial in think-aloud studies is a very careful purposeful selection of subjects (Blair, Conrad, Ackermann, Claxton, & Abt Associates, 2006; Li, 2004). Therefore, as literacy levels were found to be related to one's education level (Neely, 2002), the purposive control of this variable by recruiting participants who were undergraduates majoring in communication allowed the study to validly explore in-depth the differences in the abilities to discern online information from within the similar literacy level possessed by this segment of youth. Further, invitational emails screened for participants who are

regular users of the Internet Explorer, which was the pre-installed Internet browser in the lab computers. However, this does not rule out the possibility that participants would exhibit different levels of verbalization skills during the think-aloud process (van Someren et al., 1994). To mitigate this effect, a short warm-up session was conducted before actual data collection begins to familiarize participants to the activity.

4.2.2   Task selection

To focus this thesis on a project to uncover users' application of their personal knowledge structures and the various contextual influences, the task given should be "partially-specified" requiring a range of open-ended informational elements, rather than mere retrieval of "objective facts"(Fabos, 2008, p. 863). This technique has been found to work well for literacy educator Cushla Kapitzke (2001), who posits that assignment topics with broader, open-ended values-based objectives provide the opportunity for students to engage in meaning constructions on top of factual evaluation of information. This increases the internal reliability of the tasks, as opposed to tasks narrowly focused on evaluating factual information such as accurately identifying the weather conditions across different continents, which merely requires an assemblage and comparison of facts from different sources of online information. Furthermore, it is inevitable for individuals to go through the similar process of "partially-specified problems" in their everyday use of the Internet, requiring them to seek and evaluate information encountered based on its relevance to their context and needs.

Several other factors were considered in the formulation of the research task. As recommended by van Someren et al (1994), tasks should be at a level of difficulty appropriate to the cognitive process expected of participants. In other words, participants should not be able to solve the problems in an automated manner, as problem-solving through information-seeking involves

cognitive processes requiring deep effort and concentration of attention. Potter (2004) emphasizes also the importance of avoiding running on "auto-pilot", a condition that leads to mindless evaluation and selection of media information. Another important criterion in the selection of problem-solving tasks is that the task has to be most importantly "relevant to the cognitive process one wants to study" (van Someren et al., 1994). Therefore, participants were tasked to – *search for information online to prepare a recommendation on raising awareness about teen pregnancies and sexually transmitted diseases. The recommendation should include relevant information on whether it would be more effective to promote abstinence or to promote safe and responsible sex amongst Singaporean youths*.

4.3   Data analysis procedures

All recorded verbal responses were transcribed for analysis. Individual timelines were marked in the transcribed data to match the verbal remark with each participant's actions in the video recording of the task process. All survey questionnaires collected were also analysed as findings.

As informed by previous studies, the verbal protocols were analysed according to the conceptual model in this study's theoretical framework (van Someren et al., 1994). An open-coding scheme was formulated based on the description of knowledge structures as presented in table 3 below. The 'meaning condensation' approach (Kvale, 1996, p.195) where large amounts of transcribed data were analyzed and compressed into shorter statements representing the various themes in the study's analytical framework was then carried out on the verbal protocol transcripts as well as the responses in the open-ended questionnaires. Some of the categories were collapsed to create a more efficient method of codification without losing the reliability of the labels. The categories are described in table 3 below. Data were also analysed for inter-relations among various themes. Findings from this study are then presented according to the various themes.

Open-coded categories (Knowledge structures)	Concept labels
Media Contents	
Content formulas	Comments on how information content is arranged and presented
Aggregate figures	Comments on the 'bigger picture' of the information (e.g. "this information is very political, social, economical, violent, etc.)
Values in content	Comments ascribing values to information (e.g. "this information is bad, good, entertaining, exciting, boring, biased, profit-motivated, etc)
Media Industries	
Development of media industries	Comments on the problems or benefits created by the Internet medium
Media economics	Comments on how the Internet medium is benefitting or losing revenue
Ownership and control	Comments on who owns or controls the media
Marketing messages	Comments linking information to business or money-making strategies
Media Effects	
Broad and narrow perspectives	Comments on information causing something. Comments on information followed by the word 'cause', 'result', 'affect', 'make', 'has an effect', etc (e.g. this information can cause someone to be very sad, or this information can result in a company being sued, etc.)
Real World	Comments linking information to real life experiences, based on personal, society and world experiences
Self	
Personal Knowledge style	Comments linking information to participant's own morals, emotions, or difficulty in processing information

Table 3 Coded protocols for analysis of knowledge structures. Adapted from Hope (2007).

Findings

Findings from the study were collated from data obtained through the verbal recordings as well as from the survey questionnaires. This section will highlight the relevant and pertinent findings obtained from the study. Beginning with data obtained from the survey questionnaires, participants' personal experiences with false and biased online information is analyzed and reported. This is followed by findings from the verbal recordings to address research question 1, highlighting the prominent thinking processes of the "meaning-constructors" found amongst the participants according to the salient knowledge structures pertaining to objective knowledge of media and contextual knowledge of the real world and the self. And finally, data from the post-task questionnaires were analyzed and discussed according to research question 2, highlighting the salient informal methods and interpersonal influences undertaken by participants when evaluating online information.

5.1   Personal experiences with false and biased online information

Findings from the survey questionnaires showed that majority of participants had encountered false and biased information on the Internet during the past year. Participants also reported experiencing more biased information than false information. The following sections highlight their experiences when encountering false and biased online information based on how they discovered the information were false or biased, how they were affected, and what did they do when they were faced with false or biased online information.

5.1.1   False information online

- **How did they know?**

Respondents discovered the falsity of information from the Internet in a number of different ways. Most respondents explained that they only realized it when they chanced upon or found contradictory information in other websites. Others realized that the information was false after discussing it with friends, as mentioned by one respondent, participant 25, who was "spooked" by a video on YouTube.com of a man in an elevator with an apparition behind him. She passed the link to her friends online who later told her that it was a video made for a campaign asking people to stay home and not overwork themselves. Apart from learning from peers, respondents also mentioned different ways of discovering the falsity of the information online. Participant 11 realized that Wikipedia contained false information about Hong Kong's street culture. She said she knew the information was false because she feels she "knows Hong Kong very well". Another respondent stumbled upon a site explaining how a picture of a cat was manipulated to make it look very fat. She felt really silly because she would otherwise not notice that the picture was manipulated. On the other hand, participant 8 was surprised that even news websites such as news.yahoo.com was not free from false information. She recounted reading a headline about a World War II fighter plane found with the skeleton of a soldier. A few days later the same website revealed that its own report was a hoax and apologized.

From the experiences above, there is a noticeable trend that users did not take the time to identify the falsity of information when it was first presented to them. They actually took it to be factual at first instance. Furthermore, the coincidental manner in which falsity of information was

sometimes revealed is worrying. In other words, if the serendipitous exchanges with friends had not occurred, many respondents might never have known the information was false.

- **How were they affected?**

Respondents are affected by false online information in a number of different ways. This experience mainly affected them emotionally. Most felt frustrated after discovering they had encountered false information. Participant 15 noted he felt very frustrated when he realized that he had used a lot of information on a very biased website for his school project on advertising campaigns. Subsequently, he had to critically look through his sources again and search for newer and more reliable sources. Similar experiences were shared by other respondents. Using false information for class projects would inevitably result in a frustrating and time-consuming process of searching for more information to rectify the error. Another cause of frustration mentioned by respondents is spam emails and misleading pop-ups. Participant 21 said he was frustrated by the continuous bombardment of notifications that he had won one million dollars. His frustration was also due to the fact that he could not do much to prevent such fake information except ignore them whenever they appeared. These examples show that encountering false information can invoke an emotional response in information seekers.

- **What did they do?**

Respondents also mostly ignored the false information and fake news. One respondent, participant 11, even mentioned that he tends to "laugh it off" when encountering false information online. On the other hand, one discerning respondent encountered an anonymous person who pasted a link on his blog's comments box. The link led to a fake organization's' website. He immediately deleted the comment and took down the link. Participant 22 found out that an online

article given to her by her instructor contained fake information after comparing it to a newspaper website, and she eventually informed her instructor. More significantly, she became more careful with online information, and tend to double-check information with other information or people as much as possible.

- **Did not encounter false information**

On the other hand, respondents who mentioned not encountering any false online information in the past year indicated that they were highly aware and would constantly proof-check the information against other sources when searching for information online. Two respondents claimed to clearly understand that there were countless websites with false information and would thus go only to credible sources of information on the Internet. Another respondent, participant 23, believed that he possessed a very critical mindset, and that he believed that his mind could sufficiently act as a "filter which constantly scrutinizes whatever he sees, reads and hears". Therefore, false information is automatically blocked out. This confidence displayed by respondents in their own capabilities and awareness may potentially be double-edged. On one hand it shows that they are comfortable in their search and evaluation of online information and implies a sense of self-efficacy which encourages the use of the Internet to gather useful information and knowledge. On the other hand, as some scholars have argued, this mindset is symptomatic of laziness and complacency during online information searches. And more often than not, that would instead result in users accepting information in a less-discerning fashion (Hahn, 1997).

5.1.2 Biased information online

- **How did they know?**

Almost all respondents already have a feeling and understand that bias is rampant in cyberspace. As summed up by participant 5, compared to other forms of media "only the Internet allows free will". It is thus the best medium for people's opinions to be aired freely, making it a "source of infinite biasedness". Respondents also unanimously highlighted certain types of online topics and websites which they had found to be "naturally biased". The popularly mentioned ones are political websites, blog sites, online forums and even the free-to-edit Wikipedia. Furthermore, some respondents also highlighted how they identify and "discover" biased information and websites. Respondent 11 said that websites hosting user-made videos, such as YouTube.com, are full of biased information. He reasoned that such websites are similar to blogs, and that the videos are usually made by people who are trying to express themselves, so they contain a lot subjective and personal ideas and perspectives. Another respondent, participant 13, identified information as biased on a particular website by the tone and writing style. He explained that "when someone sounds too eager to be promoting something in particular, then it is definitely full of biasedness" [sic].

- **How were they affected?**

Respondents reported a wide range of feelings caused by their encounters with biased information online, from indifference in respondents who are "used to" biased information, to feelings of confusion. As exemplified by participant 27 who reported feeling very confused when experiencing information on websites which tend to use provocative language and flamboyant styles of writing. He reported feeling "cheated and confused" at times because, although he knew that the information is biased, and the way the language was used made the information sound convincing.

On the other hand, participant 25 said she felt frustrated and humiliated when the information she had obtained from a website for a school project was scrutinized by her group mates who later proved that it was both heavily biased and false.

Experiencing biased information had also induced emotional responses. The findings show that emotions may be a factor influencing users' experience in their search and evaluation of online information. Although existing studies have similarly shown and highlighted the significance of emotions in users' experience with online information (Walvaren, Brand-Gruwel, & Boshuizen, 2009), there is however a lack of research exploring how emotions affect their online information search behaviour and thought processes. It may prove beneficial for future studies to look deeper into the impact of emotional reactions.

- **What did they do?**

Respondents reacted in different ways when they encountered biased information. Most respondents said they either disregarded the biased information or gathered more sources for different opinions and arguments on the information. A noteworthy finding is how one respondent who liked to read gossip and blog postings online grew to understand and accept that these websites were inherently biased. She had thus "learnt to be very adaptive and to always keep an open mind". This shows that one's evaluative capability of online information can be shaped by their personal experiences online. Similarly, another respondent, participant 2 mentioned that she had "adopted a strategy of looking at things from the writer's or page owner's perspective to make beneficial use of the biased information".

Others have come to not only accept the biased nature of online information but even to find the situation helpful because, as articulated by, participant 31, it not only provided her with different

perspectives and arguments for her projects, but was also useful because "it is a good way to know what other people think about a certain issue." These findings show that biased information was not devoid of value for the respondents. In fact, as pointed out by scholars, the biased and opinionated dissemination of messages and information made possible by the democratic nature of the Internet may be more valuable than not (Machill & Waltermann, 1999), as opposed to having controlled or little sources of information. However, the findings in the present study show that in order to discern biased information, users require a good understanding of how to analyse and synthesize this biased information obtained effectively.

5.2   RQ1) Significant knowledge structures utilized by participants

5.2.1   Objective media-related knowledge structures

5.2.1.1   Media content

There are three kinds of information essential for one to build a significant knowledge structure of media content. They are: i) content formulas - identifying standard formulas for messages, ii) patterns of content - identifying commonalities and patterns in messages, and iii) values in content - underlying themes in messages (see table 1 for in-depth description). Amongst these three types of information, the present study found that participants tend to evaluate information on the patterns of content, in particular, the length of messages and the sources and dates of the content. Content formulas on the other hand were found to be the least utilized knowledge. More interestingly, findings showed that when it comes to evaluating content from the Internet, participants were found to access and evaluate the different modes of content presented, i.e. text, image, sounds, movie, etc. The ensuing discussions further elaborate on participant's utilization of media content knowledge structures.

o   *Content formulas*

Knowledge on content formulas was least utilized by participants when evaluating online media content. Conceptually, it requires media users to not only identify the different genres of media content, e.g. news stories, advertisements, fictional entertainment, but more importantly the standard formulas employed in the creation of these messages (Potter, 2004). The findings however showed that participants mainly consider the different genres of media content as opposed to content formulas. Participants identified and accessed content from different genres based on the type of information they were looking for – factual or serious information versus more subjective and opinionated information. As mentioned by participant 24 below:

[P24] There is a sexual behaviour category and there is this booklet or something of sorts for teens to educate them on sex and its consequences, and there are a lot of photos of teenagers being intimate. But there's also an advertisement for Durex. Is this an advertisement or what?

o   *Patterns of content*

Conceptually, individuals are exposed to only samples of media messages and are required through the skills of induction to draw from the commonalities and patterns from these messages. As Potter (2004) puts it, possessing adequate 'pattern perceptions' of media messages will enable media users to have a more accurate assessment of information and aids to construct a truer picture of the bigger message. The three types of patterns are the i) length of messages, ii) type of messages, and iii) sources and dates of information. The study found most participants to consider the sources and dates of information as compared to the other two patterns.

Sources and dates for the production of the messages were the most popular type of pattern utilized by participants in seeking and evaluating online information. In fact, amongst the various

54

knowledge structures, these criteria were the most widely considered by the participants when searching for and evaluating online information. Some participants began their search with an idea of the types of sources they perceived as credible and acceptable dates of information publication. Although utilizing these heuristics in seeking and evaluating information may provide for a more efficient search for information, large disparities were found on the dates that participants deemed acceptable.

> [P2] Ok, um, the decline in US teen pregnancies, 1998. Oh! This is an old article from 1998, I guess I won't use it. It is too old. I think articles should be from at least 2005 onwards.

> [P27] okay this article is dated 12th December 2002, okay. So erm, actually I've been wanting to look at information from the year 2000 and beyond.

Participants were also found to evaluate sources and dates effectively and reliably. These participants began by identifying the sources and dates and went further by also evaluating the sources and dates of other information which they had gathered for comparison. In other words, various structures of knowledge were utilized concurrently to evaluate whether a certain information obtained is reliable or not; as shown by one of the participants.

> [P10] Okay I found another website, Singaporewindow.com. Okay, it's actually, err, the Singapore window is an article produced by the AFP [Agence French Presse] and it's dated September 24th 2006. So I guess the dates are not very recent but still pretty recent to be useful and so, okay. But more importantly it is a Singapore-based website. I guess it is relevant.

With regards to media content related knowledge, findings showed flawed consideration of the length of messages by participants. When participants mentioned the lengthiness of information in a particular message, they did not evaluate the significance of the lengthiness, or its lack thereof. Instead, most of them merely acknowledge the lengthiness of the message texts and proceeded to

either read the information or not based on the amount of time needed to read the information. More worryingly, the data showed that given a finite amount of time, users tend to rely on the quantity of information collected to solve the task as compared to the quality of the messages.

o   *Values in content*

Besides the strong emphasis on objective information such as statistics and figures in messages, participants were also found to consider the underlying themes and values in different types of messages. Three main types of values were found to be most salient. They are themes of entertainment from self-uploaded videos, religiosity in online-forums and seriousness in government websites. These themes were significant influences in participants' decision-making processes on whether certain types of online content were acceptable. Two of the participants cited such values during the think-aloud process.

[P1] I don't think I'm going to go on YouTube and stuff because it's mainly entertainment. Haven't seen the more solid substantial info side of videos on YouTube.

[P9] The problem is that this site is all about people being religious, having sex and being really stressed at work, and it is not very interesting, especially to kids. This is too religious.

o   *Multimodal representation of content*

Multimodal content is prevalent on the Internet. As a result, users are increasingly required to navigate and evaluate a plethora of text, photos, videos, audio and graphics, often combining these different forms of content to achieve a better understanding of messages (Warschauer, 2003; Jewitt & Kress, 2003). Similarly, these findings showed that participants are continuously bombarded with messages presented in these various forms. And not only were they faced with the challenges of evaluating the value and significance of these modes of information, participants were also found to

be motivated to search for different forms of information on the Internet in order to gather the most reliable information to solve the given task. The salience of the thought processes involved in evaluating multimodal media content may be a potentially significant dimension to add to the knowledge structure of media content as per Potter's theory of media literacy.

The findings showed that participants were affected by the multimodal forms of information and revealed some significant evaluative methods they utilized to evaluate these information. Participants were found to comment on the effects which different modes of information had on themselves as readers, such as information from videos being easier to 'digest' than texts. Further, participants also displayed preference for certain modes of information in order to craft an effective solution for a given task. For example, information in the form of images has the potential to be attention-grabbing and to evoke more emotions as compared to text. In addition to emotions, the participants considered graphics to be cable of creating a sense of seriousness.

> [P14] I think that, ermm, by finding the picture of sexually transmitted diseases, it will be able to give my target audience a visual impact of the seriousness of teen pregnancy. Yucks, yucks. He visual looks disgusting. I think I should pick the most disgusting picture.

> [P8] I know I don't want that on my body. It's so disgusting. Visual aids could be used to send out a stronger message to act as a form of deterrence.

In addition to the significance of effects of multimodal representation of information on participants, findings further showed how a certain level of knowledge and skills are required by users when evaluating and crafting their own messages. A certain aptitude is required for understanding the combinatorial effects and possibilities of the various modalities. Participants also commented on the complementary nature of the various modes, elaborating on how they were used and should be used to augment and support the dissemination of certain messages in order to be more effective and convincing. Two of the participants' comments illustrate:

[P15] Ok, now maybe we look for images. Because we have hard facts and videos already. Maybe now we need images or maybe stories. Make it more comprehensive.

[P22] {T}here's some video results for abstinence. So I shall look at it as well, so I have a wide range of sources to pick from such as words, video, visual. Ummm, "abstinence parable" [title of information in a website], this looks like a cute video, which is easier way to reach out to students because it's not so moralistic.

Another notable mention by participants is how having different modes in one website can give a sense of trust in the website. Some participants even commented on the types of fonts used, the colour and arrangement of the texts, images and background used in the interface. This pertains to Kress' (2003) argument that new media readers are increasingly "reading" in terms of images as compared to the linear reading of texts. The combination of the different modes is set to form a page of visuals and aesthetics, which not only communicates information but also induces emotions and perceptions. It should be noted however that participants' critiques of the aesthetics and appropriate use of images and fonts could be attributed to some participants possibly being a student in new media and design. Participant 21 elaborated:

This website I got from Google, actually the fonts in this website are quite cute. I don't know why they are using these types of fonts for serious social problems. It's on teenage pregnancies. I don't think it should be presented in this way. I don't think it [teenage pregnancies] is cute. People should be more serious about this. So I think the website should consider changing the font to make it more credible.

5.2.1.2 Media industries

Supporting Potter's (2004) proposition that people generally have poorly developed knowledge structures about media industries (p.78), the study similarly found that knowledge of media industries was the least utilized knowledge structure amongst participants. This is exacerbated by the fact that the Internet, as opposed to more traditional media such as print newspapers,

magazines and television, is more open and democratic in its production and dissemination of information. Besides the lack of information filters and "gatekeepers" that checks on the accuracy and reliability of published materials, the Internet is also driven by a different set of economics and business models. Indeed the findings showed only seven participants mentioning or linking their evaluation of online information to knowledge about the Internet industry, or to knowledge of the economics, ownership and control of information on the Internet.

More significantly, when participants searched for and evaluated information based on their knowledge of the production and control of online information, they based it based on the offline ownership of websites. For example, if the website was owned by a source with a credible offline presence then its online information was deemed credible too. For example, participant 18 commented:

> So instead, I should find news articles pertaining to the issue. Why, because news articles usually have stats to back up their reports and their stories are checked. So, only credible sources should be used, such as *Straits Times* online to formulate my decision.

5.2.1.3 Media effects

Possessing a good knowledge structure of media effects require users to not only understand how the information influences receivers, but also the processes of influence and the factors that go into the process (Potter, 2004). Users are thus required to have an awareness of the: i) timing of effects, ii) level of effects, and iii) types of effects. The study, however, found that participants displayed a low utilization of knowledge on these effects when seeking and evaluating online information. Only very few participants displayed this knowledge. An example of the type of media effects displayed by participants is knowledge of the timing and level of effects. Interestingly, when it

59

comes to evaluating information based on the timing of effects, participants were found to exhibit

knowledge of how they themselves were affected due to repeated exposures to similar media

content from a common outlet:

> [P2] Okay, so maybe I should go to YouTube. But I'm afraid of using YouTube because
> it's an open website. There might be a lot of things which may not be healthy. I mean
> from experience I always get undesirable videos if I use YouTube.

Participants were also found to distinguish between direct and indirect effects more often.

When it comes to direct effects, participants not only identified the group of individuals who are

most likely to be affected, but more significantly, also explained the materials in the information

which are influential. Participants' evaluation based on indirect effects, on the other hand, were

linked to their perception that information from authority figures is ultimately able to reach the

widest segment of society and affect individuals indirectly. This information also possesses a strong

potential to affect the perception of the public. As exemplified by participant 13:

> I'm going to the MCYS [Ministry of Community, Youth and the Sports] website because I
> want to see what (is) the Singaporean government's stance on teen pregnancy, because I
> think it's important. I mean we are dealing with a Singapore campaign, and information
> from the government will be more widely disseminated and would have greater
> influence.

5.2.2. Contextual knowledge structures

5.2.2.1 The real world

Since participants were tasked to solve a partially-specified problem, their real-world

knowledge structures were effectively piqued during their search and evaluation of online

information. But more interestingly, the findings showed that participants utilized this knowledge to

varying extents. Some respondents continuously engaged in meaning construction and constantly

evaluated the information obtained throughout the entire process. These respondents searched for a minimal amount of online information, preferring instead to rationalize the use of whatever little information they had. On the other end of the spectrum were factual information seekers. These respondents preferred instead to cross-compare information they received with other information instead of basing it on their personal experiences and knowledge of the world.

     o   *Foreign knowledge*

Amongst different bodies of contextual knowledge, knowledge of the culture and current affairs of foreign societies was the least often applied by the participants. This may be because participants searched for information focused mainly on the local context in which the task was set. However, a significant number of participants searched for, or intentionally clicked on links from search results pages that pertained to information from other countries. Findings showed that participants did this to compare local and foreign situations in order to obtain a better understanding of the local context. Some respondents said they did this to obtain more information for solving the task, especially when they could not obtain sufficient information on the local context. Participants were also found to utilize their knowledge of foreign affairs and countries that they believed were more experienced with regard to the issue. For example, participant 1 said:

> Okay, mostly I think that people who write about all these things are usually Americans because they are more informed or they are more vocal, so normally these sources are more from the U.S. Based on their greater experience on the issue [teen pregnancies], they should know better.

     o   *Local knowledge*

The body of real-world knowledge most utilized by participants was knowledge of the local society, wherein knowledge of local culture was utilized more than knowledge of current affairs. Participants were also found to be experiencing problems when utilizing current affairs in their

evaluation of information. One of the problems was that participants tend to become confused when they encountered information contrary to what they had originally believed was true. More discerning participants, on the other hand, not only evaluated information based on good knowledge of current affairs but also went further in evaluating the usefulness of the information by pre-empting its future implications on society.

o   *Personal experiences*

This study found only four participants who had utilized their own experience when evaluating information. This low level may be due partly to the sensitivity of the task's topic. One of the participants who mentioned his own experience managed to quickly form a planned direction for the task and began by searching for more objective information to support his opinions on the issue. On the other hand, participants mentioned family members and teachers the least, when it came to interpersonal influences on their personal experience. Participants instead mentioned the influence of friends and acquaintances while seeking and evaluating information. Some significant examples of peer influence on respondents are as follows:

> [P10] [My] friends are more attuned to using the Internet and verifying information. It is also a way for me to balance the information that I have obtained. For example, if the number casualties of an accident ranges from between 12 to 15, 12 as said by the information online and 15 from friends -- I would settle for the middle number.

> [P21] Friends are usually the ones I go to for help. Because they know you, [and] they are the same age as me. We have something in common so we can talk about anything.

Participants utilized the knowledge from friends in two main ways -- to find out how best to search for the specific information and whether the information was reliable or not. For example, a respondent noted that she had used Google and went to specific statistics websites because she remembered the advice given by her "good friend" who works in a department dealing with

information technology. On the other hand, some participants used the information derived from their friends' experiences to evaluate the accuracy and suitability of online information that they encountered.

5.2.2.2 The Self

To build a strong personal locus and to be media literate, people need to possess good knowledge about themselves. This knowledge requires one to be highly self-aware during exposure to the media and to clearly understand the potentialities and limitations of their ability. Having good self-awareness also requires individuals to be constantly reminded of their goals (long-term or immediate), their own strengths and weaknesses, and their personal styles when dealing with information from the media (Potter, 2004). Findings from this study show that almost all the participants mentioned certain aspects of their selves and utilized the knowledge during the task. These aspects can be categorized according to participants' own *goals*, *strengths and weaknesses,* and *personal styles*. Of these, participants were found to possess a strong awareness and utilization of their personal styles in seeking and evaluating online information, followed by the recognition of their goals and personal strengths and weaknesses. The following section highlights the different types and levels of self-awareness displayed by respondents during their search and evaluation of online information.

o   *Goals*

Data gathered from the post-task questionnaire found that participants were more motivated by their immediate goals to locate and evaluate the specific information to complete the task as compared to their long term goals. Participants were also found to constantly remind themselves of their immediate goals during their information search. Strategies which were found to be utilised by participants include creating a set of targets on a Word document and working towards

achieving a smaller set of sub-goals, while others merely reminded themselves of their goals sporadically to help make decisions on whether certain information was reliable or useful. Having a constant awareness of goals kept participants focused and sheltered them from the deluge of online information. Further, findings showed that awareness of goals aided participants in deciding how to apply particular information in achieving their objective. Participant 8's comment illustrates:

> Or I should put abortion procedure. I want to find really gross pictures (because) I want to gross out everyone. Errm, [searches on YouTube] okay, abortion surgery.

○ *Own strengths and weaknesses*

Pertaining to their knowledge of self, participants were least likely to mention their own strengths and weaknesses in searching for information on the Internet. More specifically, participants were found to mention their weaknesses more than their strengths. Of the weaknesses mentioned, participants exhibited the greatest weakness in dealing with information overload or conflicting information, such as being "confused", "uncertain" and "irritated". Apart from this, another notable aspect of personal weakness was related directly to participants' lack of confidence in their own knowledge, capability or skills. Interestingly, some participants who were aware of their lack of personal knowledge and capabilities, instead found it easier to trust their instincts, or as some respondents may call it – "common sense":

> [P4] I am not much of an information filter, so I may be wrong verifying the info myself based on my knowledge.

> [P25] I think approaching different sources will only yield different opinions and viewpoints. How do you then conclude which is the right one? I believe there is no right answer. So the best way is to judge for yourself and only trust yourself.

o   *Personal styles*

Participants were found to be most aware of their personal styles for using the Internet to search for information, for example their comfort with handling various forms of information, such as texts, videos, images and photos. However, the tendency to focus their search on specific forms of information and how it is presented limited their search potential and was found to deprive participants of other forms of potentially useful information.

Ironically, an interesting type of personal style found among participants was the lack of a specific style for searching online information. These participants would merely "go with the flow" and simply made "sense" of information as they encountered it. This spontaneity also applied to the selection of types of information websites.

[P24] But the second one happily caught my eyeball, so I am going to go through it first. It seems that this situation [teenage pregnancies] is getting more normal and normal. Yucks!

5.3   RQ2) Informal methods and interpersonal influences

Findings on the various informal methods and interpersonal influences utilized by participants when evaluating online information were gathered from post-task semi-structured questionnaires. The findings for the different factors were tabulated from a 7-point likert-scale ranging from *strongly disagree to strongly agree*. The most frequently used method was to cross-check online information with other types of media sources. This was followed by respondents' utilization of their personal knowledge and influences of friends. The two least cited influences were to check with teachers and family members. Diagram 2 below shows the means of results obtained

on the different methods and interpersonal influences utilized by participants when evaluating online information.
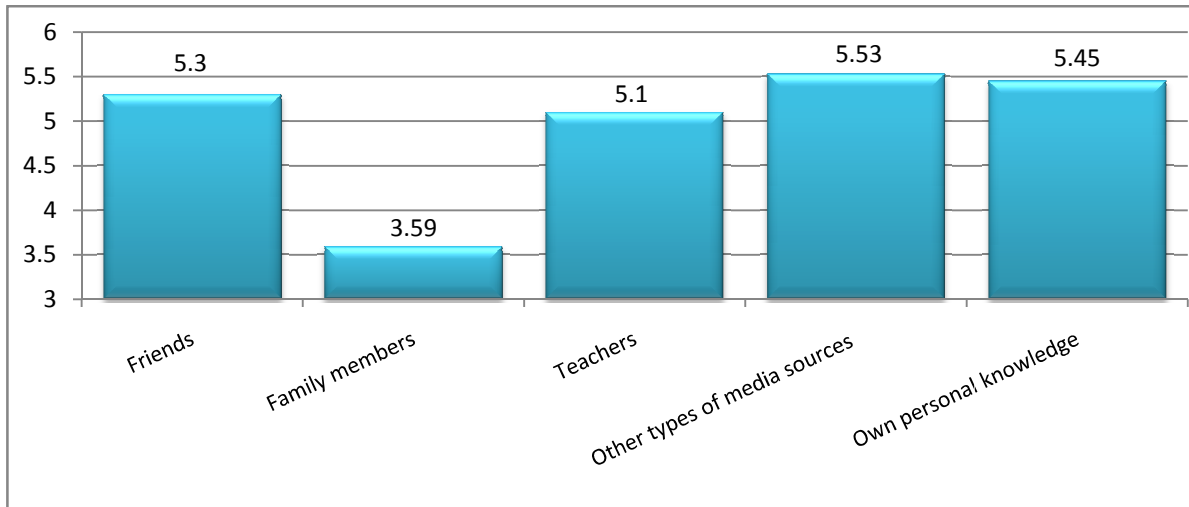
Diagram 2 Informal methods and interpersonal influences for search and evaluation of online information

The questionnaire also asked in open-ended questions why participants do or do not find these various methods and influences significant. The findings are discussed below accordingly.

5.3.1 Other types of media sources

As mentioned above, cross-checking with information from more traditional media sources such as televisions, newspapers and magazines was the most frequently cited method to verify online information. Interestingly, radio was not mentioned as a source used. Two respondents said the radio is a medium more for entertainment than for news. From the findings, the various reasons for cross-checking with traditional media sources can be categorized according to the *perception of credibility*, *knowledge of media production*, *types of information* (facts versus opinions) and *consistency of information*.

- ***Perception of credibility***

A majority of the respondents perceived traditional media such as television news and newspapers to credible sources of information. While most respondents provided rationales for why they deemed those sources more credible, there were also participants who attributed absolute credibility to these traditional sources:

> [P30] I would read newspapers or watch news reports as the information conveyed will be absolutely true.

A number of respondents rationalized that traditional mass media such as television and newspapers are credible because their information is widely disseminated to the public. They reported that they believed these sources have a responsibility to not cheat the public with misleading and false information, especially in the case of Singapore. For example, a respondent highlighted the stringent monitoring of media content by the Ministry of Information, Communication and the Arts (MICA). On top of this, credibility is also attributed according to the reputation of the producers of newspapers and television programs. Some reputable names cited by multiple respondents are the *Straits Times*, CNN, the BBC and the *New York Times*. These producers are automatically accorded information credibility by respondents. More interestingly, one respondent went further into differentiating the level of credibility between local and international news producers. Considering the contexts and styles of production, the respondent reported:

> [P14] For instance (news producers) in Singapore's context (such as) *Straits Times, Today, My Paper* [local news publishers], may have different styles but they all have the same report and angles on the same news. I will check with more established international papers like BBC world, CNN, *New York Times*.

- *Knowledge of media production*

Knowledge of how information is produced and regulated was consistently reported by participants who utilized traditional media sources to verify online information. These participants said that compared to online information, content from newspapers undergo multiple formal checks and editing processes before being printed. As a result, they believed that information from newspapers and television is more accountable and does "not contain false information". Comments from these two participants illustrate:

> [P20] Traditional media like newspapers take the time of its cycle to verify facts and figures, as opposed to Internet sources which aim to put out information too quickly.

> [P37] Sometimes online information should not be accepted wholesale since it does not have the check-and-balance features like in newspapers

However, this knowledge proved to be double-edged for some respondents who find that stringent regulatory processes tend to be "biased or slanted to please the government or the media organization" and should not be trusted completely. More interestingly, participant 16 mentioned that knowledge of the influence of interests in the production of information across different media forms makes counter-checking information a never-ending and frustrating process:

> Other media sources might be able to affirm the information. But they may not necessarily be true as well, as the information they contain might be biased or not trustworthy. I will need to double check with many other mediums. It's like a chicken and egg situation.

- *Types of information (opinions versus facts)*

The study also found that the main problem faced by participants when trying to verify information bias is the difficulty of considering the varying interests involved in opinionated-

sounding information. This is not the case when compared to factual information. Noting this difference, respondents also considered the type of online information that is needed to be verified before deciding to compare them to traditional media sources. Personal experiences and knowledge may actually be more important in verifying socially controversial topics. Therefore, when it comes to ascertaining opinions, traditional mass media sources may not be as useful and reliable. On the other hand, these sources may be more useful in checking for factual accuracy of online information. Participant 46's comment exemplifies this finding:

> Reputable websites such as BBC, NYT [as written in questionnaire] as well as Singapore government websites can be used to double-check. Singapore media tends to be highly regulated – good for checking facts.

- *Consistency of information*

To verify factual information from Internet sources, respondents mainly checked for consistency of information from the different media platforms. On top of consistency, the participants reported that the more they heard about particular information from various mediums, the more they were sure that the information is true. Furthermore, one respondent reported that by comparing and contrasting a particular piece of online news or information with different media sources, she would not only be able to ascertain the accuracy of facts but would also be able to differentiate between facts and opinions inherent in the piece of news. She would then "be more motivated to find the reason for the difference in opinions/findings". Another respondent neatly summed up her reason for utilizing other media sources to verify online information. Participant 13 said, "If all the media tally then the news is true".

However, respondents were also found to not compare online information with traditional media sources because of, for example, "cumbersomeness" and the "non-accessibility" when

comparing multiple sources of information. For some others, it had actually never crossed their minds to verify online information with that in traditional media. This may have been due to the inaccessibility of information from traditional media sources in the lab setting as compared to the Internet, which they were already using. Participant 9 explained:

> Too much unnecessary effort needed (to check with traditional media sources). Online is faster. Most times, stuff gets talked about online then reported in the news if it is a very big problem offline media is too slow.

5.3.2   Personal knowledge

Using personal knowledge is another well-used method to verify online information. Why personal knowledge was utilized was found to be related to the level of *personal trust*, *confidence*, *convenience* and *relevance of knowledge*. Respondents who cited lower levels of these factors did not or preferred not to use their personal knowledge to verify online information. Respondents also likened this inherent knowledge to "common sense" which "instinctually" guides them when deciding the credibility of online information. Furthermore, those who believed that they lacked the proficiency to source for relevant information from different media sources reported relying on their own knowledge to verify online information.

- *Trust*

Trust in one's personal knowledge differs from being confident in one's capability of utilizing personal knowledge to verify online information. Common reasons for respondents, who mentioned trust in oneself as a motivator, are that there are drawbacks in trusting other sources of information and that influences from friends and family members can be flawed. They preferred to "trust their own instincts", which they felt was reliably built up through trial and error and personal experiences. Participant 25's comment illustrates:

70

I think approaching different sources will only yield different opinions and viewpoints. How do you then conclude which is the right one? I believe there is no right answer. So the best way is to judge for yourself and trust yourself.

- *Confidence*

Confidence on the other hand stemmed from the belief that they had "read up extensively" and possessed adequate knowledge attained from school as well as having "surfed the web a lot". One respondent mentioned that being a university student made him believe that he was exposed to high-quality education which allowed him to rely on his own knowledge to verify online information. Confidence in the adequacy of one's personal knowledge was also owed to the rationalization that personal knowledge was a combination of both learnt information and personal opinion. Apart from this, confidence was also based on respondents believing that their personal experience was adequate for checking against false information.

- *Convenience*

Respondents also cited convenience as a factor motivating them to utilize their own knowledge to verify online information. Comparing information from other media sources or other people proved to be very cumbersome for a number of respondents. And for some, these sources were not easily accessible, but their "own logic [was] always around whenever they needed it". On top of reasoning and logic being the easiest verification method to use, utilizing personal knowledge and value judgments also allowed these respondents to convincingly avoid and discredit websites.

[P2] Making use of common sense is the easiest. For example, websites that go against my personal moral values, I would not even entertain. Websites which I feel are overly radical, I will refrain from using as well. Convenient!

- ***Relevance of knowledge***

Real life experiences and knowledge relevant to the information to be verified also made some respondents believe that they know best whether a piece of online information is true. One respondent explained that utilizing personal knowledge greatly depended on whether her real life knowledge pertained to the information and topics faced online. Relevance of the online information to personal experience is also crucial, as it builds a more coherent view of the information according to one's perspective. Respondents have found it hard to establish judgement and make decisions when inundated with a deluge of information and opinions from multitude media sources and interpersonal influences. Interestingly, one respondent noted that the relevancy of one's level of personal knowledge not only affects the evaluation of online information but also determines the sources that one seeks to verify online information:

> [P20] I am my own personal store of information. Furthermore, the information I search for is always relevant to my current level of knowledge. As I build my own knowledge, I refer to and check with what I already know, so I can judge whether the piece of information is reliable more satisfactorily.

5.3.3 Friends

One of the main reasons why respondents depend on their peers to verify online information is their close *proximity* to their friends. Notably, not all respondents depended on their friends to verify online information. For those respondents, the fact that their friends do not possess similar interests or may not come across the same information as they dissuaded them from verifying information with friends. Furthermore, a respondent highlighted that it was useless to confer with friends, as most of the time "no real conclusions would come out of the discussions anyway". Apart from this, some respondents do not trust their friends for the purpose of verifying online information. These respondents said friends are not only "limited in their ability to verify certain

information" but also can be very opinionated and subjective in their answers. One respondent felt strongly on this issue:

> [P35] Friends would usually be as biased as hell or not knowledgeable about the information. Furthermore, they tend to use the exact same sources as me so they might echo me.

However, most respondents find that friends, especially schoolmates, are the "most reachable sources for checking online information". This is due to the fact that respondents' spend most of their time in school with friends, hanging out with friends and even chatting with friends online. They basically spend more time with friends than with any other people, including family members. Friends are therefore a very convenient influence for respondents to verify information. Apart from *proximity*, the other main motivating reasons found are *similarity*, *knowledge* and *trust*.

- ***Similarity***

Being in close proximity and spending a lot of time together also translates to friends being on the "same wavelength" as respondents. Respondents said they find it easier to communicate with friends due to this similarity. Not only do they feel that friends understand them better but also, compared to family members and teachers, respondents felt relatively freer when communicating with and verifying online information and topics with friends. One respondent noted that although friends may possess similar levels of knowledge and understanding and "have a lot of things in common", they most definitely provide a different angle on the same information.

Findings also showed that respondents believed that friends would understand what they meant if they were to ask their friends about the credibility of online sources. This is because friends not only possess the same level of knowledge but are also more attuned to using the Internet and

verifying information from multiple sources. Being together in the same school, doing "the same kinds of research and projects", as well as having similar hobbies or interests; friends are also deemed to have searched for and come across similar information and are believed to have also undergone their own evaluation processes. Therefore, respondents said they believe that friends are dependable sources for verifying online information:

> [P43] Friends usually share common topics and frequency with me, for example when verifying soccer results online.

> [P9] We are in the same field and have similar interests. We tend to talk about it and ask, is it true? And we tend to discuss & come to a conclusion.

- ***Trust***

Trust is another major reason why friends are depended upon in verifying online information. This is especially so for respondents who are not confident in their skills to seek and evaluate information online. For the others, apart from the belief that friends would not normally lie to them, trust also hinges on the fact that they feel that friends possess a high or equal level of "intellectual capability" and knowledge as they in evaluating online information and sources. Similarities between them and friends also foster a special kind of understanding which makes it easier for them to trust that information their friends provided is relevant and pertains to them.

> [P15] I tend to trust my friends' judgement, and they being heavy Internet users, chances are they might have come across something similar and be able to tell me about it.

> [P37] I feel that my friends are considerably intellectual and capable of helping me discern the information.

5.3.4 Teachers

Surprisingly, teachers and educators were found to be the second least influential source aiding respondents' verification of online information. The main reasons for respondents to either confide in teachers or not are *accessibility*, *teacher-student roles* and *knowledge*.

- ***Accessibility***

Although students come into close contact with their teachers in classrooms, most respondents found it very difficult to access their teachers to verify online information. As some topics or information is not related to coursework, they feel that it is only appropriate to seek their teachers outside of class. While most feel uncomfortable approaching a teacher, others mentioned that they do not always have a chance to talk with their teachers. Furthermore, respondents looking to verify online information which is personal and not related to school, such as online shopping and hobbies, said they feel that seeking advice from teachers on these topics is totally "out-of-bounds". These feelings may be fuelled by the cultural perception of the roles and relationships between teacher and student in Singapore.

- ***Teacher-student roles***

Respondents also reported that they do not have close relationships with their teachers and therefore find it intimidating to verify online information with a teacher. Some respondents also find it "troublesome" and "taxing" to ensure that the questions are prepared well for them to effectively utilize the consultation session with their teachers as teachers are very busy and coming unprepared is disrespectful. Respondents also reported that, as students, they should not be asking teachers questions which do not have any academic value. Being in university, some respondents also look at

themselves as independent learners and that asking their lecturers too many questions may give the impression that they are incompetent and "pesky". One respondent expressed it this way:

> [P23] I do not want them to think that I am too dumb to evaluate websites and information myself.

However, the perception of the relationship between teacher and student is not entirely negative. Findings also show that some respondents find teachers a useful and reliable avenue for them to verify online information. Mainly, as mentioned by respondents, teachers are highly trusted, because they feel that teachers will not provide answers out of convenience since they have a duty to their students to impart accurate information. Also, compared to other human sources such as friends and family members, teachers are deemed to be the most neutral and unbiased when imparting advice. As a result, teachers instil confidence which is highly sought when verifying information:

> [P10] I will tend to listen to their inputs since I believe they also have a social responsibility towards their students and the community in ensuring that accurate information is being used.

- *Knowledge*

Related to the teacher-student relationship, respondents felt that their teachers are highly qualified and authoritative when it comes to possessing the knowledge to verify online information and sources. Teachers are also accorded mastery of content by respondents. Furthermore, respondents who approach teachers to verify online information unanimously mention the latter's experience and knowledge as the most compelling factor influencing them to seek verification from their teachers. Due to lecturers' vast experience, one respondent who frequently finds himself inundated with a wealth of information online consults his lecturers because of their capability of

filtering information. On top of this, teachers are also believed to be the most up-to-date on a lot of things. Comments from two respondents illustrate:

> [P26] Teachers are basically the ones who taught me how to verify online information in the first place.

> [P17] They usually know what sites are credible. They mark our papers and point out what references are not good.

5.3.5 Family members

Respondents' family members have the least influence on the verification of online information. Although they would trust their parents to help verify information due to parents being older, wiser and, experienced, but findings suggested otherwise when it came to conferring with family members to verify online information. This is mainly because respondents think their family members are people who possess the most dissimilar background and interests as compared to their own. Therefore, family members are not helpful to respondents in verifying information; especially information which comes from Internet sources. Besides *differing knowledge and interests*, respondents cited the *generation gap* and *trust* as reasons affecting their reliance on family members for verifying online information.

- ***Differing knowledge and interests***

The findings reflect the mentality of respondents when it comes to seeking help from family members to verify online information. Some respondents said their family members, especially parents, are "not in touch with the Internet", "do not search for information online" and are therefore not "Internet-savvy". As a result, they see no point in conferring with their parents for help in evaluating online information and websites:

[P29] My family members are either much older than me or do not know much about the Internet or the stuff on the Internet. My big brother and sister are too busy with their own school and work. The Internet is just something we don't talk about.

[P4] [There's] no point, my family members are techno-idiots [sic].

Apart from the disparity in knowledge with regards to the Internet and online sources, family members are also found to differ from respondents in terms of their interests. As pointed out by one respondent whose parents actually use the Internet, the parents basically used the Internet to gather the latest gossip on celebrities. Therefore, the respondent felt that confiding in parents was irrelevant as gossip by its very nature does not need to be verified. However, the knowledge which parents had gained from their life experiences did raise parents' positions as reliable sources of information verification. One respondent said she would consult her parents on things like government policies and travel information, as her parents had more experience and interest in those topics. For another, this useful difference in interests is also due to parents' weightier responsibilities:

[P1] Parents are updated about current affairs since the bulk of pertinent issues such as the [national] budget impacts them more than me so they might be able to help me verify these things. They have also gone through experiences which enable me to trust them more with the verification of information.

Participants' belief that their parents have differing interests with them, such as in world and current affairs, also motivates them to seek verifications with their parents when it comes to information pertaining to the topic. More interestingly, as their parents are more exposed and obtained this information mainly from mass media sources such as television and newspapers, respondents regarded their parents as conduits to these traditional media. They said they find it

convenient to have this short-cut to the information in newspapers by discussing these issues with their parents.

> [P12] They do watch the news and read newspapers more so I can ask if the incident was mentioned.

> [P13] My family members will definitely talk about contemporary issues to complain or discuss, especially my mother who watches the news 24/7.

- *Generation gap*

Differences in age and a conservative culture in the family setting make it harder for respondents to confide in their parents and siblings. As one respondent noted, certain issues such as sex and relationships are hard to broach. Other respondents noted that family conversations are not open to all issues. Apart from this, problems due to generational differences are more pronounced with a few respondents who commented, for example, that parents and siblings simply do not understand them. Some reported that their parents' knowledge tends to be outdated, while others noted that miscommunication tends to occur in discussions with family members. And in some of these cases, friends do become the next alternative to confide in with regards to sensitive online information:

> [P21] I am quite an independent person and spend more time in school with friends more than family. There are things they [family members] can get worried about or cannot understand. They don't know what stuff I am interested (in).

Summary of findings and implications

Overall, the findings show that amongst the Singaporean youths who participated in the study, knowledge structures based on objective and factual sources are utilized more than contextual and subjective knowledge in their evaluation of online information. Among the objective media-related knowledge structures of *media content*, *media industries* and *media effects*; knowledge of *media content* was the most utilized in seeking and evaluating online information. The findings also showed that respondents utilized very minimally, and some not at all, contextual or personal knowledge. These "meaning-matchers" were very focused on gathering more sources of information in their search for mainly factual information. More worryingly, the fact that the task provided was partially-specified and required a certain level of contextual evaluation on information may indicate that these students are not able to handle the highly biased online information as effectively as possible since biased information requires a certain level of rational and contextual analysis besides factual verification. Between the two contextual knowledge structures displayed, knowledge of the *real world* seemed to be more prominent as compared to knowledge of the *self* amongst Singaporean students. From the variations of real-world knowledge utilized, Singaporean students most utilized their knowledge of local culture and current affairs.

With regards to the informal methods and interpersonal influences that Singaporean students found helpful in their evaluation of online information, the most frequently used method was to cross-check the online information obtained with information from more traditional media sources. This was followed by reliance on their personal knowledge when evaluating online information. Interpersonal influences were not as significant compared to these informal methods for evaluation; however, participants were found to rely a lot on friends and acquaintances when discerning online information. Their close physical proximity to their friends and the trust resulting

from "similar wavelengths" were reasons given for relying on friends as a good source of advice for evaluating online information. Surprisingly, points-of-authority for education such as teachers were found to be not as influential. Reluctance to approach teachers proved to be the biggest hindrance to their reliance on teachers. Family members on the other hand proved to be the least influential source for respondents when evaluating online information.

6.1   Multimodality

The study also noted a number of knowledge factors from Potter's (2004) theory of media literacy, one of which was the level of competencies and thought patterns involved when users are faced with multimodal online content. Participants' thought processes seemed to be more complex, and in some cases overloaded, as they analyzed the information obtained from images and videos and synthesize them relevantly towards their goal. It seems that in order to be able to analyze and synthesize these different modes of information effectively, participants require more than computer skills and adequate knowledge. They require creativity as well. As has been mentioned by other scholars, the practices of Internet amongst youths today are more complex, sophisticated and entirely more creative as they participate in multimodal forms of communication (Lemke, 2002). However, even though creativity is found to be vital to youths' "abilities to work imaginatively and with a purpose, and to fashion critical responses to problems" across various curricular and media platforms (Facer & Williamson, 2004, pp.2), literacy tests and education are still based mostly on skills and words (Vincent, 2006). As echoed by the impact of the multimodal environment on users found in the present study, the skill dimensions such as creativity and the ability to handle increasingly complex cognitive processes are found wanting for more critical use of the Internet.

Notably also, findings show that participants are emotionally affected by multimodal content, and to a certain level, frustrated and overwhelmed by the combinatorial effects and possibilities of

the various modes used in the representation of online information. This difficulty is brought about by the newly required skill which emphasizes the centrality of "reading" the visuals and aesthetics of websites' interfaces as compared to the more traditional linear" reading of texts in books and papers (Kress and van Leuwen, 1996). And not only does the complexity affect users' emotions, the present study also found that participants' information-making decisions are affected by their personal feelings towards certain images and their subject matter. For example, an image of a child with sexually transmitted diseases will affect the judgment on the severity of the disease as compared to the image of an adult with such diseases. This shows that in the online environment, managing individual temperament and increasing their exposure to multimodal representation of information are increasingly important.

In this regard, media literacy theories and training should also focus on the emotional aspects and cognitive processes in youths' critical consumption of multimodal media content, given that their ability to consume media in a critical and discerning fashion may be wanting and further challenged in multimodal media environment [see Hobbs & Frost, 2003; Livingstone & Bober, 2004a; Shenton, 2004]. And in Singapore's context, these youths would already have grown up and will continue to live and work in an environment where multimodal representations of information proliferate across the various, readily available media technologies (Lim, Nekmat, & Nahar, 2009).

6.2 Influence of personal thinking styles

Besides uncovering the salient knowledge structures utilized during youths' search and evaluation of online information, findings from the study revealed the salience of certain cognitive styles and search patterns exhibited by participants. Cognitive styles, otherwise known as thinking styles or knowledge styles (Potter, 2004), are relatively stable patterns of information processing and thinking displayed by different individuals during problem-solving when trying to achieve a specific

objective or goal (Dillon & C. Watson, 1996). Due to constraints, the present study was not able to analyze the findings in greater depth towards exploring the pertinence of these thinking styles in youths' search and evaluation of online information. However, the present study highlights some general findings on the salient thinking styles displayed by participants, which may be useful in future studies.

One observation is that participants may be affected by their specific thinking styles at a more subconscious level as compared to their rationalized thought processes involving their inherent knowledge structures. Described as a habitual way of doing a specific cognitive task (Wang, Hawk, & Tenopir, 2000), these styles are modes of thinking which are self-consistent dimensions of one's personality (Harrison & Rainer Jr, 1992), constituting a person's characteristic mode of operation or behaviour (Martzoukou, 2004). In the present study, although different participants showed different levels and types of knowledge structures when dealing with online information, their personal thinking styles seemed to impact the effectiveness of their activity more, operating at a subconscious level, of which they may not be fully aware. Being automatic responses and habitual strategies during problem-solving situations affecting an individual's style of searching for and analysing relevant information (Saracho, 1998), this situation begs the crucial question of how or when during their lifetimes individuals pick up these cognitive strategies which eventually become ingrained and habitual. These are possible questions for future investigations on the topic.

On top of this, research focusing on the relationship between users' thinking styles and their impact on users' interaction with media and information is also becoming increasingly salient. Extant studies, stemming from the field of education (egs., Chen & Macredie, 2001; Chou, 2001; Chuang, 1999; Ford & Chen, 2000; Graff, 2005; Lu, Yu, & Liu, 2003; Oughton & Reed, 1999), and library and information sciences (egs., Crossland, Herschel, Perkins, & Scudder, 2000; Cutmore, Hine, Maberly,

Langford, & Hawgood, 2000; Huang, 1998; Montgomery, 1991; Palmquist & Kim, 2000), have looked at the significance of thinking styles employed during individuals' interaction with information and hypermedia. More closely related to the focus of this thesis, studies have begun very recently to focus on these inherent styles specifically during their interaction with information on the World Wide Web (Chen, 2010; Madrid, Oostendorp, & Melguizo, 2009; Clewley, Chen, Liu, 2010; Chen, Magoulas, and Dimakopoulos, 2005). Also, within the cognitive-psychological theory of media literacy, understanding personal thinking styles is important to achieve a higher level of personal locus for effective search and evaluation of information. As a dimension in the knowledge structure of *self*, being aware and having a good understanding of one's own thinking style have been found to be important coping approaches when faced with information (Lau, 1986; Taylor, 1981). As such, it is essential to look at a person's thinking styles in order to better understand how an individual's abilities affect the personal locus. Therefore, although the present study is constrained by resources and unable to explore deeper the pertinence of this dimension affecting Singaporean youths' interaction with online information, future studies with the aim of understanding the various factors affecting user's search and evaluation of online information may find it pertinent to further extend this line of inquiry.

Conclusion and future directions for media literacy education

In today's new media landscape, consuming media content is only part of the equation. The freedom and ability to create and disseminate content is now increasingly available and practiced by everyday users. Primarily, the digitisation of media content and the increasing availability of personal media tools for the creation of text, image, video and audio facilitate the popularity of bricolage -- the ability to manipulate objects in one's milieu -- -- amongst media consumers. (Shih, 1998; Turkle, 1995). An example of a growing trend is Web 2.0, which refers to websites containing content generated by users and shared on a peer-to-peer basis. Termed "presuming" or "produsage" this situation where media users are producing and consuming media content at the same time complicates media literacy education (Bruns, 2007). Therefore the focus of media literacy education should not solely be on critical consumption of media information, but also on the possession of appropriate skills and knowledge for producing and disseminating media messages. The findings from the present study highlighted the salience of personal experiences and interpersonal influences on one's evaluation of information and may lend a hand in improving this situation in that media literacy education should look at the salience of culturally and socially situated influences, such as personal experiences, friends, family members and teachers, when seeking to educate Internet users on consumption and production of media content.

Although media literacy education is approached differently in different contexts, its aim is generally focused on imbuing autonomy in users when dealing with media information. Primarily, media users need to possess both functional media literacy – knowing how to access media – and critical media literacy – being able to understand, evaluate and critique media messages (Buckingham, 2005). In the context of developing countries, media literacy education is typically focused on equal access to opportunities and empowerment. Mainly targeting children and the

young, this approach requires youths to not only take an active role in the critical consumption of media messages, but also emphasizes the safe and lawful creation and dissemination of these messages (Asthana, 2006; Kincade & Macy, 2003). As argued by Lim and Nekmat (2009), the production and dissemination of information requires a strong knowledge and understanding of the personal and social impact of such a venture. Everyday users who produce media content have to be mindful to do so without compromising personal safety, privacy, or incurring liability.

Also, as exemplified by the findings from this study, Singaporean undergraduates are prone to utilize objective and factual knowledge within their personal knowledge structures. Media literacy education should therefore leverage this aspect of knowledge. This could be done by educating the young adequately while in lower-level schools through proper social-education curriculum. Information and lessons obtained via formal education may be important for building knowledge structures which are more factually-based, ones that users may look upon for certainty and objectivity, as participants from this study have been found to favour.

In Singapore, information technology has permeated virtually every aspect of life, going beyond government, business, and education to everyday social interactions between friends and family members. To enhance Singaporean students' media literacy, a strategy called the Media 21 plan was devised in 2002 by the Media Development Authority. The programs, however, were narrowly-focused on "fostering a culture of appreciation for media products among Singaporeans … (and) to increase audience appreciation of films and TV" (Media Development Authority, 2008, p.15). This conception of media literacy has been insufficient in the face of the media onslaught faced by Singaporeans today, especially coming from digital media technologies such as the Internet. A new plan called the Intelligent Nation 2015 (iN2015) was then created by the Infocomm Development Authority in 2003 as a blueprint to promote "Infocomm literacy" (IDA, 2008). However, the focus was

mainly on capabilities and skills development as a foundational block to safely and effectively maximize the utility of information communication technologies in society.

Currently, the focus of this master plan has shifted to the education and learning clusters in Singapore. However, the plan is mainly focused on fusing the pedagogical methods and learning experiences in schools with the latest technological innovations, such as digital textbooks and mobile learning applications. Although these changes further embed in society the importance of functional media literacy, it does not discount, but rather exponentially increases the need for comprehensive media literacy, such as critical, evaluative and communicative literacy, due to the surfeit of mediated information available in society today.

The findings of the present study also indicate that Singaporean undergraduates are found wanting of better cognitive capabilities in applying contextual knowledge and evaluating online information. It may be reasoned that the existing approaches to media literacy education in schools as discussed above may have created a functionally-oriented approach to media information where emphasis is mainly placed on using media to effectively achieve certain goals, as opposed to a more analytical approach with regards to handling information in the various media forms. Not discounting the merits of the existing approach, future programs and policies should now move beyond "media education" and propagate instead a more autonomous and comprehensive "media literacy" approach. It is hoped that the findings from the present study, which highlight the pertinence of personal knowledge and informal influences in Singaporean youths' search for and evaluation of online information, may help inform future media literacy initiatives and research and help to foster safer and more effective media use, especially amongst the young.

References

Advisory Council on the impact of New Media on Society . (2008). *Engaging New Media: Challenging old assumptions*.

American National Research Council Committee on Information Technology Literacy . (1999). *Being fluent with information technology*. Washington D.C: National Academy Press.

Arnold, J. M., & Jayne, E. A. (1998). Dangling by a slender thread: The lessons and implications of teaching the World Wide Web to freshmen. *The Journal of Academic Librarianship*, *24*(1), 43-52.

Association of College and Research Libraries. (2000). Information literacy competency standards for higher education. Retrieved March 23, 2008, from http://www.ala.org/ala/acrl/acrlstandards/standards.pdf.

Association of College and Research Libraries . (2000). *Information literacy competency standards for higher education*. Chicago, IL: Association of College and Research Libraries.

Asthana, S. (2006). *Innovative practices of youth participation in media. A research study on twelve initiatives from around the developing and underdeveloped regions of the world*. Paris, France: United Nations Educational, Scientific and Cultural Organization (UNESCO). Retrieved from

http://portal.unesco.org/ci/en/files/22831/11593413569UNESCO_Innovative_practices.pdf/ UNESCO+Innovative+practices.pdf.

Attewell, P. (2001). The First and Second Digital Divides. *Sociology of Education*, *74*(3), 252-59.

Aufderheide, P. (1993). *Media Literacy: A report of the national leadership conference on media literacy*. Aspen, CO: Aspen Institute.

Aufderheide, P. (2001). Media literacy: From a report of the National Leadership Conference on Media Literacy. In R. Kubey (Ed.), *Media literacy in the information age*, Information and behaviour (Vol. 6, pp. 79-86). New Brunswick, NJ: Transaction.

Aviram, A., & Eshet-Alkalai, Y. (2006). Towards a Theory of Digital Literacy: Three Scenarios for the Next Steps. *European Journal of Open, Distance and E-Learning*. Retrieved April 16, 2008, from http://www.eurodl.org/materials/contrib/2006/Aharon_Aviram.htm.

Bajkiewicz, T. E. (2002). *Teens, technology, and teaching science: A case study in media literacy, science literacy, and student-authored hypermedia*. Doctoral dissertation, The University of North Carolina at Chapel Hill.

Bawden, D. (2001). Information and digital literacies: a review of concepts. *Journal of Documentation*, *57*(2), 218-259.

Berger, P. (1998). *Internet for active learners: Curriculum-based strategies for K-12.* Chicago: American Library Association.

Blair, J., Conrad, F., Ackermann, A. C., Claxton, G., & Abt Associates, I. (2006). The effect of sample size on cognitive interview findings. In *61st annual meeting of the American Association for Public Opinion Research, Montreal, Quebec, May* (pp. 18–21).

Blandy, S. G., & Libutti, P. O. (1995). As the cursor blinks: Electronic scholarship and undergraduates in the library. *Library Trends*, *44*(2), 279-305.

Bonfadelli, H. (2002). The Internet and Knowledge Gaps: A Theoretical and Empirical Investigation. *European Journal of Communication*, *17*(1), 65.

Branch, J. L. (2000). Investigating the Information-Seeking Processes of Adolescents The Value of Using Think Alouds and Think Afters. *Library and Information Science Research*, *22*(4), 371-392.

Britt, M. A., & Gabrys, G. L. (2001). Teaching advanced literacy skills for the World Wide Web. In C. Wolfe (Ed.), *Learning and teaching on the world wide web* (pp. 73-90). San Diego: Academic Press.

Bruns, A. (2007). Produsage: Towards a broader framework for user-led content creation. In *Creativity & Cognition* (Vol. 6, pp. 13-15). Citeseer.

Buckingham, D. (2003). *Media Education: Literacy, Learning and Contemporary Culture*. London: Polity Press.

Bundy, A. (Ed.). (2004). Australian and New Zealand information literacy framework. In *Principles, Standards and Practice* (2nd ed.). Adelaide: Australian and New Zealand Institute for Information Literacy.

Burbules, N. C. (1998). Rhetorics of the Web: Hyperreading and critical literacy. In I. Snyder (Ed.), *Page to screen: Taking literacy into the electronic era* (pp. 102-122). New York, NY: Routledge.

Carmel, E., Crawford, S., & Chen, H. (1992). Browsing in hypertext: a cognitive study. *Systems, Man and Cybernetics, IEEE Transactions on*, *22*(5), 865-884.

Cazden, C. B. (2000). Taking cultural differences into account. In B. Cope & M. Kalantzis (Eds.), *Multiliteracies: Literacy learning and the design of social futures* (pp. 249-266). New York, NY: Routledge.

Chae, M., Kim, J., Kim, H., & Ryu, H. (2002). Information Quality for Mobile Internet Services: A Theoretical Model with Empirical Validation. *Electronic Markets*, *12*(1), 38-46.

Chen, L. H. (2010). Web-based learning programs: Use by learners with various cognitive styles. *Computers & Education*, *54*, 1028-1035.

Chen, S. Y., & Liu, X. (2009). Mining students' learning patterns and performance in Web-based instruction: a cognitive style approach. *Interactive Learning Environments*, (1), 1-14.

Chen, S. Y., & Macredie, R. D. (2001). Cognitive styles and hypermedia navigation: Development of a learning model. *Journal of the American Society for Information Science and Technology*, *53*(1), 3-15.

Chen, S. Y., Magoulas, G. D., & Dimakopoulos, D. (2005). A flexible interface design for Web directories to accommodate different cognitive styles. *Journal of the American Society for Information Science and Technology*, *56*(1), 70-83.

Cheong, P. H. (2007). Gender and Perceived Internet Efficacy: Examining Secondary Digital Divide Issues in Singapore. *Womens Studies in Communication*, *30*(2), 205.

Cheong, P. H. (2008). The young and techless? Investigating Internet use and problem-solving behaviours of young adults in Singapore. *New Media & Society*, *10*(5), 771-791.

Cho, J., de Zuniga, H. G., Rojas, H., & Shah, D. V. (2003). Beyond Access: The Digital Divide and Internet Uses and Gratifications. *IT & Society*, *1*(4), 46-72.

Chou, H. W. (2001). Influences of cognitive style and training method on training effectiveness. *Computers & Education*, *37*(1), 11-25.

Christ, W. G., & Potter, W. J. (1998). Media literacy, media education, and the academy. *The Journal of Communication*, *48*(1), 5-15.

Chuang, Y. R. (1999). Teaching in a multimedia computer environment: A study of the effects of learning style, gender, and math achievement. *Interactive multimedia electronic journal of computer-enhanced learning*, *1*(1), 1999.

Ciolek, T. M. (1996). The Six Quests for The Electronic Grail: Current Approaches to Information Quality in WWW Resource. Retrieved August 21, 2008, from http://www.ciolek.com/papers/six-quests1996.html.

Claus-Smith, D. (1999). Starting small, dreaming big: The OSLIS project brings resources statewide. *Multimedia Schools*, *6*(5), 29-31.

Clewley, N., Chen, S. Y., & Liu, X. (2010). Cognitive styles and search engine preferences. *Journal of Documentation*, *66*(4), 585-603.

Coiro, J. (2003). Reading Comprehension on the Internet: Expanding Our Understanding of Reading Comprehension To Encompass New Literacies. *Reading Teacher*, *56*(5), 458-64.

Cope, B., & Kalantzis, M. (2000). *Multiliteracies: Literacy Learning and the Design of Social Futures*. London: Routledge.

Cotten, S. R., & Gupta, S. S. (2004). Characteristics of online and offline health information seekers and factors that discriminate between them. *Social Science & Medicine*, *59*(9), 1795-1806.

Crossland, M. D., Herschel, R. T., Perkins, W. C., & Scudder, J. N. (2000). The impact of task and cognitive style on decision-making effectiveness using a geographic information system. *Journal of end user computing*, *12*(1), 14-23.

Cutmore, T. R. H., Hine, T. J., Maberly, K. J., Langford, N. M., & Hawgood, G. (2000). Cognitive and gender factors influencing navigation in a virtual environment. *International Journal of Human computer studies*, *53*(2), 223-250.

DeTure, M. (2004). Cognitive style and self-efficacy: Predicting student success in online distance education. *American Journal of Distance Education*, *18*(1), 21-38.

van Dijk, J. (2006). Digital divide research, achievements and shortcomings. *Poetics*, *34*(4-5), 221-235.

Dillon, A., & Watson, C. (1996). User analysis in HCI: the historical lesson from individual differences research. *International Journal of Human-Computer Studies*, *45*(6), 619-637.

DiMaggio, P., Hargittai, E., Celeste, C., & Shafer, S. (2004). Digital Inequality: from Unequal Access to Differentiated Use. In K. Neckerman (Ed.), *Social Inequality* (pp. 355-400). New York: Russell Sage Foundation.

Doyle, C. S. (1992). *Outcome measures for information literacy within the National Educational Goals of 1990*. Flagstaff, AZ : National Forum on Information Literacy.

Ebersole, S. (2000). Uses and Gratifications of the Web among Students. *Journal of Computer-Mediated Communication*, *6*(1), 0-0. doi: 10.1111/j.1083-6101.2000.tb00111.x.

Eighmey, J., & McCord, L. (1998). Adding Value in the Information Age: Uses and Gratifications of Sites on the World Wide Web. *Journal of Business Research*, *41*(3), 187-194.

Ericsson, K. A., & Simon, H. A. (1984). *Protocol analysis: Verbal reports as data*. Cambridge, MA: The MIT Press.

Ericsson, K. A., & Simon, H. A. (1993). *Protocol analysis: Verbal reports as data* (Rev.). Cambridge, MA: MIT Press.

Eshet, Y. (2002). Digital literacy: a new terminology framework and its application to the design of meaningful technology-based learning environments. In P. Barker & S. Rebeslky (Eds.),

Educational Multimedia and Hypermedia (pp. 493-498). Norfolk, VA: Association for the advancement of Computing in Education.

Eveland , W. P., & Dunwoody, S. (2000). Examining Information Processing on the World Wide Web Using Think Aloud Protocols. *Media Psychology*, *2*(3), 219-244.

Eysenbach, G., & Diepgen, T. L. (1998). Towards quality management of medical information on the Internet: evaluation, labelling, and filtering of information. *BMJ: British Medical Journal*, *317*(7171), 1496.

Eysenbach, G., & Köhler, C. (2002). How do consumers search for and appraise health information on the world wide web? Qualitative study using focus groups, usability tests, and in-depth interviews. *BMJ: British Medical Journal*, *324*(7337), 573.

Fabos, B. (2006). Search engine autonomy: The industry and its commercial structure. In C. Kapitske & B. C. Bruce (Eds.), *Libr@ries: Changing information space and practices* (pp. 229-252). Mahwah, NJ: Lawrence Erlbaum Associates.

Fabos, B. (2008). The Price of Information: Critical literacy, education and today's Internet. In J. Coiro, M. Knobel, C. Lankshear, & D. J. Leu (Eds.), *Handbook of Research on New Literacies* (pp. 839-870). New York, NY: Lawrence Erlbaum Associates.

Facer, K., & Furlong, R. (2001). Beyond the Myth of the 'Cyberkid': Young People at the Margins of the Information Revolution. *Journal of Youth Studies*, *4*(4), 451-469.

Facer, K., & Williamson, B. (2004). Designing technologies to support creativity and collaboration. *A handbook from NESTA Futurelab*.

Facione, P. A., Sanchez, C. A., Facione, N. C., & Gainen, J. (1995). The disposition toward critical thinking. *Journal of General Education*, *44*(1), 1-25.

Ferguson, D. A., & Perse, E. M. (2000). World Wide Web as a Functional Alternative to Television, The. *Journal of Broadcasting & Electronic Media*, *44*(2), 155.

Ford, N. (2004). Modeling cognitive processes in information seeking: From Popper to Pask. *Journal of the American Society for Information Science and Technology*, *55*(9), 769-782.

Ford, N., & Chen, S. Y. (2000). Individual Differences, Hypermedia Navigation, and Learning: An Empirical Study. *Journal of Educational Multimedia and Hypermedia*, *9*(4), 281-312.

Ford, N., & Ford, R. (1992). Learning styles in an ideal computer-assisted learning environment. *British Journal of Educational Technology*, *23*, 195-211.

Gilster, P. (1997). *Digital Literacy*. NewYork: John Wiley & Sons.

Graff, M. (2005). Individual differences in hypertext browsing strategies. *Behaviour & Information Technology*, *24*(2), 93-99.

Grimes, D. J., & Boening, C. H. (2001). Worries with the Web: A Look at Student Use of Web Resources. *COLLEGE AND RESEARCH LIBRARIES*, *62*(1), 11-24.

Hahn, S. E. (1997). Internet: Let the User Beware. *Reference Services Review*, *25*(2), 7-13.

Hargittai, E. (2002). Second-level Digital Divide: Differences in people's online skills, *7*(4). Retrieved November 15, 2008, from http://firstmondayorg/issues/ issue7_4/hargittai/index.html.

Hargittai, E., & Hinnant, A. (2008). Digital Inequality: Differences in young adults' use of the Internet. *Communication Research*, *35*(5), 602-621.

Harrison, A. W., & Rainer Jr, R. K. (1992). The influence of individual differences on skill in end-user computing. *Journal of Management Information Systems*, 93-111.

Henry, L. A. (2005). Information Search Strategies on the Internet: A Critical Component of New Literacies. *Webology*, *2*(1).

Higginbottom, N., & Packham, B. (2007, August 26). Student cracks Government's $84m porn filter. *Herald Sun*. Retrieved from http://www.news.com.au/story/0,23599,22304224-2,00.html#.

Hill, D. T. (2003). Plotting public participation on Indonesias Internet. *South East Asia Research*, *11*(3), 297-325.

Hirsh, S. G. (1999). Children's relevance criteria and information seeking on electronic resources. *Journal of the American Society for Information Science*, *50*(14), 1265-1283.

Hobbs, R., & Frost, R. (2003). Measuring the acquisition of media-literacy skills. *Reading Research Quarterly*, *38*(3), 330-355.

Hogarth, R. M. (1987). *Judgment and Choice: The Psychology of Decision* (2nd ed.). John Wiley & Sons.

Hope, S. (2007). *Searching the Internet: A Think Aloud Investigation Into College Students' Online Search Behavior*. Purdue University Graduate School, West Lafayette, Indiana.

Hoppmann, T. K. (2007). Examining the 'point of frustration'. The think-aloud method applied to online search tasks. *Quality and Quantity*, *Online First*, 1-14. doi: 10.1007/s11135-007-9116-0.

Huang, C. M. (1998). The relationships of cognitive styles and image matching. *Bulletin of Library and Information Science*, *27*, 55-71.

Hughes, J. E., Packar, B. W., & Pearson, P. D. (1998). Reading classroom explorer: Navigating and conceptualizing

a hypermedia environment. Retrieved August 27, 2008, from http://www.readingonline.org/research/explorer/article.html.

Hung, T. (2005). Search Moves and Tactics for Image Retrieval in the Field of Journalism: A Pilot Study. *JOURNAL OF EDUCATIONAL MEDIA AND LIBRARY SCIENCES*, *42*(3), 329.

Ignacio Madrid, R., Van Oostendorp, H., & Puerta Melguizo, M. C. (2009). The effects of the number of links and navigation support on cognitive load and learning with hypertext: The mediating role of reading order. *Computers in Human Behavior*, *25*(1), 66-75.

Infocomm Development Authority. (2008). Annual Survey of Infocomm Usage on Households and Individuals for 2007. *Publications*. Retrieved July 16, 2008, from http://www.ida.gov.sg/Publications/20061205092557.aspx#usage.

International Technology Education Association . (1996). *Technology for All Americans: A rationale and structure for the study of technology*. Reston, VA: International Technology Education Association.

International Visual Literacy Association. (2006). What is 'Visual Literacy'? . Retrieved March 28, 2008, from www.ivla.org/org_what_vis_lit.htm.

Internet World Statistics. (2008, June 30). Top 47 countries with the highest Internet penetration rate. *Internet World Stats: Usage and population statistics*. Retrieved December 26, 2008, from http://www.Internetworldstats.com/top25.htm.

Jackson, L. A., Ervin, K. S., Gardner, P. D., & Schmitt, N. (2001). The Racial Digital Divide: Motivational, Affective, and Cognitive Correlates of Internet Use 1. *Journal of Applied Social Psychology*, *31*(10), 2019-2046.

Jewitt, C., & Kress, G. (2003). *Multimodal Literacy*. London: Peter Lang.

Johnson, T. J., & Kaye, B. K. (2000). Using Is Believing: The Influence of Reliance on the Credibility of Online Political Information among Politically Interested Internet Users. *Journalism and Mass Communication Quarterly*, *77*(4), 865-879.

Jonassen, D. H., Carr, C., & Yueh, H. P. (1998). Computers as mindtools for engaging learners in critical thinking. *TechTrends*, *43*(2), 24-32.

Kalantzis, M., & Cope, B. (2000). A Multiliteracies Pedagogy: A pedagogical supplement. In M. Kalantzis & B. Cope (Eds.), *Multiliteracies: Literacy learning and the design of social futures* (pp. 239-248). New York, NY: Routledge.

Kapitzke, C. (2001). Information literacy: The changing library. *Journal of Adolescent & Adult Literacy*, *44*(5), 450-456.

Kellner, D. (2002). Technological revolution, multiple literacies, and the restructuring of education. In I. Snyder (Ed.), *Silicon Literacies* (pp. 154-169). London: Routledge.

Kim, K. S., & Allen, B. (2002). Cognitive and task influences on Web searching behavior. *Journal of the American Society for Information Science and Technology*, *53*(2), 109-119.

Kincade, S., & Macy, C. (2003). *What Works in Youth Media: Case Studies from Around the World*. International Youth Foundation. Retrieved from http://www.iyfnet.org/uploads/ACFE92.pdf.

Kiousis, S. (2001). Public Trust or Mistrust? Perceptions of Media Credibility in the Information Age. *Mass Communication & Society*, *4*(4), 381-403.

Kling, R. (2000). Learning About Information Technologies and Social Change: The Contribution of Social Informatics. *The Information Society*, *16*(3), 217-232.

Kress, G. (2003). *Literacy in the New Media Age*. New York, NY: Routledge.

Kress, G. (2000). Multimodality. In B. Cope & M. Kalantzis (Eds.), *Multiliteracies: Literacy learning and the design of social futures* (pp. 182-202). New York, NY: Routledge.

Kuusela, H., & Paul, P. (2000). A comparison of concurrent and retrospective verbal protocol analysis. *The American journal of psychology*, *113*(3), 387-404.

Kvale, S. (1996). *Interviews. An introduction to qualitative research interviewing*. Thousand Oaks, CA: Sage.

Lankshear, C., & Knobel, M. (2003). *New Literacies: Changing knowledge and classroom learning*. Philadelphia, PA: Open University Press.

Lankshear, C., & Knobel, M. (2007). Researching New Literacies: Web 2.0 practices and insider perspectives. *E-Learning*, *4*(3), 224-240.

Lau, R. (1986). Political schemata, candidate evaluations, and voting behaviour. In R. Lau & D. Sears (Eds.), *Political Cognition* (pp. 95-126). Hillsdale, NJ: Lawrence Erlbaum.

Lawrence, S., & Giles, C. L. (1999). Accesibility of information on the Web. *Nature*, *400*(6740), 107-109.

Lee, C. H. M., Cheng, Y. W., Rai, S., & Depickere, A. (2005). What affect student cognitive style in the development of hypermedia learning system? *Computers & Education*, *45*(1), 1-19.

Lemke, C. (2002). *NCREL's enGauge twenty first century skills Digital literacies for a digital age*. Washington, DC: U.S. Dept. of Education, Office of Educational Research and Improvement.

Leu, D. J. (2002). The new literacies: Research on reading instruction with the Internet. In A. E. Farstrup & S. Samuels (Eds.), *What research has to say about reading instruction* (pp. 310-336). Newark, DE: International Reading Association.

Leu, D. J., Kinzer, C. K., Coiro, J. L., & Cammack, D. W. (2004). Toward a theory of new literacies emerging from the Internet and other information and communication technologies. In R. B. Ruddel & N. Unrau (Eds.), *Theoretical models and processes of reading* (pp. 1570-1611). Newark, DE : International Reading Association.

Lewis, J., & Jhally, S. (1998). The struggle over media literacy. *The Journal of Communication*, *48*(1), 109-120.

Li, D. (2004). Trustworthiness of think-aloud protocols in the study of translation processes. *International Journal of Applied Linguistics*, *14*(3), 301-313.

Lim, S. S., Nekmat, E., & Nahar, S. (2009). The implications of Multimodality for Media Literacy. In K. L. O'Halloran (Ed.), *Multimodal Representation, Knowledge and Technology: Routledge Studies in Multimodality Book Series*. London: Routledge (in press).

Lim, S. S. & Nekmat, E. (2009) Media Education in Singapore – New Media, New Literacies? In C. K. Cheung (Ed.) *Media Education in Asia.* Springer: Netherlands.

Lisa, K. R., & Gary, F. T. (2003). CONSUMER SEARCH FOR INFORMATION IN THE DIGITAL AGE: AN EMPIRICAL STUDY OF PREPURCHASE SEARCH FOR AUTOMOBILES. *Journal of Interactive Marketing*, *17*(3), 499-507.

Livingstone, S. (2002). *Young People and New Media: Childhood and the changing media environment*. London, UK: Sage Publications.

Livingstone, S. (2004). Media Literacy and the Challenge of New Information and Communication Technologies. *The Communication Review*, *7*(1), 3-14.

Livingstone, S. (2003). Children's use of the Internet: reflections on the emerging research agenda. *New media & society*, *5*(2), 147-166.

Livingstone, S., & Bober, M. (2004a, July). UK children go online: surveying the experiences of young people and their parents. Monograph, . Retrieved July 6, 2008, from http://eprints.lse.ac.uk/395/.

Livingstone, S., & Bober, M. (2004b). Taking up online opportunities? Children's uses of the Internet for education, communication and participation. *E-Learning*, *1*(3), 395-419.

Lu, J., Yu, C. S., & Liu, C. (2003). Learning style, learning patterns, and learning performance in a WebCT-based MIS course. *Information & Management*, *40*(6), 497-507.

Lubans, J. (2000). Initial findings: Study 4: Internet use among 3rd year students at Duke University. Retrieved August 16, 2008, from http://www.ship.edu/~bhl/survey/.

Luke, A. (2000). Critical literacy in Australia. *Journal of Adolescent and Adult Literacy*, *43*(5), 448-461.

Luke, A., & Luke, C. (2000). A situated perspective on cultural globalisation. In N. Burbules & C. Torres (Eds.), *Globalisation and Education: Critical Perspectives* (pp. 275-299). New York: Routledge.

Lynch, B. P. (2002). The digital divide or the digital connection, *7*(10). Retrieved November 15, 2008, from

http://firstmonday.org/htbin/cgiwrap/bin/ojs/index.php/fm/article/viewArticle/996/917.

Machill, M., & Waltermann, J. (1999). Self-regulation of Internet Content. Bertelsmann Foundation, Gutersloh. Retrieved December 16, 2008, from http://www.tigr.net/writing/1999-Bertelsmann-memorandum/Memorandum.pdf.

Madden, A., Ford, N., Miller, D., & Levy, P. (2005). Using the Internet in teaching: the views of practitioners (A survey of the views of secondary school teachers in Sheffield, UK). *British Journal of Educational Technology*, *36*(2), 255-280.

Markauskaite, L. (2006). Towards an integrated analytical framework of information and communications technology literacy: from intended to implemented and achieved dimensions. *Information Research*, *11*(3), 11-13.

Martin, A. (2006). Literacies for the digital age: A preview of part 1. In A. Martin & D. Madigan (Eds.), *Digital Literacies for Learning*. London, Ridgmount: Facet Publishing.

Martzoukou, K. (2004). A review of Web information seeking research: considerations of method and foci of interest. *Information Research*, *10*(2). Retrieved May 10, 2009, from http://informationr.net/ir/10-2/paper215.html.

Mcmillan, S. J., & Morrison, M. (2006). Coming of age with the Internet: A qualitative exploration of how the Internet has become an integral part of young people's lives. *New Media & Society*, *8*(1), 73.

Meola, M. (2004). Chuckingthe Checklist: A Contextual Approachto TeachingUndergraduates Web-Site Evaluation. *portal: Libraries and the Academy*, *4*(3), 331-344.

Metzger, M. J., Flanagin, A. J., & Zwarun, L. (2003). College student Web use, perceptions of information credibility, and verification behavior. *Computers & Education*, *41*(3), 271-290.

Mintz, A. P. (Ed.). (2002). *Web of Deception: Misinformation on the Internet* (p. 380). Information Today, Inc. Retrieved August 23, 2008, from http://portal.acm.org/citation.cfm?id=555427.

Montgomery, K., & Pasnik, S. (1996). *Web of Deception: Threats to Children from Online Marketing*. Washington, DC: Center for Media Education.

Montgomery, P. K. (1991). Cognitive Style and the Level of Cooperation between the Library Media Specialist and Classroom Teacher. *School Library Media Quarterly*, *19*(3), 185-91.

Murray, L., Hourigan, T., Jeanneau, C., & Chappell, D. (2005). Netskills and the current state of beliefs and practices in student learning: an assessment and recommendations. *British Journal of Educational Technology*, *36*(3), 425-438.

Neely, T. Y. (2002). *Sociological and Psychological aspects of Information Literacy in Higher Education*. Boston Way: Scarecrow Press Inc.

Neuman, S. B. (1991). *Literacy in the television age*. New Jersey: Ablex Publishing Corporation.

Nielsen, J. (1994). Estimating the number of subjects needed for a thinking aloud test. *International Journal of Human-Computer Studies*, *41*(3), 385-397.

Norman, K. L., & Murphy, E. (2004). Usability testing of an Internet form for the 2004 Overseas Enumeration Test: Iterative testing using think-aloud and retrospective report methods. *Proceedings of the Human Factors and Erognomics Society*.

Odell, P. M., Korgen, K. O., Schumacher, P., & Delucchi, M. (2000). Internet Use Among Female and Male College Students. *CyberPsychology & Behavior*, *3*(5), 855-862.

Ono, H., & Zavodny, M. (2007). Digital inequality: A five country comparison using microdata. *Social Science Research*, *36*(3), 1135-1155.

O'Reilly, T. (2005). What is Web 2.0? Design Patterns and Business Models for the Next Generation of Software. Retrieved August 16, 2008, from http://facweb.cti.depaul.edu/jnowotarski/se425/What%20Is%20Web%202%20point%200.pdf.

O'Sullivan, M., & Scott, T. (2000). Teaching Internet information literacy: A critical evaluation (part 1). *Multimedia Schools*, *7*(2), 40-44.

Oughton, J. M., & Reed, W. M. (1999). The influence of learner differences on the construction of hypermedia concepts: a case study. *Computers in Human Behavior*, *15*(1), 11-50.

Palmquist, R. A., & Kim, K. S. (2000). Cognitive style and on-line database search experience as predictors of web search performance. *Journal of the American Society for Information Science*, *51*(6), 558-566.

Park, T. K. (1993). The nature of relevance in information retrieval: An emprirical study. *Library Quarterly*, *63*, 318-351.

Perkel, D. (2008). Copy and Paste Literacy? Literacy Practices in the Production of a MySpace Profile. In K. Drotner, H. S. Jensen, & K. C. Schrøder (Eds.), *Informal Learning and Digital Media* (pp. Chap. 10, 203-225). Newcastle, UK: Cambridge Scholars Publishing.

Potter, J. (2005). *Media Literacy* (3rd ed.). Thousand Oaks, California: Sage Publications.

Potter, W. J. (2004). *Theory of Media Literacy: A Cognitive Approach*. Thousand Oaks: CA: Sage Publications Inc.

Potter, W. J. (2005). *Media Literacy* (3rd ed.). Thousand Oaks, CA: Sage Publications.

Pressley, M., & Afflerbach, P. (1995). *Verbal protocols of reading: The nature of constructively responsive*

reading. Hillsdale, NJ: Lawrence Erlbaum.

Price, M. E., & Verhulst, S. G. (2005). *Self-regulation and the Internet*. Kluwer Law International.

Quinn, S. (2006). *Conversations on convergence: Insiders' views on news production in the 21st century*. New York: Peter Lang.

Rao, S. S. (2005). Bridging digital divide: Efforts in India. *Telematics and Informatics*, *22*(4), 361-375.

Rieh, S. Y. (2002). Judgment of information quality and cognitive authority in the Web. *Journal of the American Society for Information Science and Technology*, *53*(2), 145-161.

Roberts, V. L., & Fels, D. I. (2006). Methods for inclusion: Employing think aloud protocols in software usability studies with individuals who are deaf. *International Journal of Human-Computer Studies*, *64*(6), 489-501.

Roblyer, M. D. (2000). The National Educational Technology Standards (NETS): A Review of Definitions, Implications, and Strategies for Integrating NETS into K-12 Curriculum. *International Journal of Instructional Media*, *27*(2), 133-46.

Ruminski, H. J., & Hanks, W. E. (1995). Critical Thinking Lacks Definition and Uniform Evaluation Criteria. *Journalism and Mass Communication Educator*, *50*(3), 4-10.

Saracho, O. N. (1998). Research directions for cognitive style and education. *International Journal of Educational Research*, *29*(3), 287-290.

Selfregulation.info. (, n.d). Internet Self-Regulation: An verview. Programme in Comparative Media Law and Policy at Oxford University. Retrieved December 26, 2008, from http://pcmlp.socleg.ox.ac.uk/selfregulation/iapcoda/030329-selfreg-global-report.htm.

Selwyn, N. (2004). Reconsidering Political and Popular Understandings of the Digital Divide. *New Media & Society*, *6*(3), 341-362.

Shade, R. S. (2002). Protecting the Kids? Debates over Internet content. In S. Ferguson & R. Shade (Eds.), *Civic Discourse and Cultural Politics in Canada: A cacophony of voices* (pp. 76-87). Ablex Publishing Corporation.

Shenton, A. K. (2004). Research into young people's information-seeking: perspectives and methods. *ASLIB PROCEEDINGS*, *56*(4), 243-254.

Shih, C. F. (1998). Conceptualizing consumer experiences in cyberspace. *European Journal of Marketing*, *32*(7), 655-663.

Singer, D., & Singer, J. (1998). Developing Critical Viewing Skills and Media Literacy in Children. *The ANNALS of the American Academy of Political and Social Science*, *557*(1), 164.

Snyder, I. (1998). Beyond the hype: Reassessing hypertext. In I. Snyder (Ed.), *Page to Screen: Taking literacy into the electronic era* (pp. 125-143). New York, NY: Routledge.

Søby, M. (2003). Digital competence: From ICT skills to digital 'Bildung'. Ministry of Research and Education, UFD, ITU, University of Oslo. Retrieved March 21, 2008, from http://www.itu.no/filearchive/Dig_comp_eng.pdf.

van Someren, M. W., Barnard, Y. F., & Sandberg, J. A. C. (1994). *The Think Aloud Method: A Practical Guide to Modelling Cognitive Processes*. Academic Press.

Stites, R. (1998). *Assessing Lifelong Learning Technology (ALL-TECH): A Guide for Choosing and Using Technology for Adult Learning. Practice Guide.* Philadelphia, PA: National Center on Adult Literacy.

Stratman, J. F., & Hamp-Lyons, L. (1994). Reactivity in concurrent think-aloud protocols: Issues for research. In P. Smagorinsky (Ed.), *Speaking about writing: Reflections on research methodology* (Vol. 8, pp. 89-111). Thousand Oaks, CA: Sage.

Taylor, S. E. (1981). The interface of cognitive and social psychology. In H. Harvey (Ed.), *Cognition, social behaviour, and the environment* (pp. 189-211). Hillsdale, NJ: Lawrence Erlbaum.

Thomson, C. (2003). Information illiterate or just lazy: How college students use the web for research. *Portal: Libraries and the Academy*, *3*(2), 259-268.

Town, J. S. (2000). Wisdom of welfare? The Seven Pillars model. In S. Corall & H. Hathaway (Eds.), *Good Practice in Information Skills Development* (pp. 11-21). SCONUL, London: Proceedings of Conference held at the University of Warwick.

Turkle, S. (1995). *Life on the Screen: Identity in the Age of the Internet*. New York, NY: Simon & Schuster.

Turow, J. (2003). *Americans & Online Privacy: The System is Broken*. Annenberg Public Policy Center, Univ. of Pennsylvania.

Turow, J., & Nir, L. (2000). *The Internet and the Family 2000: The View from Parents, the View from Kids*. Philadelphia: Annenberg Public Policy Center of the University of Pennsylvania.

Vincent, J. (2006). Children writing: Multimodality and assessment in the writing classroom. *Literacy*, *40*(1), 51-57.

Virkus, S. (2003). Information literacy in Europe: a literature review. *Information Research*, *8*(4), 8-4.

Walvaren, A., Brand-Gruwel, S., & Boshuizen, H. (2009). How students evaluate information and sources when searching the World Wide Web for information. *Computers & Education*, *52*(1), 234–246.

Wang, P., Hawk, W. B., & Tenopir, C. (2000). Users' interaction with World Wide Web resources: an exploratory study using a holistic approach* 1. *Information Processing & Management*, *36*(2), 229-251.

Warschauer, M. (2003). *Technology and Social Inclusion: Rethinking the Digital Divide*. London, England: The MIT Press.

Watson, J. S. (2001). Students and the World Wide Web. *Teacher-Librarian*, *29*(1), 15-19.

Wen, J. R., & Shih, W. L. (2008). Exploring the information literacy competence standards for elementary and high school teachers. *Computers & Education*, *50*(3), 787-806.

Williams, K. (2003). Literacy and Computer Literacy: Analyzing the NRC's "Being Fluent with Information Technology". *Journal of Literacy and Technology*, *3*(1), 1-20.

Witkin, H. A. (1973). *The role of cognitive style in academic performance and in teacher-student relations*. Princeton, NJ: ETS.

Witkin, H. A., Moore, C. A., Goodenough, D. R., & Cox, P. W. (1977). Field-dependent and field-independent cognitive styles and their educational implications. *Review of educational research*, *47*(1), 1-64.

Yang, S. C. (1997). Information seeking as problem-solving using a qualitative approach to uncover the novice learners' information-seeking processed in a Perseus hypertext system. *Library and Information Science Research*, *19*(1), 71-92.

Zins, C. (2000). Success, a Structured Search Strategy: Rationale, Principles, and Implications. *Journal of the American Society for Information Science*, *51*(13), 1232-1247.

Appendix A: Pre-task questionnaire

Participant no. _____
Session no._____

Please take your time to read all questions carefully. All answers provided are anonymous and will be kept strictly confidential. There are absolutely no right or wrong answers for the questions below. All you need to do is to share your honest thoughts and experiences.

Instructions: Please tick only the answer most relevant to you and elaborate on it in the space provided. Please a**nswer all questions.**

1. **I feel that it is important for me**
   to use the Internet well so as to:

	Strongly disagree	Dis agree	Some what disagree	Neutral	Some what agree	Agree	Strongly agree
increase my chances of getting hired							
run my own business							
obtain additional sources of income							
progress in my chosen career							
increase my career options							
obtain income independently							

2. **I feel that it is important for me**
   to use the Internet well so as to be able to:

	Strongly disagree	Dis- agree	Some what disagree	Neutral	Some what agree	Agree	Strongly agree
purchase goods online							
play games online							
source for music online							
increase access to services (e.g. government services, banking services, library services, etc)							
watch videos online							
engage in hobbies online (e.g. join online hobby groups and forums,							

	research on my own hobbies)							

obtain information on goods and services							

3. I feel that it is important for me to use the Internet well so as to:

	Strongly disagree	Dis-agree	Some what disagree	Neutral	Somewh at agree	Agree	Strongly agree
make new friends and acquaintances							
know more about other cultures							
participate in debates on public issues (e.g. transport fare hikes, organ trading etc.)							
obtain information on public issues (e.g. transport fare hikes, organ trading etc.)							
know my personal rights							
keep in touch with family and relatives							
provide my opinions on public issues (e.g. transport fare hikes, organ trading etc.)							
keep in touch with friends and acquaintances							
better understand my own personality							
learn more of my own culture							

4. I feel that it is important for me to use the Internet well so as to be able to:

	Strongly disagree	Dis-agree	Some what disagree	Neutral	Some what agree	Agree	Strongly agree
have increased access to teachers or educators							
access higher education							
engage in continuous learning apart from formal schooling							
increase my interpersonal							

communication skills							
obtain better results in learning							
increase my creativity skills							
be an independent learner							
increase my qualifications							
increase my critical thinking skills							

5. Overall,

	Strongly disagree	Dis-agree	Some what disagree	Neutral	Some what agree	Agree	Strongly agree
I want to improve on my use of the internet							
I have made plans to improve on my internet use.							
I do not intend to improve on my internet use							

6. How significant is each method to you in learning to use the internet?

	Very insignificant	Insignificant	Somewhat insignificant	Neutral	Somewhat significant	Significant	Very significant
Printed materials (e.g. books, magazines, etc)							
Online materials and information							
Friends and acquaintances							
Family and relatives							
Trial & error							
In school(s)							
ICT-related courses							

ICT-related workshops								

Please explain any other ways of learning to use the internet which you have experienced or intend to adopt.

_____
_____
_____
_____

7. Please elaborate on any factors or reasons which hinder you from improving your use of the internet. Elaborate on as many factors or reasons as possible.

_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

Appendix B: Post-task questionnaire

<div align="center">

Participant no. _____

Session no._____

</div>

Please take your time to read all questions carefully. All answers provided are anonymous and will be kept strictly confidential. There are absolutely no right or wrong answers for the questions below. All you need to do is to share your honest thoughts and experiences.

Instructions: Please circle only the answer most relevant to you and elaborate in the space provided. Please answer all questions.

1. **In the past year, 2008, did you experience or encounter information from the internet (i.e. texts, images, videos, sounds, etc.) that was <u>false</u>?**

Ans: Yes / No / I don't know / I cannot remember

If **Yes**, elaborate on the experience (e.g. how did you know, what did you do, how were you affected, etc.). You may elaborate on as many experiences as possible.

_____
_____
_____
_____
_____
_____

If **No**, why?

_____
_____
_____
_____
_____

2. **In the past year, 2008, did you experience or encounter information from the internet (i.e. texts, images, videos, sounds, etc.) that was <u>biased</u>?**

   Ans: Yes / No / I don't know / I cannot remember

If **Yes**, elaborate on the experience (e.g. how did you know, what did you do, how were you affected, etc). You may elaborate on as many experiences as possible.

_____
_____
_____
_____
_____
_____

If **No**, why?

_____
_____
_____
_____
_____

3. **To verify online information (e.g. texts, images, videos, sounds, etc.),**
   I usually confide in or check with:

   a) **Friends**

Ans: Strongly disagree / Disagree / Slightly disagree / Neutral / Slightly agree / Agree / Strongly
agree

Why, or why not, friends?

_____
_____
_____
_____

   b) **Family members**

Ans: Strongly disagree / Disagree / Slightly disagree / Neutral / Slightly agree / Agree / Strongly
agree

Why, or why not, family members?

_____
_____
_____
_____

c) Teachers

Ans: Strongly disagree / Disagree / Slightly disagree / Neutral / Slightly agree / Agree / Strongly agree

Why, or why not, teachers?

_____
_____
_____
_____

3. To verify online information (e.g. texts, images, videos, sounds, etc.), I usually confide in or check with:

d) Other media sources (e.g. television, newspapers, radio, etc.)

Ans: Strongly disagree / Disagree / Slightly disagree / Neutral / Slightly agree / Agree / Strongly agree

Why, or why not other media sources? Do also state what other types of media and how do you verify the information between the different sources.

_____
_____
_____
_____

e) My own personal knowledge

Ans: Strongly disagree / Disagree / Slightly disagree / Neutral / Slightly agree / Agree / Strongly agree

Why is your answer so? Do elaborate on where you gained the relevant knowledge from and provide examples.

_____
_____
_____
_____

f) Other online information

Ans: Strongly disagree / Disagree / Slightly disagree / Neutral / Slightly agree / Agree / Strongly agree

Why is your answer so? Do also provide examples.

_____
_____
_____
_____

g) Please state any other sources, if applicable

_____
_____
_____
_____

Instructions: For the following questions, please tick only the option that applies to you.

[Note: 'Information' refers to various forms, i.e. texts, images, videos, sounds, etc.]

4.   On the internet, I feel that it is easy for me to:

	Strongly disagree	Dis-agree	Some what disagree	Neutral	Some what agree	Agree	Strongly agree
Locate the exact information which I am looking for							
Identify the source of information							
Identify where the information is produced							
Identify when the information was created							
Know why a specific information was created							
Identify the owner of a web page							
Identify different segments of a web page (e.g. advertisement, main information, commentaries, etc.)							

	Strongly disagree	Dis-agree	Some what disagree	Neutral	Some what agree	Agree	Strongly agree
Locate a website that is most relevant							

5. On the internet, I feel that it is important for me to:

	Strongly disagree	Dis-agree	Some what disagree	Neutral	Some what agree	Agree	Strongly agree
Be careful in judging whether the information is correct							
Look for other information to check whether a specific information is correct							
Take more time to judge whether the information is correct							
Guess based on personal feelings rather than find out whether the information is reliable							

Please circle only the option that applies to you

Age:

(1) 15 - 19 years
(2) 20 – 24 years

Gender:

(1) Female
(2) Male

Highest education level obtained:

(1) Pre-school
(2) Primary level
(3) Secondary level
(4) Tertiary level (Diploma, Technical certificate, A-Levels)
(5) University Degree
(6) Post-university degree
(7) Others   Please specify: _____

Average monthly income in your household:

(1) $1,500 and below
(2) $1,501 - $3,000
(3) $3,001 - $4,500
(4) $4,501 - $6,000
(5) $6, 001 -$7,500
(6) $7,501 and above

How often do you use the Internet?

(1) Never
(2) Rarely (few times a year)
(3) Monthly (few times a month)
(4) Often (few times a week)
(5) Daily

When did you first began accessing the Internet:

(1) 4 years and below
(2) 5 – 9 years
(3) 10 – 14 years
(4) 15 – 19 years
(5) 20 – 24 years