



**JISC Final Report**

# **Users' trust in information resources in the Web environment: a status report**

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## Executive Summary

This study has three aims; to 'provide an overview of the ways in which trust is either assessed or asserted in relation to the use and provision of resources in the Web environment for research and learning'; to 'assess what solutions might be worth further investigation and whether establishing ways to assert trust in academic information resources could assist the development of information literacy'; to 'help increase understanding of how perceptions of trust influence the behaviour of information users.'

This study was carried out in two phase:

1. **Literature review** using a modified version of a *systematic literature review* to review existing research and synthesise:
  - ways in which users place their trust in digital information resources in the Web environment;
  - means by which digital information providers engender trust in their resources;
  - desirability and feasibility of certifying authenticity and provenance of digital information resources to users, from both the user and provider perspectives.
2. **Community consultation** with both users and providers on the findings, using an *on-line modified Delphi study* and a *roundtable* to:
  - validate and extend the findings from the literature review
  - establish *users' desirability* for certifying authenticity and provenance of digital information resources
  - establish *providers' desirability* and *feasibility* of certifying authenticity and provenance
  - explore the potential for developing a framework of trust that could help develop information literacy.

Major outcomes of the study are an evidence-based model of user trust in information resources in the web environment defining the path the user takes from initiating a search to 'intention to reference' and an evidence-based discussion of relationships between service provider needs and user needs in order to determine what areas are worthy of further investigation.

From a review of the literature and initial validation from the community consultation, three factors affecting trust/credibility of online information have been identified. These are external factors, internal factors and user's cognitive state. It would appear that user's cognitive state and external factors influence a user's decision as to whether or not to conduct an internal assessment of information. After the decision has been made to progress the user is then faced with decisions based on perceived risk, perceived ease of use and perceived usefulness. Only when all of these have been satisfied or not does the user reach the point of 'intention to reference', this is then either encouraged or not based on accessibility of the source.

This initial status report has provided a sound grounding in the issues relating to user trust in the web environment and established that trust plays a key role as a mediating variable between information quality and information usage. Recommendations from this study include; further validation of the model of user trust in both the HE sector and across the entire spectrum of education as search habits tend to be formed early in the educational process; exploring the relationship of cognition, self-efficacy and trust in information literacy to develop a framework which empowers users to be capable of independent certification of information resources from both and Information Science and Cognitive Psychology perspective; explore the potential of developing library systems that reflect the ease of use associated with 'Google Scholar'<sup>TM</sup> whilst retaining the need for advanced search skills as this remains an essential skill.

## Background

*How do users place their trust in digital information resources in the Web environment?*

As Hagar (forthcoming) states '*Little attention has been paid in information science to issues of information and trust..., particularly such questions as, What sources of information do people trust? Which information providers do people trust?*' This situation stands in marked contrast to research in the field of e-commerce, where research on trust is quite well progressed. As early as 1999 an influential report by Studio Archetype/Sapient and Cheskin Research (1999) argued that in order to develop a successful e-commerce business: '*The factors that produce a sense of trustworthiness need to be identified, in their entirety. Their interactions need to be understood, and their relative importance determined*'. They conducted a study of trust in e-commerce and described six key components that suggest trustworthiness:

1. **Seals of Approval** - symbols, like VeriSign and Visa, designed to re-assure the visitor that security has been established.
2. **Brand** - the corporation's promise to deliver specific attributes and its credibility based on reputation and the visitor's possible previous experience.
3. **Navigation** - the ease of finding what the visitor seeks.
4. **Fulfilment** – a clear indication of how orders will be processed and provision of information on how to seek recourse if there are problems.
5. **Presentation** - design attributes that connote quality and professionalism.
6. **Technology** - state-of-the-art connotes professionalism, even if difficult to use.

Since then, 10 years' of studies on trust in e-commerce (Briggs et al 2002) and, more recently, on trust in e-health have underlined the importance of factors such as website appearance, site usability, credibility and personalised content in helping to establish online trust (Patrick et al 2005; Sillence et al 2007).

This study brings together the e-commerce, e-health and information trust literature to provide a broader picture of what is already known around issues of trust in the use of Web resources within Higher Education (HE). Herring (2005) believes the first aspect of teaching information seeking skills is to teach students how to evaluate the information they have found; he believes that '*Information literacy is now regarded by governments across the world as a core educational and life skill, and schools have a key role to play in developing their student's information literacy*' (Herring 2005: 91). The JISC JUBILEE project found that 'Most students do not evaluate the information they retrieve electronically.' (Banwell et al 2003) Rowlands et al (2008) found that young people are 'unable to construct effective searches and evaluate the results... due to their lack of knowledge of the kinds of information content that exists' If there is an inability or lack of perceived need to evaluate Web resources, how are choices made relating to trust? 'Young people feel at ease in many virtual environments but this does not necessarily mean they are equally at ease in all virtual worlds, they are, however, acutely aware of the limitations and potential pitfalls surrounding internet use. Rather than being discouraged from over-dependence on the internet, what learners need are the tools to allow them to use the internet to their best advantages. These tools are not ICT skills, navigating a keyboard is vastly different from navigating the choppy waters of cyberspace (Pickard 2008). A key dimension of trust is the belief in ability; the expertise, skills or technical ability that another has in a certain area (Ridings & Gefen 2005). This aspect of the study focuses on identifying and assessing evidence to examine the choices individuals make based on trust and confidence within the Web environment.

### *How do digital information providers engender trust in their resources?*

Access to vast information resources via the Web is viewed by many as a positive and encouraging feature of Web-based learning. These resources have the potential to encourage and support independent, constructivist learning (McDowell & Pickard 2000). Traditionally education systems provided 'safe' environments for information seeking, usually the only environment a student has available, but this is no longer the case. Engendering trust in individual Web resources which operate out side of conventional 'gateway' services has become increasingly more important as findings from CIBER demonstrate: 'Information consumers – of all ages – use digital media voraciously and not necessarily in the ways that librarians assume. Any barrier to access, be that additional log-ins, payment or hard copy, is too high for most consumers and information behind those barriers will increasingly be ignored' (University College London 2008). 'Assessing whether to trust any information or content provided by a source is a complex process affected by many factors. Identifying and correlating the factors that influence how trust decisions are made in information retrieval, integration and analysis tasks becomes a critical capability in a world of open sources such as the Web' (Gil & Artz 2007). If traditional gateways are being bypassed by users then how do we assert the provenance and authority of services? The W3C POWDER (The Protocol for Web Description Resources) Working Group is currently exploring ways of providing document descriptions that allow users to establish the authenticity of a resource. 'These descriptions are always attributed to a named individual, organization or entity that may or may not be the creator of the described resources. This contrasts with more usual metadata that typically applies to a single resource, such as a specific document's title, which is usually provided by its author.' (Archer et al 2009). Information providers are facing new challenges, the availability of previously inaccessible information has increased the onus on the end user to locate and evaluate information resources but it has also placed an additional burden on information providers to demonstrate their credibility and value outside of bounded systems such as 'trusted library gateways'.

### *How desirable and feasible is certifying the authority and provenance of digital information resources to the end user?*

There have been many attempts to create models of trust in Web resources. Indeed, Umuhoza et al (2008), having developed an ontological representation of trust for geospatial Web services, have a further goal to 'extend the ontology by adding other aspects used to measure trust in literature like trust of communication policies, trust of information source, trust of content and others (they) will identify... (to) propose a trust function and a decision model that takes into account all trust concepts and their relations (Umuhoza et al 2008). Currently Web service trust representations tend to focus on either centralized architectures or distributed architectures where reputation is calculated based on Web service attributes and user preferences (Cardoso 2006). The final message from CIBER is that 'We know that younger scholars especially have only a very limited knowledge of the many library-sponsored services that are on offer to them. The problem is one of both raising awareness of this expensive and valuable content and making the interfaces much more standards and easier to use. The cognitive load on any library user (or librarian) in trying to work through such complexity is at present immense. Librarians are guilty of complacency here' (University College London 2008). If students are not using trusted gateways then how do we certify the authenticity and provenance of digital information resources and is this certification necessary? Recent research has found a 'new form of information seeking behavior...characterized as being horizontal bouncing, checking and viewing in nature' with users demanding 'instant gratification at a click...increasingly looking for "the answer"' (Rowlands et al 2008). This identifies researcher' activity in the digital environment as superficial and superfluous, lacking the critical depth of engagement usually related to

knowledge acquisition and research. It is clearly desirable to explore approaches to certifying authenticity and provenance as it is becoming increasingly more difficult to confine students' information seeking to trusted gateways, open searching is now prevalent in student behaviour and, in order to redress the balance, it is necessary to examine evidence of approaches to authentication on the Web. There is also a need to investigate approaches to information literacy teaching in order to identify ways of equipping students with the necessary skills to make informed and educated choices on the Web. 'Web-based information resources provide young people with opportunities to interact with each other and with vast quantities of information. Research has indicated that learning and cognitive development are intricately linked to opportunities to process and interact with relevant information and the medium used to deliver this information may well have an impact on these opportunities (Pickard 2008).

By the time an HE student arrives at university, searching habits and information seeking behaviours have already been adopted. It is vital that trust, as an element of information literacy, is seen as a continuum and education providers need to address this issue from primary education onwards. There is evidence of 'considerable ignorance on the part of both the school and university library sectors as to the nature of the information skilling within each other's establishments' (Lonsdale & Armstrong 2006). The broader picture is identified by Crawford and Irving (2007) who assert that information literacy must be 'explicitly and uniformly taught within education' and highlight the wider implications on education and the workplace. By working with teachers to identify where these skills lie in their existing curriculum, the librarian can support the teacher in developing pupils' abilities in 'asking the right questions, finding the right answers and evaluating the information they use' in order to 'teach pupils how to learn not just for now, but for their future...to know how to learn for themselves.' (Grey 2008)

## Aims and Objectives

This study has three aims

- to 'provide an overview of the ways in which trust is either assessed or asserted in relation to the use and provision of resources in the Web environment for research and learning'
- to 'assess what solutions might be worth further investigation and whether establishing ways to assert trust in academic information resources could assist the development of information literacy'
- to 'help increase understanding of how perceptions of trust influence the behaviour of information users.'

Study objectives are:

- to carry out a *systematic review of relevant literature* focusing on research and studies in three main areas:
  1. how users place their trust in digital information resources in the Web environment
  2. the means by which digital information providers currently engender trust in their resources
  3. the desirability and feasibility of certifying the authenticity and provenance of digital information resources to the end user
- to conduct a *community consultation* (with both users and providers of digital information resources) on the findings of the systematic review via an online Delphi study and a roundtable meeting; participants will be drawn from North East England, a region rich in terms of key stakeholders i.e. users (students, academics, researchers), providers and subject experts.

## Methodology

The first phase of the project methodology comprised desk-based reviews of relevant literature that analysed and synthesised the outcomes of existing research and studies in the three areas of interest, i.e. how users place their trust in digital information resources in the web environment; means by which digital information providers currently engender trust in their resources; and the desirability and feasibility of certifying the authenticity and provenance of digital information resources to the end user. In doing this, a modified version of a systematic literature review was employed.

The systematic literature review was modified in respect of scope and depth which was very focused due to the short project timescale (4 months). Two team members were engaged in searching and together they built an EndNote library based on the retrievals, sharing selection and assessment criteria and key search terms (Appendix 1). The references were then assessed by the Project Director. Online searches were used and these concentrated on a federated library search engine (especially databases in computing & business information systems; information & communication studies; and education). They independently conducted searches around different areas of the project and then merged their resultant libraries, subsequently eliminating duplicates, whilst acknowledging that the existence of duplicates might add weighting to the value of the references since they had been retrieved via independent searches using different search strategies. The rationale for this approach was that it would ensure the selection of relevant, quality work from what was available using an efficient technique that minimised bias (Evidence Network). Articles found were fully reference-checked by the team and briefly summarised ensuring both Information Science and Cognitive Psychology disciplines were mined systematically. The contents of the Endnote library were analysed to develop an in-depth understanding of the current state of the topics under study and, based on the analysis, subject terms were derived and applied in order to be able to categorise the contents under subject headings. The final Endnote library contained more than 400 references. The ultimate selection of references to include in the study was made on the basis of the appropriateness of the categorisations to the aims of the project and to a model of trust which was concurrently being developed by the team. Final selections were evaluated by the team to improve the reliability of inclusion and, where differences arose, consensus was achieved by means of discussion.

The second phase of the project methodology involved community consultation (Lappin & McLeod, 2010) of the findings from phase 1 with users and providers, using an on-line modified Delphi study and a round table (Pickard, 2007). This was to validate and extend the findings from the literature review; to establish users' and providers' perceptions of the desirability and feasibility of certifying authenticity and provenance and, in addition, to explore the potential for developing a framework of trust that could help develop information literacy. The Delphi study method was chosen because it is fast and relatively inexpensive, given the short project timescale. The on-line modified Delphi study used a brief questionnaire to establish the baseline. By canvassing individual written comments on particular questions the team hoped to be able to combine these to form consensus.

The team initially sent out an email about the project to users (students, academic tutors and researchers) and providers (commercial service providers and HE information service providers) from the North East of England (in the case of the HEIs, the two contacts were Northumbria and Newcastle, representing new and old institutions). The initial email (Appendix 2) explained that there was to be a round table event, to which they were invited, and that this was preceded by a brief email questionnaire. Only those who responded positively to this initial email were sent a follow-up email with the questionnaire (Appendix 3) attached. Respondents had no contact with each other during this process – thus avoiding

pressure to conform or dominance by individuals that are inherent weaknesses of methods such as focus groups - and were unaware who else had received the questionnaire and been invited to the round table event.

The team analysed the responses to the questionnaire prior to the round table event, comparing instances from the questionnaire data to identify tentative categories and their properties and trying to aggregate the responses into a preliminary consensus. It was anticipated that emergent elements from analysis of individual responses would be modified and developed by comparison with instances from the subsequent round table phase and that further categories and properties might emerge. Throughout the process of examining the completed questionnaires the team wrote analytic memos which served to guide and record emergent ideas. A synthesis of the original questionnaire responses was returned to all round table participants prior to the face to face consultation. This allowed for clarification of comments and ensured that the team members had interpreted comments in a similar manner. A putative trust model had been developed on the basis of the phase 1 literature review and, after analysis by the team, the responses were mapped on to this as a preliminary exercise.

The purpose of the round table was to provide a review function, to assist in the confirmation of trends established from the literature about users, and to identify which of those trends are likely to be worthy of further investigation, including the desirability and feasibility of certifying the authenticity and provenance of digital information resources. The round table was in essence a semi-structured face-to-face meeting of the individual questionnaire respondents who, having recorded their initial individual ideas, had the opportunity to share and discuss these – facilitated by the research team – and then engage in ranking procedures to assist in the determination of priorities. The event consisted of four activities based around consultation and negotiation. Participants were divided between four tables, each table being engineered to accommodate a pre-defined combination of users. Results from this event can be found in the Appendix 4: Community consultation.

After completion of all the above outlined activities this report was produced to provide an evidence-based overview of the ways in which trust is assessed or asserted in relation to both the use and provision of resources for research and learning in the Web environment; how perceptions of trust influence users' information behaviour; an assessment of which solutions might be worthy of further investigation and whether establishing ways to assert trust in academic information resources could help develop information literacy; and to make recommendations to the JISC on potential future work in this area.

## Results

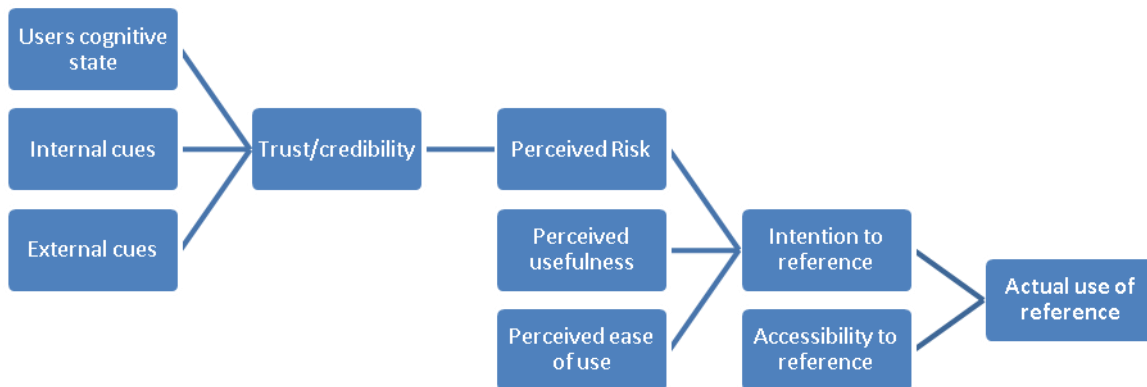
### ***Trust and credibility of online information resources in the web environment.***

People make trust decisions regularly in respect of web-based behaviour, e.g. that they are 'talking' to the right person (e.g. their bank), asking for medical guidance from the right source and sites being accessed by their children. Perceived trust or credibility has a strong influence of people's willingness to engage with online activities such as shopping or banking, where sensitive information is involved. However, with education, students seem more than willing to engage with online information. This may, in part, be attributable to their perceived self-efficiency in terms of their experience with technology. They may enter higher education (HE) with experience of search engines such as Google but lack of experience in information retrieval using more scholarly databases. Their past experience with Google and similar search engines may have led to a perception that Google is trustworthy and, given



that their use of Google does not involve sharing sensitive information such as financial details or personal information, they are unlikely to have had a negative experience to make them disposed to distrust.

From a review of the literature, three factors affecting trust/credibility of online information have been identified. These are external factors, internal factors and user's cognitive state. It would appear that user's cognitive state and external factors influence a user's decision as to whether or not to conduct an internal assessment of information.



**Figure 1: Final Model of User trust in information resources in the web environment.**

### ***External factors***

Agarwal and Prasad (1999) found external factors that impacted on user beliefs about usefulness and ease of use of information technology. These factors give external cues of credibility or trustworthiness and include the following:

- Whether or not the information must be paid for or is free – students, e.g., are unlikely to want to pay for information (OCLC 2002; Borgatti & Cross 2003; Weiler 2005)
- Seals of approval such as HONcode or TRUSTe (Benassi 1999; Luo & Nardawi 2004; Moores 2005; Boyer 2006; Hong 2006; Walsh 2007)
- Credibility rating systems controlled institutionally (that might use authority, currency, objectivity etc to rate) – if a library did this it could be seen as an extension of their collection development function (Herring 2001; Wathen & Burkell 2002);
- Preapproved databases, e.g. JSTOR or ERIC (or a local one like Northumbria University's NORA or Edinburgh University's Searcher) (Baker 2005; Brophy & Bawden 2005);
- PIC labels that certify the trustworthiness of a site (Blaze et al 1997; Walsh 2007);
- Digital signatures that ensure authenticity of author and information (Smith 2000; Castelfranchi & Yao-Hua 2002; Bradley 2005);
- Recommendations from others (peer reviews via eBay, Amazon or a peer reviewed journal, colleagues recommendations in the case of Hertzum's (2002) engineers;

lecturers recommendation in the case of students; online communities collectively screening, pooling and cross-checking recommendations (Shippensburg 2000; Burbules 2001; Pavlou 2006; Li et al 2009; Head & Eisenberg 2009) which lends what Liu (2004) terms reputed credibility.

- Rankings (Page et al 1999; Zhu & Gauch 2000; Stein & Hess 2006; Hess & Stein 2007; Korfiatis et al 2006);
- Offline credibility, i.e. sites with strong offline credibility might be assumed to have equal/commensurate amounts of credibility in their online forms; information based on a respected print source (Lubans 1999; Shippensburg 2000; Fogg 2001; Beatty, Elliott & Faiola);
- Presentation of the site or the provider, e.g. site ownership is explicit (Kafai & Bates 1997; Wolcott 1998; Fidel et al 1999; Lubans 1999; Shippensburg 2000; Agosto 2002a; Hertzum et al 2002; Hung 2004; Bar-Ilan 2009); and
- Ease of use of the site (Davis et al 1989; Fogg 2001; Grimes & Boening 2001; Corritore 2003; Weiler 2005; Golbeck 2006; Castaneda et al 2007).

With more tangible media, there are very evident procedures that enable users to assess the trustworthiness and authenticity, e.g handwriting/watermarks for primary resources or author/publisher details for books. But online media are 'fluid' in nature (Cheny et al 2009) given the sheer scale of their proliferation, their sometimes limited lifespan; and the fact they are susceptible to "pervasive deceit" (Simmons quoted by Lynch 2000). If online resources were to specify the provenance (i.e. the original/context/history) of digital information that they supply would they be more likely to be trusted? Generally, in respect of evidence of provenance of online information, this is achieved by identification by a trusted third party such as a library or certified digital repository (Cullen 2000; Dobratz et al 2007)

### ***Seals of approval***

In the field of e-health and e-commerce, third party seals provide a trust-building measure such as that employed by Truste and the HON code of conduct, both of which attempt to standardize the reliability of information available on the Web and protect the privacy of online users by publishing principles and guidelines for Web sites to follow (Luo & Nardawi 2004) Truste (Benassi 1999; Friedman et al 2000; Moore 2005) awards a "trustmark" to Web sites that adhere to its privacy principles, and agree to comply with Truste's supervision and consumer resolution procedures. If a portal displays a trustmark it signifies conformity to the privacy standards and principles advocated by TRUSTe. The cost of acquiring a seal is determined by a sliding scale depending on company's annual revenue and/or number of brands. The HON (Luo & Nardawi 2004; Boyer 2006) code seal guarantees that a health portal observes basic ethical standards in the presentation of information and informs consumers about the source and purpose of the information being presented. HON provides free independent verification to web sites that contain medical related information and wish to demonstrate commitment to following the HON code of conduct.

### ***Credibility rating systems and recommendations by others***

In eCommerce, Malik & Bouguettaya (2009) introduce RATEWeb, a framework for establishing trust in service-oriented environments in which web services share their experiences of the service providers with their peers through feedback ratings. The different ratings are aggregated to derive a service provider's reputation. This in turn is used to evaluate trust. The overall goal of RATEWeb is to facilitate trust-based selection and composition of Web services. In eHealth, Jadad (1998) surveyed rating instruments that evaluated web sites providing health information to establish their degree of validation and

found that many such instruments were underdeveloped and failed to measure what they claimed to measure. He also highlighted the problem that users may fail to notice the evaluations or, even if they do, may choose to ignore them – obviously higher risk than with other information sources.

### ***PIC labels***

PIC labels according to Resnick & Miller (1996) and Blaze et al (1997) can assist would-be users to make more informed judgements since they comprise selection software that vouches for the trustworthiness of a site and can, e.g. be configured to stop a child aged under fifteen from accessing websites labelled '15' (in the same way the British Board of Film Censors labels films) or using web content filtering tools that regulate access to web content by users connected to networks of libraries, schools etc. PICS is a value neutral labelling infrastructure for the Internet so labels/set of rules for labelling have to be decided upon. It would presumably be feasible to use these tools as Bertino (forthcoming) suggests as a means to make users aware of the quality of web resources by evaluating their contents/characteristics and matching them against users' preferences.

### ***Rankings***

Page et al. (1999) describe PageRank, the Google ranking method that rates web pages objectively and mechanically, through analyzing the structure of the document reference network. The system may be compared to peer review in that the logic is that the number of citations afforded a paper is indicative of quality. In order for a web page to get a high PageRank, it has to convince 'important' pages (or a large number of less 'important' pages) to link to it. PageRank is virtually immune to manipulation by commercial interests since the only way this could be achieved would be for the commercial interest to buy advertisements on important sites but this is costly to the commercial interest as well as likely to be looked on unfavourably by many important sites.

Stein & Hess (2006) and Hess & Stein (2007) propose the enhancement of such rankings by the incorporation of a second layer, the author trust network, in order to further improve ranking quality. In their proposed development, social networking would enable users to get personalized recommendations for digital resources via reviews written by users they trust. These reviews would be integrated into search engine document ranking such as PageRank to achieve more personalized retrievals. Korfiatis et al. (2006) suggests a similar approach in respect of evaluating contributions in collaborative author environments such as wikis, believing that such an approach could improve the authoritativeness of, e.g., information found in Wikipedia. However, most people have experience of using rating sites such as TripAdvisor or restaurant reviews and are aware that dissatisfied users are more likely to make postings than are satisfied customers and that consequently customers can rate web services incorrectly/unfairly, related to service behaviour (Letia & Pop 2008)

Peer review systems were discussed in the community consultation for the project and the fact that, in academia, there is a skew towards peer reviewed journals although other sources might be just as trustworthy. Questions were raised about how far we examine, e.g., editorial boards of peer reviewed journals to ensure there is no conflict of interest and concern was expressed about the proliferation of new journals online, claiming to be peer reviewed. Should/do editorial boards and peer reviewers sign up to a professional code of conduct? If a scholar bases analysis on a claim in a peer review journal that is later proved to be unsubstantiated, what is the comeback? Can more certification be derived from the

fact a peer review journal has a physical as well as an online presence? These were the sort of questions that concerned members of the community consultation group

Could external cues such as those itemised and described be employed in peer rating/peer review of scholarly information? Lynch (2001) discusses metadata and the suggestion that users would be willing to trust metadata created by information professionals such as librarians or archivists or such metadata certified or rated by information professionals. He goes on to say that such a system would require the existence of an organization that would license such professionals and, additionally, maintain a 'blacklist' of those found guilty of creating deceptive metadata. One would imagine that membership of a professional association such as CILIP should be a form of certification of the information professional and the degree of their trustworthiness to create or accredit such metadata.

Metadata is typically applicable only to single resources and is supplied by the author. W3C POWDER is an exploratory protocol that enables individuals/organizations to publish descriptions of websites or sections thereof that may/may not have been created by them to help users establish the authenticity of a resource (Archer 2009; Archer et al 2009; Krill 2009) The aim is to help people find information that meet their own quality standards automatically. Similar work has been done in the e-health field in the EC-funded Quatro project (Karkaletsis & Mayer 2006) that has defined a vocabulary for quality labels and a schema to deliver them in a machine-processable format.

The value of some existing trustmarks is diminished by the fact that they are invisible to search engines so that a user has to be on the web site before they know that it meets the labelling provider's claims. Also, the logo is often displayed on a single page and is invisible to site users who are viewing other pages on the web site. Protocols like POWDER would presumably mean that users could read information about the suitability of website content from search results and get more granular search results, e.g. selecting preferences allowing them to find websites suitable for children or suitable for visually impaired users. It seems therefore this is technically feasible but is it desirable?

What are users' opinions of the desirability of some form of certification? Calvert (1999, 2001) is one of the few researchers who have asked users about the desirability of controlling information quality on the Web by using some form of certification. Participants in his focus groups felt that this was neither possible nor fully desirable. Reasons for this included firstly the sheer size of the Web and the volume of information added that would make it impossible to keep up to date. Secondly there was concern that certification could lead to censorship. This was something that arose in the community consultation where concern was expressed that certification might remove transparency and result in limitation of mainstream information. If this happened it could imbue users with a false sense of security because they would be more removed from sources and bring their own critical and evaluative skills to bear in assessing credibility and trustworthiness of information. This point is raised in the literature of e-commerce in respect of seals of approval which Burkell (2004) claims are not transparent interfaces, i.e. doing what the user expects them to do and he believes that such interfaces will promise more than they deliver "unless and until consumer expectations are congruent with evaluation practice." (Burkell 2004: 491)

Those members of Calvert's (1999, 2001) focus groups who were more positive about certification felt that the certification by an impartial body of scholarly publications could improve the quality of information on the Web but generally there was feeling that the existing gate keeping procedures (i.e. peer review) of e-journals rendered further certification redundant.

None of the authors who cite Calvert pick up on the desirability/feasibility of certification issue, focusing rather on the misinformation or information literacy aspects of his study.

What did come out of the Calvert study was a concern about censorship and/or control by commercial/political interest, i.e. the idea of paternalistic systems that set up trust-related parameters as part of the indexing process and then apply such parameters to every search. An alternative view to this one is, as suggested, by Lynch (2000), that integration of trust and provenance into information retrieval, if done properly, would inform and empower users. Quatro+ sees it this way also as the project strap line is "Content Labels for User Empowerment" (Archer et al 2009)

### ***Internal cues***

In addition to external cues, there are factors linked with internal cues of information's credibility/trustworthiness including the following:

- Accuracy, freedom from errors and verifiable elsewhere (Rieh 1998; Fallis & Fricke 2002; Hung 2004; Weiler 2005; Corriveau & Harris 2009);
- Authoritative, i.e. reputation of the source, qualifications etc (Herring 2001; Dong 2003; Hung 2004; McKnight & Kacmar 2006);
- Objectivity, i.e. fact rather than opinion (Hung 2004);
- Currency, i.e. site displays a recent date, information contained is topical, up to date (Rieh 1998; Hirsch 1998, 1999; Jacobson & Ignacio 1997; Lubans 1999; Bilal 2000; Weiler 2005);
- Coverage, i.e. comprehensive, in depth (Klein 2001; Grimes & Boening 2001; Metzger et al 2003; Hung 2004; Weiler 2005);
- Presentation and format, i.e. quality of writing, structure (Rieh 1998; Hung 2004);
- Affiliations of source or site (traceable by tools such as WhoIS, traceroute, wslookup) (Rieh 1998; Burbules 2001; Fritch & Cromwell 2001; Hung 2004; Liu & Huang 2005; Swanson 2007);
- Source motivation, i.e. why are they publishing this information (Rieh 1998);
- Citations, i.e. by whom has reference been cited; inclusion of references (Liu 2004); and
- Type of 'object', e.g. a journal, a blog (Lunsford 1998; Stanford et al 2002; Princeton 2005).

Most of these cues are fairly self-evident. In studies of users' perceptions, authority features prominently in terms of both the organization and the individual. For example, users trust information hosted by a well respected organization (Stanford et al 2002; Liu 2004). The assumptions held by users that information is trustworthy or good because it comes from a certain organization lend presumed credibility (Liu 2004). The members of the community consultation referred to examining the credibility of organizations, e.g. by checking out domain names; going beyond the company or individual name to explore the 'About us' part of websites. The members of the community consultation mentioned taking decision about how 'academic' information is and highlighted the need to cross check and verify that the same information could be found in several sources and to feel that all eventualities and arguments have been explored prior to taking the decision to cite a source. This is what Wachbroit (2000) terms developing trust in information through attribution by comparing information across multiple sources (online and offline) and triangulating claims made therein (Wilkinson et al 1997; Rieh & Belkin 1998; Burbules 2001)

In terms of affiliation, Liu (2004) found that affiliation with a prestigious institution was a more positive indicator of credibility than authorship by a famous 'expert'. Koehn (2003) has commented on how, by providing a phone number, an organizational signals its willingness not only to engage directly with its clients but also to be held accountable. The community consultation group discussed existence of a physical location and contact details as elements that they took into consideration when deciding on the trustworthiness of a site.

With respect to coverage, the community consultation members raised this, commenting how time and cognitive stage determined the depth of coverage they required rather than the information per se. If they had limited time or there was likely to be one factual answer to their query, they needed less depth of coverage and therefore this would affect their choice of source.

Presentation and format rate highly in user perceptions studies especially those with student populations and they can lend what Liu (2004) calls surface credibility. Sites using graphics and multimedia are evaluated more highly by the 'Google generation' (Kafai & Bates, 1997; Wolcott, 1998; Fidel et al, 1999; Agosto 2002a). Hung (2004) found that, upon entering websites students made judgements based on surface characteristics, e.g. 'it looks scholarly', and peripheral cues (Cacioppo et al 1983). Kulthau (1991, 1993a, 1993b) describes this as the affective side of information seeking as opposed to the cognitive/behavioural aspect of information seeking but, as Amichai-Hamburger et al (2007) have identified, the need for cognition can influence user susceptibility to internal cues such as presentation of the site.

Presentation of sites was discussed by community consultation members who claimed not to trust sites that did not look 'professional', organised and well-laid out. They based their opinions on the initial impression of the home page and on a usable interface with clearly laid out results with no typos. "Bells, whistles and flashy stuff" on sites were likely to diminish trust. This development of trust is through bonding by influence of aesthetics evoking an emotional response and is something on which e-commerce organizations capitalize on (Smith 1997; Wilkinson 1997; McMurdo 1998; Hertzum 2002)

Currency was also discussed by the community consultation members who wanted to know the date of content discovered on a site. They were aware that the fact a web page had been updated did not mean that all the information contained had been similarly updated.

Type of object was also a subject of discussion during the community consultation. Blogs were mentioned as being trustworthy if the author of the blog was known to have posted in peer review journals, i.e. their reputation was established elsewhere but there was awareness that, more generally, blogs could be a source of bias.

### ***User's cognitive state***

In addition to external and internal cues, the user's cognitive state impacts on their beliefs about credibility or trustworthiness of online information sources. McKnight and Kacmar's (2006) study provided evidence that **initial** information credibility is built through three general dispositions:

- Disposition to distrust
- Trust in general technology
- Risk propensity

McKnight and Kacmar also found that, in terms of **building** information credibility important factors were:

- Trusting beliefs
- Perceived reputation
- Willingness to explore information

These are among the factors linked with cognitive state that include the following:

- Need for closure (Kruglanski & Freund 1983; Amichai-Hamburger et al 2004);
- Need for cognition (Petty et al 1981; Petty & Cacioppo 1984; Verplanken et al 1992; Cacioppo et al 1996; Amichai-Hamburger et al 2007; Kaynar & Amichai-Hamburger 2008);
- Willingness to explore (Borzekowski & Rickert 2001; McKnight & Kacmar 2006);
- Motivation or disposition to believe that may be intrinsic or extrinsic (Weiler 2005; Lim 2009);
- Purpose (Klobas 1995; Rieh 1998; Collis & Moonen 2001; Jones et al 2008);
- Prior knowledge (Rieh & Belkin 2002; Taraborelli 2008);
- Time available (Verplanken et al 1993; Klein 2001; Metzger et al 2003);
- Ability (Collis & Moonen 2001; Thompson 2003; Wang & Artero 2005; Rowlands 2008; Usher 2009);
- Past experience with site and success in usage (Lim 2009) which lends what Liu (2004) terms earned credibility or what Wachbroit (2000) terms developing trust in information through prediction;;
- Past experience with the author or their institution (Rieh 1998);
- Propensity to trust (Mayer et al 1995; McKnight & Kacmar 2006);
- Trust in technology (McKnight & Kacmar 2006);
- Risk propensity (Sheppard & Sherman 1998; McKnight & Kacmar 2006; Kelton 2008);
- Faith in humanity (Uslaner 2002; Koehn 2003; McKnight & Kacmar 2006);
- Suspicion of humanity (McKnight & Kacmar 2006);
- Internet anxiety (Tsai 2001; McKnight & Kacmar 2006).

The last-mentioned, 'Internet anxiety' would appear not to be an issue for students (although it may be with mature students or with international students from less developed countries) but who are members of the 'Google generation' of students familiar with, and trusting of, Google and similar search engines. Students arrive in HE with an aptitude for using information communication and technology (ICT), an ability to multitask with diverse media and interactive work styles (Schooley 2005; Breeding 2006)

However, many studies indicate that in fact the students are naïve about ICTs and have misplaced confidence and trust in them. For example, with respect to web search engines, Colaric's (2003) study found that students' existing knowledge of Web search engines and how they worked was, in the main, around 33-40% incorrect. Students exhibited a lack of awareness of how web pages can be engineered to manipulate search engine ranking functions (Page et al 1999) and a similar lack of awareness of 'subliminal' advertising featured by search engines alongside searches, based on keywords. In terms of websites with advertising, students in the OCLC (2001) study perceived these as having equally reliable information to ad-free websites, with only 20% of the students believing that ad-free sites might have more reliable information.

Few students in Calvert's (1999) study few could understand the motivation for putting misinformation on the Web and those that did saw it in a more mischievous light than being more sinister (research students were aware of the motivations, e.g. academic processes such as tenure and the REF). In the past there have been examples of misinformation being deliberately posed on Wikipedia, but some students in Burhanna et al's (2009) study were unaware that the content of Wikipedia could be edited by any user and, only when they realised this, became concerned about its accuracy.

Generally studies find that students exhibit trust and belief that external resources provided by Google are reliable and relevant, and have quality materials (Wong et al 2009). They are unaware of the distinction between materials on the web and peer-reviewed journals (Tenopir 2003). They are also unaware of filters used to ensure that information available in

libraries is of high quality and, concomitantly, unaware that these filters are not employed on the Internet (Pask & Snow 1995)

Interestingly, although students in the OCLC (2002) study expressed strong feelings that they knew best what information from the Internet to use for their assignments, only half of the students agreed completely that Internet information was acceptable for assignments! This may be connected with need for closure.

### ***Need for closure***

People with a high need for closure are motivated to avoid uncertainties and to stop looking or more information (freeze) when they need to form an opinion. They get locked into conceptions and tend to ignore contradictory information. Wang & Arteros (2005) and Lim (2009) found in their studies that there was a tendency for students to use information wherever it came from if it met their needs. Students in Metzger et al's (2003) study ranked quantity over quality, favouring search methods that returned a high number of results early on (Head & Eisenberg 2009). Google is one tool that finds users the information they want in return for a minimal investment of time and energy (Anderson 2006)

### ***Need for cognition***

If a person has a low need for cognition, they do not enjoy the cognitive effort required to deal with complicated issues and so will rely on other people's opinion, or rely on simple cues such as attractiveness as described above. The ELM model (Elaboration Likelihood Model) suggests that, in situations with low personal relevance to a person with low need for cognition, the person will be affected by peripheral attributes of the message such as the website attractiveness. Those with a high need for cognition will search for the core attributes within the information content.

Satisficing has been described as:

*“setting an acceptable level or aspiration level as a final criterion and simply taking the first acceptable [option]”* (Newell & Simon 1972: 681).

Agosto (2002a) has identified two satisficing behaviours, reduction and termination. In the former, a user decreases the number of websites to a small subject of, e.g. known sites. In the latter, the selection/reduction process is ended this may be because of a satisfying outcome but may be because of physical discomfort, time constraints, onset of boredom, perception of information overload/snowballing, presumably also linked to cognitive limitations. Termination in the case of Grimes & Boening's (2001) students came when they perceived there to be insufficient information or repetition of information. Students in the UBiRD study changed resources when they 'hit the wall' (Wong et al 2009)

The community consultation questionnaire asked respondents when they searched further for information and when they stopped searching. Further searches were influenced by degree of engagement in the topic being searched and in the results being sought and by the belief there was more information 'out there' and wanting to explore all eventualities prior to accepting information. The majority of respondents to the questionnaire found it difficult or challenging to know when to stop but some admitted that, eventually, frustration, boredom, tiredness or physical discomfort could cause them to do so.



## ***Purpose***

Several studies on trust in information quality have assessed the degree to which information matches the user's requirements (Klobas, 1995; Marchand, 1990; Rieh & Belkin, 1998; Wilkinson et al., 1997). Lim (2009) discusses how confidence in information is closely related to the concept of outcome expectations of social cognitive theory (SCT), i.e. confidence in information quality is demonstrative of the outcomes anticipated from using that information resource.

Community consultation members discussed how trustworthiness depended on context, e.g. they would go to a bank or similar financial institution for information on exchange rates. In the commercial world, trust had to be 100% because of the need for certainty about the veracity of information given to clients. In the public sector also decision making processes could be impacted upon by misinformation. They differentiated between information sought for business/academic/specialized purposes as opposed to that sought for pleasure/leisure purposes.

Students claim to set boundaries between educational and social spaces on the Web (Breeding 2006; Burhanna, Seeholzer et al 2009) and use different criteria for evaluating sites, depending on whether information seeking tasks are study-related or leisure-related (Wolcott, 1998; Bilal, 2000; Agosto 2002b). They are, they claim, more likely to use sources such as Wikipedia when content is 'not vital' or using such a resource but verifying it when information 'really matters' (Calvert 1999; Burhanna et al 2009). So it would appear that the perceived importance of a task is directly related to the relevance of trustworthiness (Hertzum et 2002). There are two elements to this – the nature of the topic and the nature of the task. For example, if the topic is on a controversial issue then trust and credibility are of paramount importance (Jungermann, Pfister, & Fischer, 1996; Kolsto, 2001). The nature of the task may demand comprehension and/or differentiation of multiple texts and integrate information across sources, e.g. if students are required to compare & contrast views or to discuss arguments of a particular author or to focus on explanations and information integration across sources (Perfetti et al 1999; Wiley & Voss 1999; Pickard, 2005; Rouet 2006; Braten, Stromso et al 2009)

The community consultation members discussed how students seeking information are assessment-driven, placing trust in the lecturer and the belief they have to read what s/he has cited and trusting in their own information literacy skills. There was concern that literature reviewing was rarely taught in courses and that students felt under pressure to read 'the right bits'. There was some criticism of this approach because it was felt it could result in students seeing information in digestible 'chunks' rather than in context. Facilities such as Yahoo Answers Homework Help could exacerbate this because it gives answers or instances unrelated to the wider context.

## ***Prior knowledge***

Users systematically rely on background knowledge and previous experience as a main factor to decide whether a source of information in the World Wide Web is trustworthy (Tarborelli 2008). This was corroborated by responses to the community consultation questionnaire where respondents said they trusted information aligned to what they already knew about a subject and that, when they looked for clues as to the trustworthiness of information retrieved, they compared it with their prior knowledge.

## **Time available**

In the case of availability of time, with students this may be related to the amount of time they are willing to wait for information/help (Simon 1979; Agosto 2002a; Weiler 2004). Their early experiences with ICT may have led them to expect information quickly from multiple sources in real-time for immediate processing (Schooley 2005) and immediate access to information (Fidel et al 1999):

*“It’s easier on the Web, especially if you’re lazy. It’s easier because . . . it’s just sit and click . . . and just see what you get.”* (Fidel, 1999: 27)

Procrastination or a ‘just in time’ attitude on the part of students can exacerbate this tendency (Head & Eisenberg 2009)

Members of the community consultation also commented on two time-related elements – the time they had available and the time they were willing to spend. When responding to the questionnaire, their decisions to use particular search engines were influenced by time-related factors, e.g. ease of use, speed, effective delivery of results, and immediacy of downloading. It was felt that possession of good information literacy/search skills could be time-saving and deliver better, more trustworthy results. Mention was also made during community consultation, of use of alerts and digests – from trusted third parties - to keep abreast of new information and as a time-saving service.

## **Ability**

Most research studies indicate that students overrate their Internet skills/experience (Burhanna et al 2009). Manual (2002) believes this may be attributable to perception of Internet as a ‘cool’ medium about which they are expected to know. To compound this, they tend to work independently with internet resources which is likely to impair their critical/evaluative abilities.

Students rate their abilities favourably, claiming they are successful finding information they need and know how to discriminate and choose the best information (Lubans 1999, Shippensburg 2000, OCLC 2001, Buschman & Warner 2005) Buschman & Warner’s (2005) study corroborates findings of Fidel et al (1999) and Grimes & Boening (2001) on student misplaced confidence in their Internet searching abilities as opposed to their actual research skills/performance.

*“when asked in the interview if they would like to learn how to search the Web better, most students thought they already knew what they needed to know”* (Fidel et al 1999: 31).

Student users’ belief that Internet-provided information is as accurate and trustworthy as any other information source is substantiated by Lunsford’s (1998) findings which indicate that undergraduate students do not perceive the Web to be any less accurate as an information source than other common information sources, including business magazines, scholarly journals, newspapers, books or company annual reports. Other researchers similarly found that young people tended to deem all printed/electronic information as being of equal authority (Kafai & Bates, 1997; Hirsh, 1999).

Risks of such naiveté and misplaced confidence become apparent if consideration is given to Borzekowski & Rickert’s (2001) discussion of young people’s use of Internet information on a range of sensitive health issues (e.g. STDs, sexual behaviours, diet). Hembroff (2006)

discovered that three-quarters of students used the Internet as their primary source for researching health information, despite the fact nearly a quarter (23%) of their respondents had doubts about the Internet as a credible source of information.

Level of maturity/senior or experience may impact on ability. For example Head and Eisenberg (2009) found credibility of resources was more of a factor of use for students from 4yr institutions (cf HE) than those from 2 yr (cf FE) Postgraduate students in Wong et al's (2009) study reported evaluating a range of resources prior to their use of electronic information sources whilst undergraduates tended to use Google and Wikipedia. Similarly, Wong et al found their postgraduates used internal resources such as EBSCO and ProQuest whilst undergraduates used external resources such as YouTube and Yahoo. Liu and Huang's (2005) study of Chinese students found undergraduates predominantly relied on author's name/reputation/affiliation for their credibility evaluation; whilst postgraduates focused more on information accuracy/quality. In terms of maturity, research indicates that students who have moved to a relativistic world view are better able to handle conflicting information and to use critical thinking to determine authority/accuracy of information retrieved online (Whitmire 2003, 2004; Hofer 2004, Wiley & Goldman et al 2009).

### ***Cognitive limits***

Part of the evaluation of Internet resources involves judging level of content difficulty, complexity of its organisation and comparing this with one's own level of developmental ability. (Simon 1979; Kafai and Bates 1997; Wolcott 1998; Agosto 2002a, 2002b) Mention was made during the community consultation on how, over time, trust changes as the experience/knowledge of the information seeker changes.

### ***Propensity to trust***

Studies of trust as a psychological attribute revealed that each person possesses a personality characteristic influencing their willingness to extend trust in specific situations (Rotter 1980). Mayer et al (1995) refer to this trait as propensity to trust. The concept is rooted in the theory of generalised expectancies that assert individuals form general expectations of the world based on personality traits, culture (Blomqvist 1997) and accumulated experience (Lee & Turban 2001; Bart 2005; Holsapple 2005) The higher this propensity is in general, the more likely people are to trust in particular instances, including information seeking

### ***Risk propensity***

Seleznyov (2004) describes trust as "... a measure of willingness of a responder to satisfy an inquiry of a requestor for an action that may place all involved parties at risk of harm, and is based on an assessment of the risks and reputations associated with the parties involved in a given transaction". (Seleznyov 2004: 99). The fact that Seleznyov mentions assessing risks indicates that consideration has been given to those risks and acknowledgement that the perceived reward is worth the risk. Several authors on the concept of trust have highlighted the fact that the presence of risk creates a need for trust (Luhman, 1988; Seligman 1997) and that willingness – and freedom – to accept rather than reject that risk is a vital dimension of trust (Mayer et al 1995; Hardin 2001). Willingness indicates the voluntary nature of trust as opposed to being coerced or exploited into risk-taking. Trusting behaviour, trusting intentions or behavioural trust are also differentiated from confidence or belief in

something which may not involve taking any action based on that confidence or those beliefs and, consequently, will not involve any related risk-taking. (Blomqvist, 1997; Gambetta, 1988; McAllister, 1995; Mayer et al 1995; McKnight et al 2002). Risk features in many definitions of trust (Lewis & Weigert 1985; Mayer et al 1995) and, as Corritore et al (2003) say, risk is particularly relevant in the online environment.

### ***Internet anxiety***

This phenomenon has been reported in older studies, but this may not be an issue with students, with the possible exception of mature students or international students with limited prior experience of usage of ICT.

### ***Information searching vs information assessment and some caveats***

There is a need to differentiate between information searching and information assessment. The former involves the ability or likelihood of a user to search for 'trustworthy' information and affects their choice of tools and the degree of effort they will invest to find information (i.e. the breadth of processing). The latter involves the ability/likelihood of a user to assess an individual piece of information for its trustworthiness (i.e. the depth of processing).

Grabner-Krauter (2003) discusses the fact that, whilst accepted theories such as that of Ajzen (1991) on planned behaviour suggest a positive relationship between intentions and actual behaviour, situational aspects may interfere with this relationship. This highlights the importance of examining not only trusting intentions or willingness to engage in trusting behaviour (Mayer et al 1995) but also to examine actual behaviour.

The majority of user studies are conducted online so are biased towards those who use Internet and, in addition, samples tend to be convenience ones, i.e. homogenous groups of student. There are few citation studies which might be more indicative of what sources students actually used as opposed to those they say they use (such citation studies include Fescemyer 2000; Malone & Videon 1997; Gannon-Leary et al 2006; Riahinia 2010). Citation analysis can reveal examples, such as those identified by researchers, of students citing other student papers found online (Gilette & Videon 1998; Grimes & Boening 2001); sections of a single website as multiple sources (Grimes & Boening 2001); websites with false links (Grimes & Boening 2001)

There is a social desirability inherent in many of the measures so students' reports of their online behaviour may be inflated as a result (Metzger et al 2003). In terms of students' ability to assess their own information seeking skills, many studies are based on students' own perceptions of these skills so lack reliability (Thompson 2003)

### ***How students use the web for research***

Several studies have asked students how they use the web in information seeking. The first port of call is generally commercial search engines such as Google or Yahoo (Shippensburg 2000; OCLC 2001; Jones 2002; Thompson 2003; Fallow 2005; Johnson-Yale et al 2008; Head & Eisenberg 2009) In some cases this is truer of undergraduates than postgraduates (Shippensburg 2000); in some cases it is done in conjunction with course notes (Head & Eisenberg 2009); and in others it is done even after students have received information skills training (Becker 2003; Buschman & Warner 2005, OCLC 2005). Calicott & Vaughn (2006) and Wiekliniski (2005) discuss the usefulness of this approach as a starting point. Wikipedia

was mentioned by students, especially undergraduates, as being useful for background information at the start of a project (Jones, Johnson-Yale et al 2008; Wong et al 2009)

In fact, members of the community consultation in responding to the questionnaire indicated that they used Google first (in two cases to the exclusion of other search engines). Membership of the community consultation comprised academics, researchers, managers, etc as well as students so it may be that, although the research reviewed herein covers students, that members of these other groups exhibit similar characteristics. Five respondents to the questionnaire said they would follow up use of Google with use of library data bases and four made specific mention of the library's NORA portal.

Another popular starting point for students was to get help from friends or use friends recommendations (Lubans 1998, 1999; Agosto 2002b; Pickard, 2008; Wiley & Goldman 2009). In fact, more than 60% of respondents in the OCLC (2001) survey said they would seek help from a friend rather than ask a librarian for assistance. Other sources of advice/recommendations were lecturers (Shippensburg 2000; Agosto 2002b).

Fewer respondents said they would use library websites and this was a less likely starting point than use of a search engine (Shippensburg 2000; Johnson-Yale et al 2008) especially for undergraduate as opposed to postgraduate students.

In terms of searching techniques, research indicates that there is reliance on past experience of successful searching in starting a new search (Fidel et al 1999) and this may account for a tendency for students to follow the same pattern in the initial stages irrespective of the information goals (Head & Eisenberg 2009). In formulating a query a typical query length is around two words (Nielsen 2001) or a keyword or URL (Fidel et al 1999). There is little forward planning with reactive information seeking behaviour being determined by what is displayed on the screen (Fidel et al 1999). Another tendency is not to look beyond the first results page (Nielsen 2001).

Respondents to the community consultation questionnaire indicated that they tended to go to their favoured search engine first irrespective of the information sought, because they were familiar with it and had past positive experiences when using it to find information.

Research indicates that students rarely follow links (Agosto 2002b; Becker 2003), although prior research indicated a student preference for sites with links (Jacobson and Ignacio, 1997; Fidel et al. 1999; Bilal, 2000). They also use websites containing advertising (Fidel et al 1999; OCLC 2002) despite saying that web site authority, source and accuracy were of importance to them.

There is a lack of systematic interrogation, refinement, limitation or reformulation of queries (Wong et al 2009) When a search strategy is unsuccessful, rather than refining or revising strategy students will switch to another search engine or abandon their search or even change assignment topic (Agosto 2002b; Becker 2003).

Websites are chosen in an arbitrary/haphazard manner and free web resources are used almost to the exclusion of library resources (Buschman & Warner 2005). The library websites are seldom or infrequently used since students believe that other websites have 'better' information (Fidel et al 1999; Shippensburg 2000; OCLC 2002, 2005)

In consequence there is sometimes reliance on indifferent results from a search engine (Buschman & Warner 2005) and a lack of evaluation of sources despite the fact that students have indicated that they are aware of evaluation criteria (Becker 2003; Buschman & Warner 2005)

The tables below illustrate students' perceptions of the library portal in comparison with the Internet and research papers comparisons of the library portal and the Internet.

**Table 1: Student perceptions of the library portal vs the Internet**

<b>Library portal</b>	<b>Internet</b>	<b>Reference</b>
Based on card catalogue	Intuitive interfaces	Breeding 2006
Poorly ordered search results	Relevancy ranking	Breeding 2006
Complexities of Boolean search	Search engine models	Breeding 2006
Organization – not always helpful/understandable	Cluttered – but users found what they wanted!	Fast & Campbell 2004
Trustworthy	Less trustworthy – but confidence in evaluation	Fast & Campbell 2004
Modest expectations of finding what wanted, less confident	High expectations of finding what wanted, more confident	Fast & Campbell 2004
Less up to date content	More up to date content	Fidel 1999; Fast & Campbell 2004
Slower in terms of time & effort	Faster in terms of time & effort	Fast & Campbell 2004
Control	Freedom	Fast & Campbell 2004
'Ineffectual' admiration – i.e. admirable but doesn't inspire use!	Enthusiasm	Fast & Campbell 2004
Passivity	Proactivity	Fast & Campbell 2004
Complex	Simple	
Deferred gratification	Immediate gratification	
Demanding of greater understanding	Undemanding of understanding	
Demanding in terms of skills	Undemanding in terms of skills	
Intimidating	Non-threatening	Fast & Campbell 2004
Frustrating	Facilitating	Fast & Campbell 2004
Multiple approaches	One-stop shopping	Fidel 1999; Head & Eisenberg 2009
Unreliable, hit & miss -e.g. embargos on current journals	Expectations more likely to be met by Google/Wikipedia in terms of finding relevant info	Wong et al 2009

**Table 2: Comparisons of the library portal and the Internet from the literature**

<b>Library portal</b>	<b>Internet</b>	<b>Reference</b>
Quality of results superior	Quality of results inferior (G)	Brophy & Bawden 2005
Coverage inferior	Coverage superior (G)	Brophy & Bawden 2005
Accessibility inferior	Accessibility superior(G)	Brophy & Bawden 2005
Full text access 21%	Full text access 73%	Haya et al 2007
Half # documents found	Full # documents found	Haya et al 2007
User interface fails to conform to expectations, can appear complex	User interface conforms to expectations, familiar, minimalist	Adlington & Benda 2006; Haya et al 2007
Front end searching	Back end searching	Miller 2005
Meta searching can be slower than Google	Google can be faster than meta searching	Cathcart & Roberts 2006
Trusted for access & location	Preferred for discovery of	York 2006

of materials	information	
Search rules not understood	Search rules understood	Haya et al 2007
Searching needs training (what difference does this make?)	Intuitive searching	Miller 2005; Anderson 2006
May need intermediaries (will they seek help?)	Don't need intermediaries	Miller 2005; Anderson 2006
Librarianese (author/title/subj searches)	User-picked search terms	Anderson 2006
Misunderstanding around multiple word searches	Understanding of multiple word searches (AND default)	Haya et al 2007
Version control	Multiple versions , e.g. preprints, revisions and final versions (GS)	Tenopir 2005; Adlington & Benda 2006
Unhelpful for multidisciplinary or transdisciplinary searches	Particularly useful for multidisciplinary and transdisciplinary searches	Adlington & Benda 2006
Results not ranked in a meaningful way	Popularity-based rankings using non-specialised language. Help at early stages of learning subject	Thelwall 2006
Retrievals closely linked to search terms so relevant and manageable	Numerous hits but too few pertinent to the search – managing these can be at the expense of evaluating their content, potential to miss the 'best'	Anderson 2006; Cathcart & Roberts 2006; Donlan & Cooke 2006
Using library portal might alert to hard copy material/books that might contain better (i.e more relevant/complete/accurate) info	Using GS is less likely to alert user to existence of better (relevant/complete/accurate) material in hard copy format – i.e. on library shelves!	Anderson 2006
Subject analysis via subject thesauri in databases	Federated search engine dependent on KW searching – only as good as subject headings included (GS)	Gross & Taylor 2005; Donlan & Cooke 2006
Invisible web content of quality (e.g. high quality medical resources) but esoteric? Minority interest?	Some 'invisible web' content inaccessible for technical/political/economic reasons (but meets most user needs, i.e. popular) (GS)	Anderson 2006; Egger-Sider & Devine 2006; Herring 2006
Business model – provision of list of material used to 'compile' results. FX scope + authority.	Business model – doesn't provide list of material used to compile sources. FX scope + authority (GS)	Adlington & Benda 2006
Do librarians understand users' web-based behaviour. Are they/should they be responding to this?	Google understanding users' Web-based behaviour and responding to this.	Phipps & Maloney 2006
<p>G = Google GS = Google Scholar</p>		

### ***Return on Investment (ROI) and risk***

Earlier in this report mention was made of the fact that Google finds users the information they want in return for a minimal investment of time and energy (Anderson 2006). The concept of ROI is relevant in this context. Collis & Moonen's (2001) simplified return on investment (ROI) model is based on the 4Es relating to the use of technology for learning related purposes. These are Environmental context; individual's perception of educational Effectiveness; Ease of use; and sense of personal Engagement with the technology.

In respect of vector 2, the individual perception of educational effectiveness, users in information seeking in the digital environment expect results. These may be short-term (tactical) or long-term (strategic) but measuring effectiveness (e.g. in terms of quality of learning) is problematic. From the tables above and the preceding discussion of the literature, issues that might impact on this measurement include speed, efficiency, saving time, lowering effort and lessening frustration but do these issues relate to the quality of learning or are they related to short-term pay off?

Measures of effectiveness are largely reliant on perceptions of individuals whether they are students, tutors or librarians of how much students have learned. With respect to benefits for themselves, students might perceive these in terms of assignment grades (primarily), understanding of, and skills for use with, ICTs, a feel good factor (affective domain) e.g. success with, and confidence in, ICTs; and, in the cognitive domain, the ability to locate and use information and to develop critical and evaluative skills

With respect to benefits for student users, tutors and librarians might perceive these in terms of attitudes, quality, access and development of ICT literacy; improved teaching and learning experience; experiencing new forms of teaching and learning and of learning activities; and experiencing new resources.

Investment by libraries includes licences and software packages; time and effort in purchasing decisions; numerous technology-related investments; ICT support and training including continuing professional development (CPD) and, if certification programmes or procedures were to be deemed desirable there would, presumably, be further such investment required. In addition to the benefits or ROI for students, there are potential benefits for librarians such as improved interaction with users; improved understanding of user needs; improved understanding of their own CPD/experience/knowledge; recognition as an 'expert' or professional; and general job satisfaction.

Community consultation members were asked to discuss and tabulate Risks vs ROI and the results of this exercise are featured in Appendix 4, table A3. In the questionnaire they were also asked about risks in using online information and some of those identified included failure to use a range of resources (e.g. online to the exclusion of primary/print); the lack of intermediaries on the Internet to filter information; the potential for digital information to be altered; and the risk of giving unsubstantiated information to customers. Reward was also mentioned in the questionnaire in respect of taking the decision to search further for information since several respondents mentioned the 'pay off' involved in finding and using information – i.e. 'how much it matters' that information is trustworthy. In e-commerce literature Castelfranchi & Yao Hua (2002) refer to personal thresholds that users have above and below which they will/will not take risks. The more risk seeking the user, the lower will be their threshold (Luhmann 1979; McKnight et al 2002). How far is trust a critical factor in user acceptance or rejection of a site/portal? Clearly risk is taken into account but what other factors are at play in the decision and how do they relate to trust?



Risks in the use of less trusted resources such as the Internet as opposed to trusted portals such as that of the library have been discussed in the literature. These include ideas of search engines such as Google resulting in the 'dumbing down' of services (Anderson 2006; York 2006) and ideas that search engines such as Google Scholar cater to the "lowest common denominator", discouraging more thorough research (Callicott & Vaughn 2000: 86) and practically handing information to users 'on a plate' (Anderson 2006)

From differences in students' reported behaviour and their actual behaviour in information seeking, it would appear there is a gap between tutors' expectations of what sources students will use and what they actually use (Grimes & Boening 2001). A concern is that students will rely exclusively on search engines such as Google Scholar for their research (York 2006). Such an approach has the potential to compromise the quality of their search results and possibly to contribute to student frustration with the research process as well as impacting on the quality of student work and their originality of thought (Rothenberg 1998; Grimes & Boening 2001; Lombardo & Miree 2003). Lack of intermediaries or intervention by, e.g. a librarian, means students may select sources of dubious quality (Farber 1995; Kuh & Gonyea 2003).

If students take a surface, utilitarian approach to learning, they will fail to engage in behaviours associated with self-regulated learning (Wiley & Goldman 2009) and will not develop their information literacy skills (Anderson 2006). Head and Eisenberg (2009) comment that information seeking skills may be perceived as a rote-learned competency thus undervaluing information literacy training on offer from library services.

If there is lack of differentiation between the free web and trusted resources chosen and paid for by the library (Buschman & Warner 2005) then it is possible that there will be lack of recognition for the library and even that users may be duped into paying for content to which the library already subscribes (York 2006). Library portals may be undermined by search engines such as Google Scholar (Banks 2005; Jones 2005; Lackie 2006) and, in using Google Scholar, the portal or gateway can be bypassed, as can the librarians as gatekeepers (Phipps & Maloney 2006). This could mean that students could graduate from HE without using the academic library or scholarly information (Wilder 2005; Donlan & Cooke 2006) and, worst possible scenarios, libraries and librarians could become irrelevant/redundant (York 2006)

It would appear from tables 1 and 2 above, that there is a gulf between how information is organised in/retrieved from libraries and student understanding of that organisation/retrieval. (Becker 2003). Fast & Campbell (2004) argue for redefining library portal/OPAC interface in line with Web-based standards of usability.

*"Web searching is shaping user expectations of what an information retrieval system looks like, how it behaves, and how to interact with it."* (Fast & Campbell 2004: 138)

Much of the literature argues that libraries cannot compete with search engines such as Google Scholar so their best strategy is to take inspiration from and emulate them (Massey-Burzio 2002; Lackie 2006) and to collaborate with them and other stakeholders in the development of systems that delivery quality and convenience (Bell 2004; Egger-Sider 2006).

Other strategies suggested include 'selling' Google Scholar as just one tool in a suite of services on offer to users (Adlington & Benda 2006; Callicott 2006), a tool with which librarians could develop expertise as part of their CPD and as a competitive intelligence measure. Cathcart and Roberts (2006) suggest the use of branding to promote meta-search or federated search technologies as like Google Scholar but better! They cite Kennedy &

Price (2004) as challenging library community to capitalise on opportunities Google Scholar offers but also express doubts about LIS being up to the challenge. This is echoed by Anderson (2009) on how:

*“Librarians response to the Google Book Search (GBS) juggernaut has, generally been that of an ostrich that pauses, as it whistles past the graveyard, only long enough to stick its head in the sand...”* (Anderson 2009: 38)

### **Discussion on the desirability of certification**

Choice of information resource may be based, among other factors, on purpose and the degree of risk involved, as described in the preceding text on users' cognitive state. Health information, e.g., there is a high degree of risk since it has the potential to benefit/harm a large number of people (Mayer et al 2006). Users seeking such information need a guarantee that websites visited meet a minimum quality standard, e.g. that information contained thereon is vouched for by suitably qualified professionals (Karkaletsis & Mayer 2006; Mayer et al 2006).

Some researchers assert that trust does not play an important part in obtaining information from the Internet (Uslaner 2002) because users are aware that misinformation exists and are free to choose whether they use or discard what they find (Kini & Choobineh 1998). Other researchers claim that trust as a construct is applicable only to people not to systems (Friedman et al 2000; Lynch 2001; Kelton 2008). Trust does, however, play a key role as a mediating variable between information quality and information usage (Chopra & Wallace 2003; Kelton 2008).

Under what circumstances do users feel strongly enough about the quality of information they access to deem a form of certification desirable? If they do feel strongly, and if librarians are to play a role in this, do users have similar respect for information professionals as they do for medical professionals? In terms of credibility rating systems, e.g., would users trust digital information resources more if librarians or publishers reviewed them and gave them a seal of approval? Librarians already make choices in their collection development policies but Herring (2001) points out that they would need to work with researchers in different disciplines to enhance their understanding of the impact cognitive authority factors have on specialists' acceptance/rejection of information sources for their disciplines.

In the community consultation workshop members believed that, if a University library subscribed to a resource it could be trusted and if a web page was hosted on an academic site it was more trustworthy than such a page hosted on an independent site. However, they queried who would be held accountable if information provided was proved inaccurate or untrustworthy. If user trust transfers the responsibility of securing and monitoring the quality of digital resources to the organization, then the onus is on that organisation to implement methods that assure the integrity, authenticity and authority of the resources they provide (Bradley 2005).

Technically, given the existence of external cues described earlier in the report, certification is feasible but how desirable is it? It could be advantageous in terms of simplifying and reducing the complexity of information seeking in the digital environment. It could negate the need for users to visit numerous web sites prior to finding out if the content were suitable for, or accessible to, them; and presumably organizations would benefit from more standards and codes of conduct being adopted more widely with a concomitant improvement in user trust.

Members of the community consultation workshop believed that certification from commercial organisations was questionable since, e.g. it could involve 'paying the subscription and getting the badge' and wondered how such schemes were policed. An example was used of an engineer's site claiming he was Corgi certified, and how they would still wish to go to the Corgi website to cross check that he had the certification he was claiming. They felt that information was subjective and more difficult to certify and discussed whether certification could be done formally by a University or less formally through peer reviews whilst still involving the individual seeking the information in cross-checking to verify information and to build up a layer of trust and confidence.

From the literature and from the consultation It would appear that there is a limit to what can be done in code or by labelling and what, ultimately, must be left for human/social judgement in relation to authenticity/integrity/provenance. Many coding or labelling procedures are basically about trust in identity and identity alone does not guarantee that the information provided or warranted by an organization can be trusted, since much is dependent on the policies of the organisation and the promises it makes therein. Potential users of information provided by such organizations may still need to establish trust in the behaviour of that organization, i.e. entity-centred trust (Lynch 2000; Gil & Artz 2007) as opposed to content trust. It is important that organizations create an environment for users that feels safe and in which it is easy to locate their policies about privacy and security (Schneiderman 2000; McKnight et al 2002)The use of certification, coding or labelling assists the transference process of trust building, i.e. you need to trust the ability/integrity/reputation of the information provider acting as third party that awards the certification such as a librarian, a manager of a digital repository or a publisher before you trust the content of the information provided.

## Outcomes and conclusions

This project had three aims, the outcomes from the project can be demonstrated under each of the original aims:

- to 'provide an overview of the ways in which trust is either assessed or asserted in relation to the use and provision of resources in the Web environment for research and learning'

One of the major outcomes of the study is an evidence-based model of user trust in information resources in the web environment defining the path the user takes from initiating a search to 'intention to reference'. From a review of the literature and initial validation from the community consultation, three factors affecting trust/credibility of online information have been identified. These are external factors, internal factors and user's cognitive state. It would appear that user's cognitive state and external factors influence a user's decision as to whether or not to conduct an internal assessment of information. After the decision has been made to progress the user is then faced with decisions based on perceived risk, perceived ease of use and perceived usefulness. Only when all of these have been satisfied or not does the user reach the point of 'intention to reference', this is then either encouraged or not based on accessibility of the source.

The construction and subsequent initial validation of a model of user trust in information resources on the web provides a detailed and systematic review of ways in which trust is assessed by users and asserted by providers. This model is now sufficiently robust to allow further validation both within HE and across the education spectrum. In order to retain the integrity of this model there is a need for wider validation that remains focussed in both Information Science and Cognitive Psychology, allowing issues to be explored and

investigated from both disciplines. These aspects are intrinsically linked and can reveal a great deal about user behaviour and learning in this environment.

A second aim was:

- to 'assess what solutions might be worth further investigation and whether establishing ways to assert trust in academic information resources could assist the development of information literacy'

An evidence-based review of relationships between service provider needs and user needs has been provided in order to determine what areas are worthy of further investigation. The community consultation then validated and extended the findings from the literature review; to establish users' and providers' perceptions of the desirability and feasibility of certifying authenticity and provenance and, in addition, to explore the potential for developing a framework of trust to integrate into information literacy frameworks and education. Technically certification is feasible but the questions remains; how desirable is it? It could be advantageous in terms of simplifying and reducing the complexity of information seeking in the digital environment. It could negate the need for users to visit numerous web sites prior to finding out if the content were suitable for, or accessible to, them; and presumably organisations would benefit from more standards and codes of conduct being adopted more widely with a concomitant improvement in user trust. It would appear that there is a limit to what can be done in code or by labelling and what, ultimately, must be left for human/social judgement in relation to authenticity/integrity/provenance. Many coding or labelling procedures are basically about trust in identity and identity alone does not guarantee that the information provided or warranted by an organization can be trusted, since much is dependent on the policies of the organization and the promises it makes therein. Potential users of information provided by such organisations may still need to establish trust in the behaviour of that organisation. There were many levels of 'certification' discussed that demonstrated the complexity of any such certification but probably the most notable is removing of ownership from the decision making process. Information Literacy is a key life skill and becoming increasingly more relevant, certification would reduce the need for personal decisions and judgment but could leave the user open to believing false claims and becoming complacent in acceptance of information. This would work against the learner becoming information literate. Areas of further research have been indicated in the final section of this report and were seen as a more favourable solution than attempting to aim for a generic form of certification before any real depth of understanding relating to trust, learning, communication and cognitive development could be explored.

The final aim of the study was:

- to 'help increase understanding of how perceptions of trust influence the behaviour of information users.'

By the time an HE student arrives at university, searching habits and information seeking behaviours have already been adopted. It is vital that trust, as an element of information literacy, is seen as a continuum and education providers need to address this issue from primary education onwards. There is evidence of 'considerable ignorance on the part of both the school and university library sectors as to the nature of the information skilling within each other's establishments' (Lonsdale & Armstrong 2006). The broader picture is identified by Crawford and Irving (2007) who assert that information literacy must be 'explicitly and uniformly taught within education' and highlight the wider implications on education and the workplace. By working with teachers to identify where these skills lie in their existing curriculum, the librarian can support the teacher in developing pupils' abilities in 'asking the right questions, finding the right answers and evaluating the information they use' in order to 'teach pupils how to learn not just for now, but for their future...to know how to learn for

themselves.’ (Grey 2008) This study has demonstrated that trust plays a vital role in the behaviour of users when interacting with web based resources but there is still very much that is unknown. A question that emerged from the community consultation was “Do librarians understand users’ web-based behaviour. Are they/should they be responding to this?” If users continue to side-step expert library systems and rely on commercial search engines than the answer must be that no, information professionals would appear not to understand users’ web-based behaviour and are unable to construct trusted portals that respond initiatively to that behaviour.

## Implications

This status report has identified a number of questions that remain unanswered by the current literature in relation to trust but key messages for various stakeholders have emerged from the study.

There is a clear message for publishers that much of their current credibility is rooted in their ‘offline’ presence. Trust is engendered by such attributes as the peer review process, visible and credible editorial boards with a clear identity and the visual recognition users feel when reading an article. All of these attributes create a brand that users trust and recognise, it is vital that publishers retain this brand as we move more and more towards an online only presence.

A key message for librarians is the desirability of a trusted portal that provides the ease of use associated with commercial search engines whilst still providing more advanced retrieval, storage and analysis options. Investment by libraries includes licences and software packages; time and effort in purchasing decisions; numerous technology-related investments; ICT support and training including continuing professional development (CPD) and, if certification programmes or procedures were to be deemed desirable there would, presumably, be further such investment required. In addition to the benefits or ROI for students, there are potential benefits for librarians such as improved interaction with users; improved understanding of user needs; improved understanding of their own CPD/experience/knowledge; recognition as an ‘expert’ or professional; and general job satisfaction.

A key message for educators is the need for critical evaluation skills in the information literacy framework, skills that respond to current web-based information delivery mechanisms and not pre-determined ‘library’ skills that are not intuitive. Web-based information resources provide young people with opportunities to interact with each other and with vast quantities of information. Research has indicated that learning and cognitive development are intricately linked to opportunities to process and interact with relevant information and the medium used to deliver this information may well have an impact on these opportunities (Pickard 2008). Although this study focuses on the use of Web resources within the HE sector, it is important to recognise that learners develop habits long before they enter the HE sector and that those habits remain with them unless there is some level of intervention to change those habits. This would suggest that answers to questions based on user trust could have their foundations in research carried out across the educational spectrum, from primary school to HE. Certification may not be the answer as is clear from the literature in e-commerce in respect of seals of approval which Burkell (2004) claims are not transparent interfaces, i.e. doing what the user expects them to do and he believes that such interfaces will promise more than they deliver “unless and until consumer expectations are congruent with evaluation practice.” (Burkell 2004: 491) Certification could result in students seeing information in digestible ‘chunks’ rather than in context. Facilities such as Yahoo Answers Homework Help could exacerbate this because it gives answers or instances unrelated to the wider context. Technically, certification is feasible but not necessarily desirable

## Recommendations for further research

This initial status report has provided a sound grounding in the issues relating to user trust in the web environment and established that trust plays a key role as a mediating variable between information quality and information usage. Recommendations from this study are;

- further validation of the model of user trust in both the HE sector and across the entire spectrum of education as search habits tend to be formed early in the educational process. The validity and robustness of this model is dependent upon testing in a much wider environment and the comprehensiveness of the model is dependent upon a continuing examination of both the information science and cognitive psychology aspects of the model;
- exploring the relationship of cognition, self-efficacy and trust in information literacy to develop a framework which empowers users to be capable of independent certification of information resources from both an Information Science and Cognitive Psychology perspective;
- exploring the potential of developing library systems that reflect the ease of use associated with 'Google Scholar'™ whilst retaining the need for advanced search skills as this remains an essential skill.
- In addition, the members of the community consultation were asked for suggestions for future research based on discussions and activities and these are listed in Appendix 4.

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# Appendixes

## Appendix 1 Search terms used

KT = key terms

[ ] indicate truncation used

Terms used in conjunction with each other in multiple permutations

Affiliation	
Authentic[ity]	KT
Authority	KT
Belief	
Believability	
Brand	
Certification	
Confidence	
Credib[ility]	KT
Critique	
Deceit	
Desirab[ility]	
Digital	
Engender[ing]	
Evaluat[ion]	
Evidence	
Expectations	
Feasib[ility]	
HCI/Human-computer interaction	
Impact	
Influence	
Information literacy	
Inspir[ing]	
Integrity	KT
Judg[ement]	
Power	
Proof	
Provenance	KT
Quality	
Relevancy ranking	
Reliab[ility]	KT
Reputation	KT
Resources	
Responsibility	
Risk	
Safety net	
Trust relationships	KT
Trust[worthiness]	KT
Valid[ity]	KT
Web-based	

## *Appendix 2 Initial email invitation*

**Subject:** Jisc User trust project

Dear [invitee's name],

We are currently engaged in a JISC funded research project to provide a status report on '*User trust in information resources on the Web*'. As part of this project we would like to engage in a Community Consultation exercise with information providers, both academic and commercial, and information users across the academic community.

We would be really appreciate your input into this Consultation element of the project to look at the desirability and feasibility of a developing a model of User Trust, your involvement would include:

- Responding to a brief, open ended questionnaire providing your thoughts on the issues we have identified – this questionnaire will be sent out on **Wednesday 3<sup>rd</sup> Feb** and we would like you to respond spontaneously to it and return it to us by **Wednesday 10<sup>th</sup> Feb**.
- To attend a Roundtable event at the University on **Thursday 25<sup>th</sup> Feb** including lunch and an afternoon debate which attempts to identify the importance of the issues to relating to *User Trust*.

Could you let me know if you would be willing to be part of the consultation process before I send out the questionnaires later this week.

Very best wishes,

## Appendix 3 Questionnaire

### JISC

#### User trust in information sources on the web

*Northumbria University*

#### **Initial Consultation**

Please provide a spontaneous response to the following questions, the purpose of this questionnaire is to collect initial thoughts concerning issues pertinent to user trust in web resources. It may appear that you are being asked to provide very detailed responses but please do not spend a great deal of time considering your thoughts. This questionnaire will be analysed and themes and issues will be used to direct the debate at the Round Table Meeting on February 25<sup>th</sup>

*Confidentiality of individual responses is guaranteed.*

**1. When searching for information online what factors influence your choice of search engine?**

**2. What factors influence whether or not you use the information you find on the web?**

**3. What factors influence your trust in any information you find on the web?**

**4. When searching for information on the web what clues do you look for when deciding if you should trust the information you find?**



**5. What risks do you associate with using only online information?**

**6. What factors motivate you to engage in more complex or time consuming searches?**

**7. How easy is it to decide when to stop searching? What factors help you to make this decision?**

*Many thanks for your time in completing this questionnaire, your opinions are very valuable to this research project.*

## Appendix 4: **Community Consultation**

### **Round Table Schedule.**

<b>12</b>	Place name cards on tables Lunch Warm up and introductions
<b>12:30</b>	Housekeeping and Introduction Introduce 'hoped for' flipchart
<b>12:45</b>	Index cards Try to identify what type / form of certification would convince you of the trustworthiness of an online resource Write each clue on an index card 1 clue per card
<b>1:15</b>	Introduce trust model
<b>1:30</b>	Put A3 copy of each model on each table Post it notes for comments on stages in the model
<b>2:15</b>	Return to index cards Each participant has 6 green dots Please rate the clues 3 = most desirable 2 = next most 1 = next most
<b>2:45</b>	Remind participants about flipchart
<b>3:00</b>	Tea / coffee
<b>3:15</b>	Risk / Return Place a flipchart sheet on each table – two columns Barriers (Risk)                      Drivers (Return of investment)
<b>3:45</b>	Flipchart ideas Rate these Burning / smoking / smouldering

### **Methodology**

Questionnaires were received from [26] respondents, of whom four were librarians, two researchers, one PhD student, seven students, six academic staff, three commercial providers, two managers (one resource manager & one research operations manager) and one student support officer. One respondent was also representing the professional association CILIP.

Respondents who completed the questionnaire and were also able to attend the round table event numbered [20] and included three librarians, three members of academic staff, two researchers, two commercial providers, two managers, one PhD student and seven students. Again, one participant was representing CILIP.

The cabaret style arrangement of the event was 'socially engineered' in order to have a mixture of respondent types on each table.

**Table A1: JISC User Trust – Round table participants**

Table #	Participant's role
ONE	Librarian
	Researcher
	Academic
	Student
	Student
TWO	Student
	Researcher
	Librarian
	Academic
	Commercial Provider
THREE	Student
	Commercial Provider
	Academic
	Research ops Manager
	Student
FOUR	Student
	Student
	Resource Manager
	Academic
	Librarian

Participants were sent a brief analysis of the questionnaires (appendix 5) prior to attending the event and were also asked, if they had time, to complete the BBC website's Virtual Revolution quiz to identify what 'species' of web animal they were. After being given a brief presentation of the aims of the project and the plan for the day, participants were asked to review the synopsis of the questionnaire results.

After discussion, the participants were grouped according to the social engineering plan and asked to identify any 'clues' to certification that they would recognise and trust. These were put onto index cards for a subsequent exercise. The participants were then introduced to the trust model derived from the literature – a copy of which was available on each table - and, during a coffee break, were asked to make comments on the model, using post-it notes to append to elements of the model on which they were commenting. After this exercise the participants were asked to revisit the index cards that had been prepared on the basis of the 'clues' to certification activity. Each participant had six coloured dots and they were asked to add three dots to the card which had the most desirable 'clue', two dots to the card with the second most desirable and one dot to the third most desirable.

During the whole of the event participants had been alerted to the existence of a flip chart on which they were asked, at any time, to write down any suggestion/s for future research that might occur to them during the afternoon. At the end of the event, they were asked to vote on priority areas for research based on the round table suggestions.

## Results

Activity 1 – signs that would lead participants to trust an online resource

This activity required the groups to identify certification, i.e. a sign that would lead them to trust an online resource to the extent that they would follow it through and reference it. Discussion in the groups centred around several issues including the following

- Domain names although there was some discussion about how the spoof ones could be identified from the genuine. Participants believed one with an https prefix would be secure and therefore more trustworthy
- 'Grey' information was cited as being problematic, e.g. anonymous pdf files related to sites (e.g. University working papers), in which cases participants felt they had to try to work their way back via the links to be able to tie the paper in with the original site and its URL – anonymous pdf files, questionable URLs related to sites, need to be able to tie back to original site – e.g. University 'working papers'.
- In instances such as the 'grey' information above, participants felt that this could be a case of poor web content management and this fact does not mean that the information or data contained in the document is 'bad' or untrustworthy.
- What the organisation is, e.g. an 'About us' part of a website
- Where the organisation is, e.g. if it is not relatively easy to find a terrestrial address or contact details on a website this would lessen its trustworthiness. Participants mentioned odd organisational names and locations, e.g. Cambridge School of Economics in Tonga!
- Credibility of the organisation although, in relation to a company name, participants said their degree of trust would depend on whether the organisation were trying to persuade users to buy or subscribe to something.
- Usable website interface. This does not necessarily mean that it has to be replete with 'bells and whistles'. In fact, participants commented that 'flashy stuff' would lead them to trust a site less.
- Country. There are some countries from which information would be deemed less trustworthy
- Symbols such as padlocks and VeriSign were trusted. The latter was referred to in relation to Twitter and the fact that some tweets contained the symbol to indicate that, e.g., it really did come from Stephen Fry.
- Peer reviewed sources were deemed more credible and trustworthy as were sites with references on them.
- Sites to which access was gained via passwords and identifiers, e.g. Athens, were considered more trustworthy
- Professional bodies sites were cited, e.g. gas engineers who say they are Corgi registered although participants felt that this on its own would not be trusted and that they would cross check against the official Corgi site so confirm the registration of that individual engineer.
- In relation to e-commerce, participants trusted sites using PayPal, e.g. eBay, and also, to some extent, trusted those that took credit card payments because they felt this was backed up by knowledge that their credit card provider would compensate them if there were problems
- Dates were cited as being important, e.g. for up to date information participants would not trust a website that had not been maintained.
- Blogs were a matter of debate. Some participants would not trust these but others said they would if they knew that the author had a high reputation (e.g. Tim Berners-Lee, Moira Bent). However, some participants were sceptical how far one could trust that the author associated had actually written a particular blog contribution. Generally association of a name with a concept that legitimises them as an academic renders information trustworthy

There was consensus that trustworthiness was dependent on context, e.g. the type of information and the source one would use, i.e. a bank or similar organisation when searching for information on exchange rates.

Another issue on which there was consensus was questioning, when searching for scholarly purposes, of whether a source and the information contained there in was 'academic

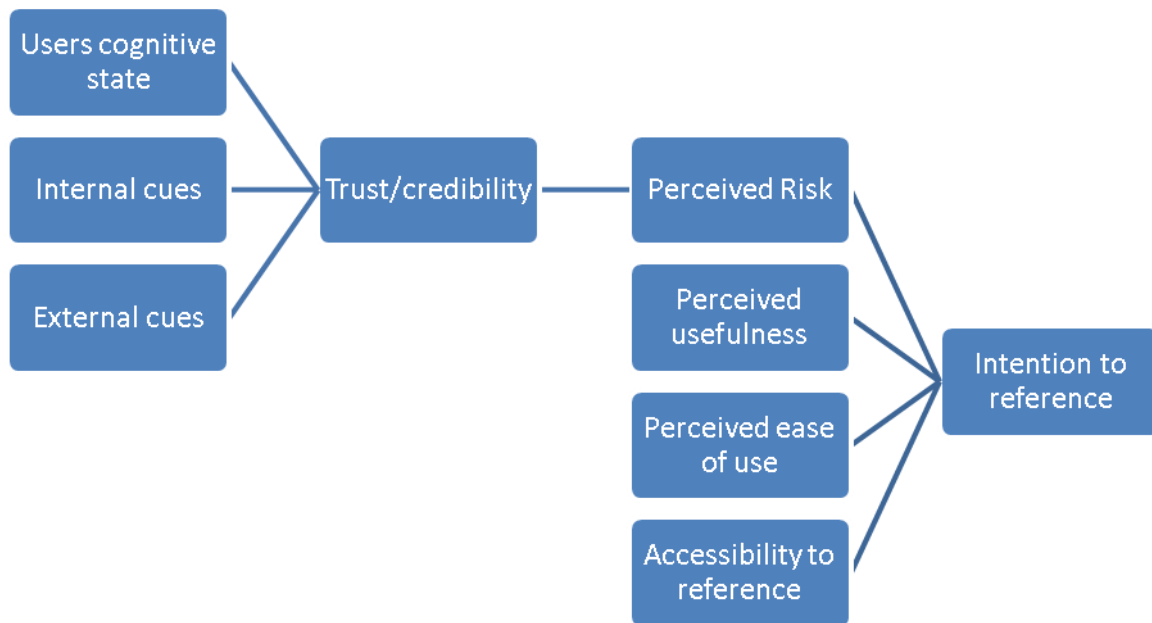
enough' and how one knew. There was agreement that it would be important to cross reference and not just take something as a given but to search other avenues to verify information or data prior to deciding to reference the source. An example was given of a recent climate debate where it was discovered that data had been fabricated by one University department. It was felt this had implications for how far one trusted a whole University or that organisation on a department by department basis.

At the end of the exercise, the participants wrote the signs they had identified on cards. These are replicated in the table below, in ranked order.

**Table A2: Certification ranked by desirability**

Reputation/credibility of source/producer/recommender verified (6)
Peer reviewed, edited, transparency/credibility (using peer reviewed ratings from sites to clarify risks in order for pay-off; published in the context of academic work vs a working paper on a website) (3)
Route/secure gateway/Id/Password for NORA (shows any information accessed past this point has been authenticated) (2)
Professional accreditation/affiliation with a professional body (2)
Identity of author/provider (2)
Date of site update/of data (dated resource as better than undated, one more point that adds legitimacy) (2)
Knowledge as accurate/examples of accuracy known to you (2)
URL, domain name (being able to get back to the home page from a URL attached to a document) (2)
Cited sites/organisation
Company information easily accessible
Repeatability of information from different sources
Content reflects/reaffirms your own prejudices
Web interface
Country of origin
Recognised certification mark – face value, not face value – check
Producer states if information is low/high quality
Producer states if information is low/high value
Situated context (what surrounds information/resource)
Brand loyalty
Information provider has signed up to ethical code (e.g. on sources of funding)
Presentation, quality of site
Verification, VeriSign
Re-use of site
Experience of source in respect of accuracy
Provenance
Sites with references
Metadata identifying the object as well as its content

## Activity 2 – Discussion of the trust model



**Figure A1: Model accepted by participants**

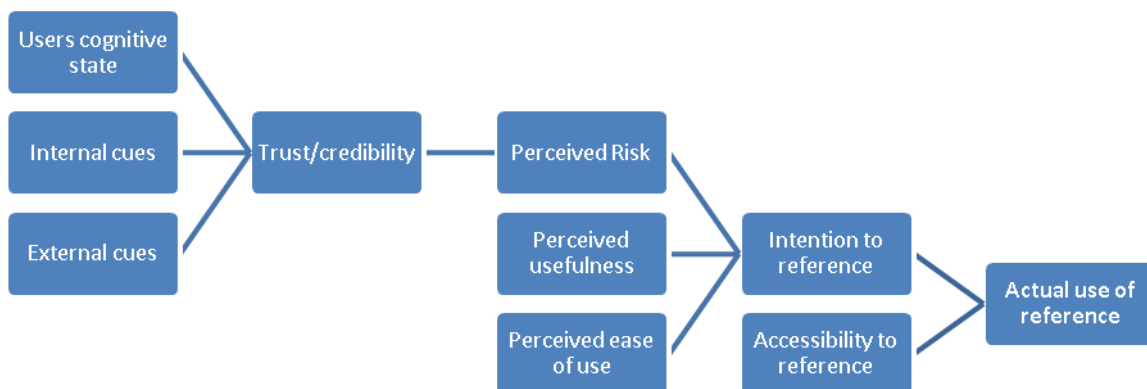
At the workshop, there were two different models presented to participants. These models differed in the representation of the tool/method used to acquire the reference. In one model this was singled out, in the other it was not. Participants were asked to discuss these in their groups, pick the one they identified most with, review this model and suggest any changes to it they thought appropriate. As a result of this consultation, the proposed model was modified slightly. Participants all agreed that separating out the tool was not part of the model and suggested changes to the model in Figure 1.

The main topics of conversation were

- The role of purpose or use of the reference
  - A significant point of discussion was that the purpose or use of the reference was predicted to have a significant impact on the level of trust required and therefore the entire process. There were suggestions that this should be pulled out as a separate factor, however, the literature suggest that the purpose is a factor that affects the users cognitive state and so currently it has been left as an input to the users cognitive state.
- Trust is not a sufficient predictor of actual use of a reference.
  - All participants agreed that the model would not be complete if it just addressed trust. They believe that actual use of the reference is determined by trust in the information, but also usefulness, ease of use and accessibility to the reference.
- Intention to use a reference is influenced by perceived usefulness and ease of use of the reference, as well as trust.
  - Participants believed that intention to use a reference is driven by the usefulness of that reference with regards to the purpose of its use, for instance if it fills a gap in knowledge. However they also believe that perceived usefulness is also relevant to the tool used to find the reference. Therefore if they have been successful at using the tool previously, they are more likely to use references found by that method again.

- Participants believed that perceptions of ease of use drove intention to use a reference. Therefore if they found an entry in Wikipedia which had already provided a summary of the topic they were more likely to use this information than to search for more information which would require them to work out the answer for themselves. This was seen as particularly relevant when first getting to know a topic.
- Does risk affect trust perceptions or trust perceptions affect risk perceptions and should both feed independently into intention to reference.
  - Participants were uncertain about the relationship between risk and trust. Some believed that perceptions of risk were influenced by perceptions of trust, others believed the influence was in the opposite direction, and others believed that they were two separate factors that influenced intention to reference separately rather than through each other. For the moment, the model is left as suggested by the literature, however this relationship requires further investigation
- Accessibility impacts actual use of reference rather than intention to reference.
  - Participants believed that accessibility to reference did not impact their intention to use the reference, but rather whether or not they actually used the reference. Statements were made that they fully intended to use a reference but then found it was more difficult to access (eg required interlibrary loan) they would look for a more readily accessible reference. Discussions also pointed out that risk may be directly related to actual use of reference as well as intention to reference

These discussions led to the iteration of the model to the final model presented in the report.



**Figure A2: Final model**

### *Activity 3 - Risk versus return on investment*

In this activity participants were asked to consider how risk and reward might be related. They were asked to consider the risks in the information environment rather than in e-health

or e-commerce and what are the potential rewards or return on investment. These, participants, were told, did not have to be 'paired' although some participants pointed out that, in certain instances, the risks might be the opposite of the rewards. The table below illustrates the participants' responses to this activity.

**Table A3: Risks and rewards in the information environment**

<b>Risk</b>	<b>Reward</b>
<b><i>To the Information provider</i></b>	<b><i>To the Information provider</i></b>
Cost of maintenance, quality etc – limited future if not implemented	Income generation/ funding
Poor service – loss of respect/reputation	Positive feedback from others
Negative impact on the organisation	Positive PR – credibility, status, reputation
Loss of business	Positive impact on others – sharing good practice
Litigation – slander/libel/breach of copyright/plagiarism	Integrity
Costs in time & effort as well as money	
<b><i>To the information user</i></b>	<b><i>To the information user</i></b>
Failure/having to repeat a year/ loss of degree/job & concomitant financial risk – paying back fees if fail	Academic achievement/recognition, e.g. high marks, high level pass, degree leading to job
Disappointment	Personal well-being, sense of achievement, impressing family, friends, tutors
Discredit – linked to professional body	Praise/prizes/kudos – being referenced by others
Chance of being 'found out' and challenged	Progression in studies & career, employability
Lack of knowledge & high uncertainty	Peer placement, 'top of the class'!
Leads to wrong decision making	Education/lifelong learning
Public embarrassment, condemnation, e.g. climate change data	Transferability
	Confidence in (search) strategy

In discussion, situated context was mentioned and the effect this has on the weighting of the risk. The higher the risk, the more effort was invested, the more intensive the searching and the greater necessity that the information be trustworthy.

Participants commented how, if they used information well, then people would believe in them, i.e. they would be more credible. In the case of an academic member of staff, e.g., they hoped that such good use of information would inspire students to go away and research for themselves exhibiting similar good use of information. In the case of an information provider, the reputation of their organisation was 'on the line' and their service was unlikely to be used again by a client who was misled, given misinformation or given information that was not well presented. In both cases participants felt that there was a potential reward if they and, by inference, their organisation had high credibility in information provision since this would lead to good PR and more income (in the form of more students in the case of the academic).

There was consensus that some rewards were tangible whilst others were intangible. There was some joking among participants about looking for chocolate as a reward. This was equated with students' looking for a good mark on an assignment and led to a discussion of instant gratification and what form of overall gratification we are looking for in our information seeking behaviour. Is this gratification short-term or long-term and does it in fact vary? If so, how does it vary and under what circumstances?



The discussion generated by the activities in themselves raised topics for further research but, in addition to this, the participants were invited to make suggestions for future research and these are incorporated in the following table.

**Table A4: Suggestions for future research**

Search/browse/serendipity - is there a difference?
Risk and Rol in the information environment
A comparison of 2 sets of students doing the same assignment <ul style="list-style-type: none"> <li>• 1 to use pre-packaged Googled/popular/newspapers (digested) sources</li> <li>• 1 to use only peer reviewed (accredited) sources/readings (no detriment clause on assessment of course!)</li> </ul>
When do we start expecting exploration from students? At what point do we introduce information literacy skills?
Research into gender differences, e.g. multitasking online (cf multitasking offline)
Effect/impact of mage/video/audio/text information (or combination) on trust
Notion of situated context – potential (type of information/source etc) on intentional/unintentional misrepresentation
Concept of trust with different types of overload – time/information overload/attention spans
Exhaustiveness of searches in relation to behaviour on OCD continuum
Search skills – how to develop and what exists
Information literacy skills

## **Appendix 5: Analysis of Questionnaire**

(Bracketed numbers indicate number of respondents giving the same/similar response)

### **1. When searching for information online what factors influence your choice of search engine?**

Google first (17) (at least two respondents said they use it exclusively)  
Google then library databases (5)  
NORA mentioned (4)  
Type of information being searched for – business/academic specialised vs. pleasure/leisure (9)  
Ease of use/Usability (7)  
Speed (7)  
Familiarity (6)  
Effective delivery/results/thorough search + relevant info (5)  
Ease of access (5)  
Past positive experience/tried & tested (4)  
Layout/display of results – non confusing, easily digestible (3)  
Comparisons made (Yahoo, Alta Vista, known vs. unknown) (3)  
Branding/the name of Google/Yahoo (3)  
Reliability (3)  
Reputation (3)  
Add-ons/value-added (Google Scholar) (2)  
Convenience (e.g. browser/search engine link) (2)  
Ease of navigation (2)  
Need for passwords as a negative (2)  
Use of generic language/keyword recognition (2)  
Ease if obtaining information/print out vs. need to order (1)  
Variety of results (1)  
Coverage (1)  
Cost (1)  
Clarity of results (1)  
Ability to limit to UK (1)  
Ability to filter (1)  
Avoidance of adverts (1)

### **2. What factors influence whether or not you use the information you find on the web?**

Source/creator of info, e.g. government depts/professional bodies/legitimate publishers/named author/NORA/peer reviewed journal (17)  
Validation against existing knowledge/other sources/other measure/check author biog/commonalities & differences between sites (10)  
Bias – don't use Wikipedia, caveat blogs (8)  
Relevance/matches needs (7)  
Currency/updated info (7)  
Reputation/brand (6)  
Fluency/well written/no typos/legibility (5)  
From previously used/trusted website/host (e.g. listed as safe site) (5)  
Reliability (4)  
Presentation format (3)  
Purpose for which information being used (3)

Pop-ups/spam/commercial negative (3)  
Amount of detail (3)  
Document delivered (2)  
Immediacy/doesn't take ages to download (2)  
Legitimacy/regulated (2)  
Credibility (2)  
Accuracy (2)  
Breadth of knowledge/comprehensiveness (2)  
Amount of information already sourced from the web (1)  
Cost (1)  
Country of origin (1)  
Language (i.e. not in English) (1)  
Level/neither too simple nor too complex (1)  
Impression of home page (1)  
Links given (1)

### **3.What factors influence your trust in any information you find on the web?**

Editors/authors/institutional reputation (e.g. BBC) (16)  
References to site by other reputable authors, articles, peer reviewed papers, positive ratings/listings of safe sites (12)  
Reputation of site/URL address (9)  
Professional looking interface (5)  
Recommendations by colleagues/word of mouth/friends/family (5)  
Info can be altered/driven by users as negative (4)  
Same information found in several sources (4)  
Use/purpose to which info is going to be put (3)  
Currency (3)  
Academic source (3)  
Slant/ bias/opinion rather than fact a negative (3)  
Whether it aligns with what I already know about the subject (2)  
Sources lacking a clear physical location (2)  
Existence of 'protected' symbol to prove authenticity (2)  
Accuracy (1)  
Commercial a negative (1)  
Country of origin (1)  
Sources recycling info from other sources (1)  
Previously used website (1)  
Poor navigability/usability/accessibility (1)  
Sites that require registration as negative (1)  
Hard copy (1)  
Blogs/social media as negative (1)

### **4.When searching for information on the web what clues do you look for when deciding if you should trust the information you find?**

Names/affiliations of authors/contributors (16)  
Security images on the site/padlocks etc (6)  
Advertising/commercial firms as a negative (5)  
Good design, look and feel, no spelling mistakes (5)  
Prior knowledge to compare with info (4)  
References to substantiate, source of info (4)

Dates (4)  
Fact vs. opinion (3)  
Number of times the web source has been referenced (3)  
URLs (3)  
Contact details, business email accounts (3)  
Currency (3)  
Physical presence (2)  
Brand name/reputation (2)  
Credibility of site (1)  
Info source transparent/credible (1)  
UK originated (1)  
Peer reviewed info (1)  
Fluency (1)  
Avoid Wikipedia - negative (1)  
Political allegiances/viewpoints - negative (1)

### **5. What risks do you associate with using only online information?**

Not using a range of sources/getting the full picture (not everything is online)/neglect of primary sources/print based (9)  
Fraud/misuse of personal info/privacy, security (8)  
Inaccuracy (7)  
Out of date (6)  
Anyone can essentially publish on the internet, lack of gatekeepers editors/publishers (6)  
Bias (4)  
Giving unsubstantiated information to customers (3)  
Copyright /plagiarism (2)  
Viruses (2)  
Corrupted information (2)  
Digital information can also be altered (2)  
Good key information lost with the dross\* (2)  
Legitimacy (1)  
Confidentiality (1)  
Breadth of detail (1)  
Depth of subject (1)  
Verification and legitimacy of online sources hard to prove (grey literature equivalent) (1)  
Opinion not fact (1)  
Commercial world ownership of web - loss of free info accessible to all (1)  
Lack of version control (1)  
Impermanence (1)  
Loss of personal contact (1)

\* What Zhu & Gauch (2000) refer to as the "Information: noise ratio"

### **6. What factors motivate you to engage in more complex or time consuming searches**

Purpose or criticality of/need for info (including who you are doing search for) – changes depth of research (16)  
Personal interest in subject/degree of engagement in, e.g. job hunting, shopping (8)  
Amount of time available/urgency (8)  
Payoff/how much it matters (4)  
Not enough info (4)

Knowing there is more out there/persistence (4)  
Degree of interest of results (2)  
Desire to get back to the original info to x-ref (2)  
Want to explore all eventualities/arguments before taking decision (2)  
Cost (2)  
Too much info – need to narrow search (2)  
Complexity/fiddly as negative (1)  
Desire to get additional refs to follow up (1)  
Narrow subject means more time (1)

### **7. How easy is it to decide when to stop searching? What factors help you to make this decision?**

Majority found it difficult/challenging to know when to stop searching.  
Time (13)  
[Enough] Info found (13)  
Frustration/boredom (4)  
Going round in circles finding the same or similar information/frequency of hits decreases dramatically (4)  
Decision search is fruitless/need more info/different search strategy (3)  
Prior knowledge and belief something is available, must be out there somewhere! (3)  
All obvious databases/web searches + permutations of search terms tried (3)  
Difficult - Balance of volume of material vs. actually reading and processing (2)  
Volume of material identified (2)  
Tiredness – is often a factor (2)  
Difficult when you don't think you have found what you really need (1)  
Difficult with complex query (1)  
Cost of printing of material (1)  
Further you search, less relevant info... (1)  
Accepting best match/limiting # retrievals/pages (1)  
Need for the information becomes redundant (1)  
Need to be elsewhere! (1)  
Mealtimes (1)  
Physical discomfort (1)

Appendix 6: Questionnaire results mapped on factors influencing content trust decisions (Gil & Artz 2007)

	1.Choice	2.Use	3.Factors	4.Clues	5. Risks	6. Do More	7. Stop
1. Topic (see 2)							
2. Context and criticality	●●●●●●●●	●●●●●●●●●●	●●●			●●●●●●●●●● ●●●●●●●●●● ●●●●●●●●●●	●●●●●●●●●●
3. Popularity (see 6)							
4. Recognized authority *		●●●●●●●●●● ●●●	●●●●●●●●●● ●●●●●●●●●● ●●	●●●●●			
5. Reputation	●●●●●●●●●● ●	●●●●●●●●●●	●●				
6. Referrals			●●●●●●●				
7. Association*			●●●●●●●●●●	●●●●●●●●	●●	●●●	
8. Provenance*		●●	●●●●●●	●●●●●●●●●● ●●●●●●●●●●	●		
9. Expertise of the user				●●●●			
10. Perceived bias** (see 11)				●●●●●●●●	●●●●●		
11. Perceived incentive**							
12. Absence of other						●●●●	●●●●●●●●
13. Agreement	●●●	●●●●●●●●	●●●●				
14. Precise	●	●●●●●			●●●●●●●●	●●	●●●●●
15. Likelihood of content being correct			●●				
16. Time (see 19)							
17. Professional appearance	●●●	●●●●●●●●	●●●●●	●●●●●●●			
18. Likelihood of deceptive behaviour**		●●●●●●●●●●	●●●●●●●	●	●●●●●●●●●● ●		
19. Recency		●●●●●●●	●●●	●●●	●●●●●●●●●●		

NB. Gil & Artz point out that 4,7 & 8 relate to the origins of the information; \*\*10, 11 & 18 relate to bias (or risk)

Project Acronym:  
Version:  
Contact:  
Date:

Comments on the table based on Gil & Artz (2007)

In the questionnaire respondents were asked to make immediate replies to the survey without thinking overmuch about it. This meant that they often anticipated questions and in fact made responses appropriate to later questions earlier in the survey. In order to try to capture the overall pattern of responses the results were mapped against Gil and Artz's 19 factors. In fact some factors were merged in the process because respondents often gave one word responses and these could not be followed up or expanded on for clarification or in-depth analysis::

- 1 & 2 Topic & context
- 3 & 6 Popularity & referrals
- 10 & 11 Perceived bias & perceived incentive
- 16 & 19 Time & recency

Mapping the questionnaire results against the table produced the following ranking of factors influencing content trust decisions based on overall scores across the table.

1	Context & criticality of the need for information, e.g. high degree of precision needed then more cross-checking/Topic searched
2	Recognised authority of associations
3	Likelihood of deceptive behaviour
4	Provenance and pedigree, e.g. entities providing content
5=	Reputation, based on past positive experience
5=	Professional appearance
5=	Recency, current reputation, currency/time
8	Association by other trusted resources, e.g. citations
9	Precise and specific content
10	Perceived bias/Perceived incentive
11	Absence of other alternative resources
12	Referrals by other users/popularity of the resource
13	Expertise of the user
14	Likelihood of content being correct

These are comparable with the certification ranked by desirability produced by the community consultation activity and reproduced in Appendix 4 table A2. It is interesting that Gil & Artz (2007) identified their factors 4, 7, 8, 10,11 and 18 as important in making trust decisions. The first three were related to the origins of the information whilst the last three related to bias (or risk).

From the questionnaire results their first three factors pertaining to origins of the information were ranked 2<sup>nd</sup>, 4<sup>th</sup> and 8<sup>th</sup>. The last three were ranked 3<sup>rd</sup> and 10<sup>th</sup> (since 10 & 11 were merged as explained above)