Finding Credible Information

A Challenge to Students Writing Academic Essays

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*This study focuses on how students assess the credibility of scientific information in web-based environments. What importance do students attach to different cues when assessing credibility? The aim is to investigate whether the framework suggested by Fogg (2002; 2003; Tseng & Fogg 1999a; 1999b), which comprises four types of web credibility (*presumed, reputed, surface *and* earned credibility*), can be of use in this specific context to increase the understanding of how essay-writing students assess the credibility of scientific information in web-based environments.*

A questionnaire concerning students' search behaviour and their evaluation of information was answered by 144 students (110 women and 34 men) at a Swedish university. Descriptive statistics were used during the data processing.

The students were asked to rate the credibility of 24 elements. They attached most importance to the following elements: Year of publication*,* Teachers' recommendations*,* Abstract*, and* Established researcher*. These elements represented all four types in Fogg's framework. The elements that concerned* earned credibility *– based on first hand experience – were noted as comparatively more important by the respondents.*

Keywords: information seeking, students, academic writing, credibility, web-/computer-based information, Internet, source criticism

University students searching for scientific information, printed as well as digital,[1] need information skills and useful strategies to identify the genre

of academic texts. In task-based information seeking, where the seeking is done for a specific purpose, the students must also consider the text's importance in relation to their own research and to the research field as seen in a wider perspective. Assessing the credibility of the texts should be of great interest to students since this obviously is a situation where credibility matters.

In this article, the aim is to investigate how students assess the credibility of scientific information in web-based environments and whether the framework suggested by Fogg (2002; 2003; Tseng & Fogg, 1999a; 1999b), which comprises four types of credibility, can be of use in this specific context to explain the types of web credibility that is of importance to students when they are searching for and evaluating web-based texts for use in their own academic writing.

Information-seeking Students and Academic Texts

In the Swedish university education, students are expected to present a number of academic essays and papers. In order to contribute to the existing accumulated knowledge, students must link their own work reported in the papers to earlier research. When searching for useful material from trustworthy and acknowledged researchers, the students need to separate "academic texts"[2] from other, "non-academic texts", so that they can find reliable earlier research. To be able to judge the value of any text, it is necessary to first make a classification based on its properties, for instance related to the style, structure, contents, and/or length, or to the context in which it occurs. Defining the genre of "academic texts" is not all that easy; the fact that a text is written in an academic environment does not *ipso facto* guarantee that it is academic in character, and certainly does not guarantee good scientific quality.

Ó Dochartaigh (2002, 56) proposes that:

> *Academic articles are the articles which appear in academic journals. They are marked out by certain features which are designed to ensure high standards of accuracy and quality. […] An academic journal is, almost by definition, one whose contents have been subject to peer-review.*

According to tradition, the peer review system, where articles are reviewed by other researchers, or *peers*, guarantees an acceptable scientific quality in journals serving as authoritative sources of information within their specific fields. Today's technology has opened new possibilities for publishing. Through university libraries, students get access to databases[3] where they can find academic articles and journals, some of them peer reviewed. Journal articles may be available as digital or scanned documents and/or in print. Accessibility to computerised full text and reference databases makes it easier for students to find and handle information.

The constantly increasing quantity of digital information, both on the free Internet and in different commercial databases, requires a particularly critical approach when evaluating the information. We cannot simply dismiss all the information from a particular digital source, for example the Internet, because of its mixed quality. Rather, we need to approach the information critically, especially when it comes to computer-based information.

Assessment of Credibility

We can talk about academic texts as being "good" quality texts, since they have been read and accepted by respected representatives of the research community. But, it is not the text, or source, *per se* that decides its value; the environment in which the text occurs is also of importance. For instance, Labov (1973) shows that the verbal context we associate with an object also affects how the object is classified. Gumperz (1982, 131) uses the term *contextualization cues*, meaning "any feature of linguistic form that contributes to the signalling of contextual presuppositions". The contextualization cues are interpretable separate from concrete situations, but might indicate different meanings depending on the existing conditions. In Gumperz's view, interpretations can be *successful* and *unsuccessful*. Quality could also be described in terms of something that exists between the text and the reader, something that cannot exist without a context that has been shaped by the reader.

Rather than using evaluative and emotive words such as "good" and "bad" about texts, the concept of *credibility* is suggested here. *Credibility*[4] comes from the Latin *credere*, and can, from a social psychology point of view, be defined as "the quality of meriting belief or confidence" or as

"the persuasiveness of a person or message source" (Colman 2002, 175). Fogg (2003, 122) concludes that in the fields of psychology and communication, scholars now agree that:

> *[C]redibility is a perceived quality [that] does not reside in an object, a person, or a piece of information.*

Except from the fields above, academic literature on credibility can be found in disciplines like library and information science, rhetoric, and informatics.

Hovland, Janis and Kelley (1953, 21) initially made a distinction between the communicator's *trustworthiness* and the communicator's *expertness*. The first component refers to "the degree of confidence in the communicator's intent to communicate the assertions he considers most valid", and the second component to "the extent to which a communicator is perceived to be a source of valid assertions". This two-dimensional concept of credibility, *trustworthiness* and *expertness,* or *expertise,* has been further developed by Fogg (2003, 123). *Trustworthiness* captures the perceived goodness or morality of the source,[5] for example a trustworthy source is expected to be truthful, fair, and unbiased. *Expertise* refers to the perceived knowledge, skill, and experience of the source (Figure 1). Cues, or labels, giving the impression of expertise could be titles such as *doctor* and *professor*. The human perception is central in this approach, but our representations of different objects or concepts in our environment work both on an individual and a collective level; the latter could, for instance, be referred to as conventions, traditions and practice.

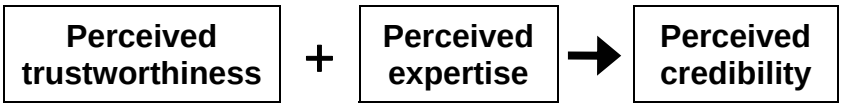

Figure 1. Key dimensions of credibility (Fogg 2003, 123).

Technological and communicative developments bring new insights into the interaction between humans and computers, as well as into mediated

communication. Consequently, *computer credibility* and, later, *web credibility* have become fields of interest.[6] The point of departure for this kind of research is that credibility matters in some situations, for instance, when people by means of computers: 1) Instruct or advise users; 2) Report measurements; 3) Provide information and analysis; 4) Report on work performed; 5) Report their own status; 6) Run simulations; and 7) Render virtual environments (Tseng & Fogg 1999a; 1999b; Fogg 2003). To information-seeking students, computer-based information might provide information about research and science and thus plays important roles.

Readers' Responsibility

Traditionally, the author is held responsible for the text that he/she has produced, but the transformed situation with digital information entails that we must be aware of a shift concerning responsibility towards a more responsible reader. A hypertextual structure can be found on the Internet and other web-based sources such as intranets. The nonlinear hypertext allows the reader to move between texts and segments of texts in innumerable combinations, and makes it possible for the reader to create his/her unique experiences. As he/she follows and explores the links offered by the primary author, "the reader [could be given] the potential to transcend the role of a passive reader to an active reauthor of the text" (Mitra & Cohen 1999, 187).

To some extent, the overt intertextuality is actually transferring the responsibility from the publisher to the reader, or user. The empowerment of the user, in this case the student, lays stress on the evaluation process and points to the importance of the assessment of credibility. The students must rely on themselves to a greater extent than earlier.

Evaluation Errors or Credibility-related Pitfalls

Despite the fact that credibility has been described here as principally a perceived quality, web texts, from a more objective point of view, could possess certain qualities that make us consider them as for example good, well-written, and/or well-founded texts. When searching for information and assessing credibility, there are especially two potential risks that should be noted: as shown in Table 1, we can either be too *gullible* and

make gullibility errors, or too *suspicious,* or *incredulous*, and make incredulity errors (Tseng & Fogg 1999a; 1999b; Fogg 2003).

Both errors could be disastrous to, among others, students, teachers and researchers who are seeking information. As a consequence of making a gullibility error, we could accept information that does not have relevance to our work, or has poor quality according to academic standards. The incredulity error is caused by suspiciousness, and results in the rejection of information that could be valuable and useful to us. If we go to the extremes, the heterogeneity concerning digital information can be treated either with total scepticism or with extreme confidence. Our standpoint is vital when it comes to how we assess credibility.

It is important to accentuate that errors when assessing credibility are made within a context, and can cause problems when information is accepted or rejected for the wrong reasons in relation to our aims and goals. To avoid making errors like these, we need to increase our understanding of the elements, types, and dynamics of web credibility (Tseng & Fogg 1999a; 1999b; Fogg 2003). Fogg (2003) emphasises the importance of learning how to find and use *credibility cues* when searching for computer-based information. This can help students avoid the gullibility error as well as prevent interesting features of valuable information from being drowned in a flood of non-essential information.

	User perceives product as credible	*User perceives product as not credible*
Product is credible	Appropriate acceptance	**Incredulity Error**
Product is not credible	**Gullibility Error**	Appropriate rejection

Table 1. Errors in credibility evaluations (from Tseng & Fogg 1999a, 83; 1999b, 44; Fogg 2003, 139).

Fogg's Framework of Credibility – Four Different Types of Credibility

Through large-scale online surveys in 1999 and 2002, Fogg (2003) has asked people to rate the elements that could affect their perception of the credibility of web information. These studies are based on the framework of web credibility where different types of credibility relevant to computer-based products are identified (Fogg 2002; 2003; Fogg &

Tseng 1999a; 1999b). The proposed taxonomy includes four types of credibility: *presumed, reputed, surface,* and *earned* credibility (Table 2). The overall assessment of web credibility can be made based on a single type of credibility, as well as on two, three or four types simultaneously. How we assess credibility differs. Fogg's research has served as a source of inspiration for this study, and aroused an interest in whether or not the framework can be of use in this context.

Presumed credibility	*Reputed credibility*	*Surface credibility*	*Earned credibility*
Based on general assumption in the user's mind	Based on third party endorse-ments, reports, or referrals	Based on simple inspection, first impression	Based on first-hand experience that extends over time

Table 2. Four types of web credibility (from Fogg 2003, 163).

Presumed and *reputed* credibility do not presuppose any first-hand experience or personal knowledge; we just assume something or have heard from others about a site, a name, a research institute and so on.

Presumed credibility is built on general assumptions. We may rely on a web site simply because we believe it is likely to be trustworthy, for instance, the site declares that this is the official site for a specific topic, or that the source behind it is a research institute or a university. On a superficial level, the assumptions help us to evaluate the credibility, but in time, we realise that things are not always what they seem to be.

Reputed credibility is based on other people's experiences, for example, we will consider the information on a web site as credible if it has been recommended to us by a friend whom we perceive as credible (Fogg 2003). We may also have heard of a useful web site through the media, and therefore we regard it as trustworthy.

Surface and *earned* credibility require direct experience, in the case of essay-writing students, experience of computer-based "academic texts". However, *surface* credibility has to do with recognition from a more superficial point of view – our conclusions are drawn from observations of visual cues – whereas *earned* credibility presupposes experiences and

knowledge on a deeper level to evaluate the contents – we enter more deeply into the text.

Surface credibility is the type of credibility that matters most when people browse the Internet; web users tend to leave a site that gives a negative first impression. Fogg (2003, 167) says that they "surf around, hopping from page to page and site to site, making quick evaluations of Web credibility by browsing through sites". We do not spend enough time for evaluating the information on a deeper level; just a rapid glance and we go to the next page. *Earned* credibility could be seen as the most powerful and solid form of credibility. Basically, it derives from people's interactions with each other – or with computer products, like texts on the Internet – over an extended period of time. Texts are (almost exclusively) produced by humans, but technology has dissociated them from the original producers. The ability to assess *earned* credibility strengthens with the time we spend on the information source (Fogg 2003). If the experiences we gain are good, for example if the information from a database or a web site repeatedly seems to be accurate, we are likely to ascribe the database or web site a high level of earned credibility.

To capture the elements of web credibility, Fogg (2003) points out three main categories of distinguishing elements: the *site's operator* (according to Fogg, this is an organisation, an institution, a company or a person offering the site), the *site's content* (the information and the functionality provided by the site), and the *site's design* (visual and aesthetic aspects, but also how easy the site is to navigate). Web credibility is difficult to study because of the many factors involved. These include factors related to human perception, such as the individual's information processing, as well as the context and environment in which it takes place, which often has to do with the circumstances and the where and when in which the perception takes place.

The Study – Investigating Students' Assessment of Credibility

This exploratory study aims at examining the assessment of credibility made by students searching for scientific information in web-based environments. It will also investigate whether Fogg's framework of credibility could be of use in this specific context. Questions that are addressed are: How can we understand the kind of credibility that is of

importance when students are searching for and evaluating web-based texts to use in their own academic writing? What importance do students attach to different elements involved in the evaluation process?

Method

A survey with a structured questionnaire was chosen as the method for investigating students' search behaviour and their evaluation of information. This method made it possible to reach a relatively large number of essay-writing students in quite a short time. The study was carried out between April and August 2003.

Population and Participants

The population in this study can be described as essay-writing students enrolled in programmes at a particular Swedish university.[7] These students were writing academic essays or examination papers for their Associate's, Bachelor's, or Master's degrees (according to the Swedish system, essays on B-, C-, or D-level). The university chosen for the study is situated in a medium-sized Swedish town. It offers a wide range of education in engineering, business and economics, education and communication,[8] as well as health and nursing care. Students participating in this study were expected to have personal experiences of academic writing – they should be engaged in an essay-writing process or recently have finished their essays. They were assumed to be familiar with information seeking through digital library databases and/or on the Internet.

The questionnaires were distributed to nine course groups that were identified as having essay-writing students. These groups represented all of the educational disciplines mentioned above. A total of 274 questionnaires were distributed. 144 students responded to the questionnaire: 110 women and 34 men. See table 3 for the distribution on educational courses, essay-levels and gender.

Educational direction	*Students writing essay on…* *B-level*	*C-level*	*D-level*	*Total*	*Distributed question-naires*	*Response rate*
Health and nursing care	0	39 (Females 38) (Males 1)	0	39	66	59 %
Education and communication	23 (Females 23) (Males 0)	11 (Females 10) (Males 1)	0	34	83	41 %
Business and economics	0	25 (Females 13) (Males 12)	17 (Females 13) (Males 4)	42	65	65 %
Engineering	4 (Females 2) (Males 2)	24 (Females 11) (Males 13)	1 (Females 0) (Males 1)	29	60	48 %
Total	27	99	18	144	274	53 %

Table 3. Number of participants and response rates in the study.

Response Rate and Drop-out Analysis

The response rate was 53 per cent; consequently there was a non-response rate of 47 per cent. Factors contributing to the low response rate can partly be referred to the routines involved. For instance, distribution was partly delegated to the students' teachers and in some cases very few students completed and handed in the questionnaire. Perhaps the students needed more information to be motivated. Some of the students could probably answer the questionnaire immediately, or almost immediately, while others were told to hand it in later. The time factor could also be influential. As many students were very busy with their essay-writing, they may not have taken the time – or had the time available – to answer the questionnaire.

The selection procedure was based on convenience rather than on random sampling, but despite this, the participants seem to provide a representative sample of the population, at least on a rational basis. The predominance of female participants can be understood in light of the

fact that in 2003, 61 per cent[9] of the students at the university were females. The average age of the participants was 29 years, as the study includes some groups of students continuing their professional education.

Some of the programmes give essay-writing courses at the end of the autumn term and others at the end of the spring term. In order to more thoroughly survey students at different levels, enrolled in different programmes and courses, the questionnaires could perhaps have been sent out twice, at the end of both terms.

The Questionnaire

The questionnaire constructed for the study consists of closed questions with fixed sets of alternative answers (multiple choice questions), as well as some open questions in order to allow the participants the possibility to give supplementary answers and to comment on the questions asked.

The questionnaire covers behaviour, attitudes and demographics. Students were asked questions about: how and where they search for information; their strategies and attitudes; the importance of scientific quality in different situations; the use of various texts; their education in information seeking and awareness about the information seeking process; as well as their assessment of credibility. Demographic questions about gender, age, education, essay-level, major subject, profession, native language, and previous experience of academic writing were included.

This article focuses on one of the key questions in the questionnaire which relates to the concept of credibility. In a self-report test, respondents were asked to declare the perceived assessment of credibility for 24 elements. The introductory question, directed to students, was formulated as follows:[10]

> *The following questions presuppose that you are searching for information to use in your own academic writing, e.g. an essay or an examination paper. The information should be computer-based, and can be accessed either through library databases or through the Internet.*
>
> *What seems important to you when you decide if the material/ information is credible from a scientific point of view and can be regarded as serious research findings?*

Students were then asked to evaluate the importance of each of the following 24 elements by marking only one of the alternatives: "Very important", "Important", "Less important", "Not important at all", or "I don't know".

1) Established researcher
2) Titles and academic qualifications
3) Well-known universities/ institutions
4) Year of publication
5) Well-known references
6) Connection to established journal
7) Peer reviewed article
8) Personal knowledge of the subject/topic
9) Personal experience of seeking information
10) Teachers' recommendations
11) Students' recommendations
12) References to authorities
13) Suggestions from the librarians
14) References you have seen earlier
15) Title of the article/work
16) Abstract
17) Structure of the article/work
18) Description of method
19) Style, linguistic instinct
20) Layout
21) Number of references
22) Search engine
23) Database
24) Name of the site

These elements were followed by an open question allowing for comments or suggestions of other possible elements to be taken into consideration. The elements chosen in the questionnaire were supposed to reflect most possible aspects involved in this specific situation.

Participants' Experiences of Computer-based Information Seeking

All the students in the study used computers for information seeking. When they were asked about *where* they searched for academic texts, most of them (95 per cent) used the Internet at least occasionally; 48 per cent described the frequency of their use as "often". The use of the web-based local library catalogue was also reported as high, with a total of 97 per cent of the respondents stating that they used it, among them 45 per cent did so "often".

In response to the question about *how* they look for computer-based information for their essay-writing, the students reply that the Internet is the most common source for searching for information (mainly using

search engines, such as Google and Alta Vista), then library databases (local and national library catalogues are not included). 6.5 per cent of the respondents stated that they never used databases provided by the library, although university libraries have subscriptions that provide their students with access to databases, archives, electronic journals *et cetera* free of charge, which makes it possible for the students to obtain a multitude of texts that belong to the academic genre.

18 per cent of the respondents searched only in Swedish and 78 per cent both in Swedish and English (including 7 per cent who had an additional language, for example German, 4 per cent).

This study presupposes (this was explained in the questionnaire's opening text) that the participants in some way use computers to search for material for their essays – they could search on the free Internet and/or in digital databases with full text contents or references to articles, books, and journals (born digital, scanned or print). 90 per cent of the participants declared that they have been given instruction in information seeking (77 per cent just one day or shorter).

Processing the Data

The data was analysed using the statistical programme SPSS 11.5 for Windows. Principally, descriptive statistics were used. Tests with Analysis of Variance (ANOVA) offered supplementary information concerning significant differences between the course levels ($p < 0.05$).

Reliability

The question where the students were asked to evaluate the importance of the 24 elements has been tested with Cronbach's alpha to see the expected consistency in the answers. In this test, the reliability coefficient should not be below 0.7 (Clark-Carter 2002). The value here, 0.81, suggests a reasonably good reliability.

Results

To investigate the applicability of Fogg's model – to see whether the framework can be of use in this specific context – the elements in the questionnaire were organised according to the types of credibility in the framework. The categorisation was done when processing the data. The

use of Principal Component Analysis (Varimax) did not show a pattern of inter-relationships between the elements that sufficiently supported a categorisation relevant to Fogg's framework of credibility; instead each element had to be carefully examined in the light of the four types of credibility. The elements were also compared with the examples given by Fogg. The framework of credibility will be explained more closely when examining the results.

In the presentation of the results, the evaluation of the importance of the elements is in focus. The presentation will also include some reflections on the findings. In table 4, the 24 elements in the questionnaire have been categorised according to Fogg's framework. The four most important elements (according to the students' assessments) are marked in **bold text** – they happen to fit into each of the four categories.

Presumed credibility	*Reputed credibility*	*Surface credibility*	*Earned credibility*
1. Established researcher (4)	6. Connection to established journal	**4. Year of publication** (1)	8. Personal knowledge of the subject/topic
2. Titles and academic qualifications	7. Peer reviewed article	15. Title of the article/work	9. Personal experience of seeking information
3. Well-known universities/ institutions	**10. Teachers' recommendations** (2)	17. Structure of the article/work	14. References you have seen earlier
5. Well-known references	11. Students' recommendations	20. Layout	**16. Abstract** (2)
12. References to authorities	13. Suggestions from the librarians	21. Number of references	18. Description of method
22. Search engine			19. Style, linguistic instinct
23. Database			
24. Name of the site			

Table 4. Type of credibility and elements in the questionnaire, most important elements. [Fogg's web credibility framework extended to include the elements from the questionnaire. Elements valued as most important (placed 1 to 4, with a shared second place) by the respondents are printed in bold type.]

Presumed Credibility

Presumed credibility describes the extent to which a person believes something because of general assumptions. This type of credibility originates from a feeling about what is right or wrong – in this case having to do with what is credible or not credible. Fogg (2003) suggests that elements that increase credibility are, for instance, if the site is presented by a non-profit organisation, or if it provides links to its competitors' sites.

The answers regarding the 24 elements in the questionnaire have been given the following values: "Very important" = 4, "Important" = 3, "Less important" = 2, and "Not important at all" = 1. The alternative "I don't know" was excluded before processing the data. The tables 5 to 8 presuppose that the higher the value, the greater importance the students attach to the element.

According to the mean values, the key elements related to presumed credibility were *1. Established researcher*, *5. Well-known references*, and *3. Well-known universities/institutions* (Table 5). All these elements work on a rather presumptive level. Since they convey the impression of expertise, we assume that these researchers, references and institutions are likely to represent good sources. The most extreme value, the least important element in this type of credibility, can be found in element *24. Name of the site*. Apparently, this element does not usually offer students any valuable information.

Element	*N*	*Mean*	*Standard deviation*
1. Established researcher	131	2.97	0.784
5. Well-known references	132	2.86	0.707
3. Well-known universities/institutions	133	2.72	0.782
23. Database	126	2.62	0.725
2. Titles and academic qualifications	129	2.60	0.805
22. Search engine	125	2.50	0.809
12. References to authorities	121	2.49	0.720
24. Name of the site	126	2.21	0.765

Table 5. Presumed credibility, mean values on elements, highest value first (of most importance).

Reputed Credibility

Reputed credibility is based on the endorsements or recommendations of a third party. In this context, significant persons principally refer to teachers (supervisors included) and librarians, but can also refer to other students (Table 6). The responses show that teachers represent the most important of these categories, followed by librarians. Consulting other students does not seem to be all that important to the participants, even though students are supposed to examine each others' work critically and collectively in order to improve the essays before the final versions are handed in.

Students attach relatively – but not extremely – low importance to element *7. Peer reviewed article*. Significant differences appear neither between essay-levels nor between educational disciplines. The review system is still very much operational as a universal quality check for academic texts; even though its importance might vary between different subject fields or disciplines.

Element	*N*	*Mean*	*Standard deviation*
10. Teachers' recommendations	136	3.02	0.602
13. Suggestions from the librarians	130	2.92	0.654
7. Peer reviewed article	124	2.83	0.773
6. Connection to established journal	130	2.73	0.745
11. Students' recommendations	135	2.57	0.641

Table 6. Reputed credibility, mean values on elements, highest value first (of most importance).

Surface Credibility

Surface credibility requires first-hand experience, but unlike the next type of credibility (earned credibility) the processing of information takes place on a comparatively superficial level. To make an initial assessment of a document's credibility, people use quite limited impressions, principally based on visual cues. This type of credibility is the most common one when browsing on the Internet (Fogg 2003). Fogg refers to first-

hand experiences of web documents in general, but in this context, focus would rather be on the experiences of academic articles in web-based environments – still from a superficial point of view.

The elements related to surface credibility have to do with visual design rather than with content. Compared to many of the web sites on the Internet, in accordance with tradition, the design of academic articles is usually not very imaginative. On the one hand, the visual cues might therefore be experienced as relatively subtle, without design elements like colours, decorations and images; on the other hand, the cues could be seen as signs of academic professionalism.

The element that seems to be of greatest importance (of all the elements in the questionnaire) is element *4. Year of publication* (Table 7). Both this element (in terms of a publication's age) and element *21. Number of references* involve quantitative aspects, but the latter is seen as quite unimportant (the second least important of all the elements).

Element	*N*	*Mean*	*Standard deviation*
4. Year of publication	135	3.36	0.728
17. Structure of the article/work	135	2.80	0.731
15. Title of the article/work	135	2.64	0.729
20. Layout	135	2.56	0.769
21. Number of references	130	2.35	0.746

Table 7. Surface credibility, mean values on elements, highest value first (of most importance).

Earned Credibility

Earned credibility also requires direct experience, but this assessment takes place on a deeper level. According to Fogg (2003), this type of credibility is the most difficult to gain, but also the type that is most likely to lead to attitude and behavioural changes. Earned credibility concerns the establishment of a relation between the user and the site or operator. We thus need another, expanded way of thinking concerning the relation between the user/reader and the web actor – a relation that has more to do with the user's notion and knowledge of the actor than

with a more manifest feedback situation. The situation could be seen as an intrapersonal dialogue since it takes place between oneself and the imaginable author/authors of the text.

On average, the elements related to earned credibility have been given greater importance than elements from the other categories (Table 8). The most important element of this type is element *16. Abstract*. Reading and understanding the abstract of an academic article (element 16), as well as the description of methods (element 18), and analysing the linguistic style (element 19), requires a certain degree of scientific maturity.

Element	*N*	*Mean*	*Standard deviation*
16. Abstract	133	3.02	0.723
9. Personal experience of seeking information	128	2.92	0.623
19. Style, linguistic instinct	135	2.90	0.756
8. Personal knowledge of the subject/topic	135	2.89	0.631
14. References you have seen earlier	129	2.86	0.583
18. Description of method	135	2.86	0.724

Table 8. Earned credibility, mean values on elements, highest value first (of most importance).

Excluded Responses and the Alternative "I don't know"

The data shows that there are far more responses "I don't know" than could be expected for some of the elements. Do students have difficulties in expressing their view of these elements, or do they not fully understand the questions?

Concerning element *7. Peer reviewed article*, it is rather surprising to see that 8 per cent have chosen to answer "I don't know". Together with non-responses, a total of 14 per cent of the cases were excluded. Are students unaware that the peer review system is commonly used as a quality mark in academic publishing?

The drop-out rate and the number of excluded cases on element *12. References to authorities* (a total of 16 per cent, including 8 per cent for the alternative "I don't know") are remarkably higher than in element *5. Well-known references* (a total of 5 per cent, including 4 per cent on the alternative "I don't know"). Despite the similarity between these two elements, the students seem to value them both but treat them differently.

An element that has a notable number of excluded cases is element *22. Search engine* (a total of 13 per cent, including 7 per cent on the alternative "I don't know"). To a large extent, the students seem unable to separate their search activities on the free Internet from searches in the library databases. On the Internet, the search engine *per se* and the way it organises the information could give some important information that could facilitate their assessment and acquisition of available information.

Discussion and Conclusions

Students' Assessment of Web Credibility

The responses from the questionnaires could give an insight into how the students reason when evaluating information that they obtain during their essay writing. It is important to remember that what the figures show are each respondent's own description of his/her comprehension of the elements, not how they actually think, act and respond in different situations.

As an overall summary, it would appear that these essay-writing students to a large extent attribute more credibility to specified subjects than the ordinary Internet user does.[11] All the elements referred to in this article as earned credibility – the most advanced type of credibility, according to Fogg – have been given relatively great importance by the participants.

When looking at the four most important elements in the questionnaire, it is interesting to find that they represent all the four types of credibility (Table 4): *4. Year of publication* (surface credibility) followed by *10. Teachers' recommendations* (reputed credibility), *16. Abstract* (earned credibility), and *1. Established researcher* (presumed credibility). The results therefore suggest that students use cues from different categories simultaneously to decide on their overall assessment of computer-based

texts in their own educational context. It would have been interesting, though, to see if the corresponding elements had been evaluated in the same way in other media, for example in printed information.

This study concludes that the most important element for the participants is element *4. Year of publication*. Why do students attach so much weight to that particular element? Different reasons may be postulated. Students give the latest research findings greater value, because these are supposed to reflect the state of the art. They assume that knowledge is usually cumulative, and therefore expect that the latest research findings *de facto* incorporate the most important earlier findings as well as criticism of these. Another reason may be that current research is easily available in databases. Previous groundbreaking research is still, to a large extent, only available in print. It is reasonable to assume that the accessibility to information could influence students. Maybe their evaluation of element 4 also reflects a justification of the convenience of computer-based information as it is very tempting to choose those articles that need not be ordered or copied in time-consuming processes. But, on the other hand, would this element be valued in a similar way if the question had been about paper-based articles? Students may need to be reminded that it is valuable to consult original and traditional sources as well, even if they are not yet available in digital form.

The least important of all the elements is *24. Name of the site*. On this element, 12.5 per cent of the cases were excluded (among them 5 per cent have chosen to answer "I don't know"). One reason could be that the element itself is vaguely formulated – to use *Internet address* or *URL (Uniform Resource Locator)* instead of *Name of the site* might have been a better solution – and maybe this has caused a sense of insecurity among the respondents. Another reason could be that the students have not reflected on the information involved in the name of the site.

The value traditionally attributed to the peer review system is still strong, but despite this, the students do not view element *7. Peer reviewed article* as very important. Perhaps the meaning of the concept *peer review* has been overlooked, or the information the students have received about it has been inadequate and not emphasised the influence of peer review enough. It also seems possible that the academic community is on the verge of adopting a new paradigm for evaluating

academic writing which might include other solutions for maintaining academic standards. Paradigmatic shifts like these affect students and teachers, as well as the research society as a whole; everyone who should be able to assess academic texts.

Reflections on Fogg's Model

Fogg's model adds interesting ideas to the concept of credibility. The four types of credibility obviously complement each other. The last type in the framework, earned credibility, is the most advanced and complex – and in this case also the most interesting. When the assessment takes place on this level, it is more likely to reflect a change or development within the individual – resulting in new knowledge.

The kind of *interactivity* Fogg (2003) refers to has to do principally with the user obtaining answers or feedback from a web site. The process of information seeking could similarly be seen as a dialogue between the student and the information system, in which the student poses inquiries by entering search terms and other requirements, for example year of publication. In return, the system reports lists of compatible hits. Based on interaction between the individual and the system, step by step, the search is refined so that the student finds the articles that correspond to his/her request. The information seeking process contributes to develop the student's information skills.

Earned credibility concerns increased personal knowledge and experiences. The elements in this study that were included in this type could be further divided into two different aspects: the first one is related to personal expertise (such as the elements *8. Personal knowledge of the subject/topic* and *9. Personal experience of seeking information*); we could compare this aspect to orientating ourselves in a subject field or a sphere of interest. The second has to do with the more advanced cues that require certain skills to evaluate or decode (such as the elements *16. Abstract*, *18. Description of method* and *19. Style, linguistic instinct)*; this aspect could be experienced as "breaking the code", which means that we realise what the cues look like and what they connote.

The circumstances in which this study was carried out differed in several ways from the large-scale online surveys that Fogg performed. Fogg is looking at the persuasive influence of web sites, while this study focus-

es on task-based information seeking in an academic environment. In Fogg's studies, web users in general (most of them from the U.S. and Finland) were asked online to answer a questionnaire. The university students in this study constitute a more homogeneous group. Fogg's framework can be applied on various contexts, more defined as well as broader ones. Since the elements can be chosen for each specific situation, this study should be within the scope of Fogg's wider definition.

Fogg (2003) reports the struggle his research group went through in order to reduce the amount of elements, before a subset was selected for his survey. In the present study, it was necessary to take into consideration some other aspects; in particular, the elements in the questionnaire had to be chosen with regard to the information seeking process as seen from the students' position. Later on, each element was carefully examined and labelled to fit into Fogg's taxonomy; the categorisation was seen as satisfactory when the inclusion of all the elements involved could be motivated. An approach such as this contains some risks, but since the students have not suggested any further elements in the open question, hopefully the questionnaire has captured the most relevant elements.

Using Fogg's Model to Find out about Students' Learning Experiences

Questions about differences in assessment between students at different academic levels have been raised during the study. Do students writing essays for their Master's degree (D-level essay) think differently than students working on their Associate's degree (B-level essay)? Would Fogg's model make it possible to identify some differences between students on different essay-levels that indicate a change or progress during the time of study? In what way can Fogg's model be used to find out something about the students' learning experiences? We need to realise that the four different types of credibility affect in different ways, and depending on the type of credibility, different changes within the individuals are supposed to take place.

According to Fogg (2003) we can postulate, both concerning earned and surface credibility, that the process of assessment usually works on a deeper level, and not just by recognition or familiarity. These two experience-based types would probably be the most relevant ones to investigate when searching for some kind of development over time.

The more the students encounter academic texts, the more they will form an idea about what the genre looks like, and become aware of the cues that are associated with, for instance, abstract, style and structure. Abstracts usually offer some brief and introductory information about the articles, but even if they are easily available, reading and understanding abstracts require some experience. Hopefully, the more experienced students are able to "break the code"; their increased awareness would result in that elements referred to as earned credibility are attributed greater importance. It is likely that there are differences between students on different levels, or rather between students with different experiences of academic texts. If so, D-level students – the more experienced students – will consider the elements referred to as earned credibility as more significant than B-level students, who are less experienced, do when searching for scientific information.

If earned credibility works on a deeper, more latent level, the elements related to surface credibility concern a more manifest level. Experience could help the students to better understand how visual cues convey expertise and trustworthiness. However, concerning surface credibility, the information is not processed to the same extent, and it is most likely that differences between students on different essay-levels do not indicate development in the same way as suggested in earned credibility. As in most Internet surfing, surface credibility is about interpreting visual cues and making fast judgements.

The other two types of credibility, presumed and reputed credibility, are not based on first-hand experiences in the same way and, logically, their importance will diminish when the students become more aware of the cues involved in content and design. Concerning presumed credibility, the assessment is based on general assumptions or on preconceived notions, and if experienced students attach less importance to these elements this could be a sign of better insight or intuition.

The question about the applicability of Fogg's model to indicate a change or progress is complicated to deal with, because the overall assessments of credibility can derive from one or more types of credibility and we need to know more about the mental processes involved. To further test the application of Fogg's model, more elements can be added, but we should also take into consideration that, except for the essay-level, other

factors or circumstances might affect the assessment of the academic standards of texts: educational disciplines, traditions, cultures, environments, knowledge of and access to technology, *et cetera*.

The completion of university studies should imply academic – and personal – development, and it seems possible that the experiences could increase the kind of sensitivity that facilitates a broad perception of credibility.

Developing a Sense of How to Perceive Credibility

The main conclusion of this study is to accentuate that students need to develop a sense of how to assess credibility, and learn how to interpret elements or cues indicating credibility that are present in academic texts. During their education, an important goal for each student should be to improve their information skills. This means, *inter alia*, to acquire increased awareness of meta-cognitive strategies[12] as well as strategies for distinguishing and evaluating academic texts, especially – as in this study – in web-based situations. Knowledge about what meta-cognitive strategies, both generally and individually, that support the processing of information should be of use to increase the understanding of how credibility cues work.

At least in this context, it seems appropriate to regard credibility as a perceived quality – a quality that does not reside in the information *per se*. Rather, it exists as a unique experience created in the meeting between the information seeker, or user, and the text within a specific context. To complicate the situation even further, the meeting might also be affected by, for instance, the user's knowledge, experiences, personality, choices, needs, intentions, interests, strategies, convenience, *et cetera*. Then there are the factors of time, accessibility, and technology that also should be considered as part of the environment where the assessments take place.

Information skills will probably become even more essential in the future as the amount of available information continues to increase. The technological development affects the terms for academic publishing, and has transferred the responsibility from the publisher to the reader, the user of the information. This situation makes it even more necessary for the user, in this case the student, to gain knowledge about where to search for reliable texts, and what sources that are of importance to their

field or discipline. Students should be aware that source criticism is not of less importance when it comes to digital sources than with print or manuscript sources.

The study of elements of credibility focuses attention on the importance of providing students with useful tools, as well as guidance, for searching information for use in their own academic writing. In the study, element *10. Teachers' recommendations*, is the second most important element for students. The increased accessibility tends to change, or rather expand, the role of the teacher; besides being a person with a deep knowledge of his/her subject area, the teacher is expected to know how to find reliable computer-based information, and to teach the students about source criticism. Without being an expert on information and communication technology (ICT), the teacher should be able to make use of the technology in order to guide the students in their search for sources that are trustworthy. Gärdenfors (1996, 9) declares that the accessibility to digital information brings about a society where "more and more of what we know is outside our heads".

The large amount of accessible computer-based information affects the way we obtain new knowledge. But, as Gärdenfors (1996) points out, the accessibility to information does not automatically make us wiser, or even more well-informed. However, it does affect the dissemination of knowledge.

The education system must make the most of information technology, always remembering that *information* is not synonymous with *knowledge*.

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Notes

1. There are several alternative terms to describe the information we meet on the Internet or in databases that all mean more or less the same thing. Some others are electronic, digitalised/digitised, online, databased, computer-based, and web-based.
2. In some cases the words *academic* and *scientific* can be used almost synonymously, but a distinction may be found in that *academic* refers to the environment, usually a university and its traditions, whereas *scientific* has connotations of quality, method or principles.
3. These could be full text and/or reference databases.
4. Other similar concepts are *trustworthiness*, *reliability*, and *believability*. Sometimes *credibility* and *believability* can be used as synonyms.
5. In the field of rhetoric, the term *ethos* is used to describe this concept.
6. First, the interaction between humans and computers was in focus, then when the Internet emerged, the cultural view of computers as credible was challenged and instead the credibility of web sites received special attention (Fogg 2003). Fogg (2003) talks about both *computer credibility* and *web credibility*, the latter is computer credibility applied to users' experiences on the web.
7. Approximately 1,000 students were registered on essay-writing courses during this period, according to the university admissions office.
8. The participants are studying to become teachers (education).
9. The dominance of women was even more pronounced in two of the four educational disciplines: education and communication (78 per cent) and health and nursing care (87 per cent).
10. The question has been translated into English.
11. Fogg (2003) claims that most browsing on the Internet takes place on a rather superficial level which does not allow any deeper reflection on specified subjects.
12. Meta-cognitive strategies have to do with the individual's awareness and reflections on his/her own behavior and strategies (Stigmar 2002).

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